AN IRON HOARD FROM TORKSEY, LINCOLNSHIRE: IDENTIFICATION AND ANALYSIS

Dissertation for the fulfillment of M.A. Medieval Archaeology

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ABSTRACT

This research is the first in-depth analysis completed on a substantial, likely early medieval, iron hoard found in Torksey, Lincolnshire in 2002, which includes a collection of woodworking tools and, significantly, a considerable number of very large vessel fragments. The objects are individually studied and catalogued using X-radiographs and typological analysis and their identity and dating is discussed. The hoard is further considered as a group, and compared to the wider tradition of hoards, mainly of iron objects, during the early medieval period, to explore the location of the find, its nature, its deposition, and its potential to contribute to the knowledge of the development of the Torksey area. The ambiguity of the find's provenance is addressed, along with the difficulties which arise when working with collections of metal found by metal detectors over a decade ago. The significance of the hoard is also considered within the framework of the current, ongoing study focusing on the Viking winter camp and the development of the borough.

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INTRODUCTION

Since it was discovered in 2002, a substantial iron hoard found in the environs of the Viking winter camp and Torksey, Lincolnshire has yet to be thoroughly studied or analyzed and thus, its potential connection with and significance to the study of the Viking 'Great Army', Anglo-Saxons and the growth of the wider area around Torksey, has yet to be explored. In this study, I will attempt to first determine what the actual nature of this hoard is, and subsequently if, and how it adds to the current understanding of Anglo-Scandinavian or Anglo-Saxon society in Torksey, Lincolnshire.

BACKGROUND

Discovery and Acquisition of the Hoard

In early 2002 a hoard of iron objects was located by a metal detector user[1] in the 'millfield' Torksey, Lincolnshire, thought to be in the area of the Viking winter camp. The 31 iron objects are quite varied and include woodworking tools, agricultural tools, bowls, ring fittings, a tripod, and fragments of vessels of varying size. The objects were later gifted to what was then the City and County Museum in Lincoln. The Hoard is currently in possession of The Collection, the name of the current museum of culture, history and archaeology in Lincoln.

Historical Context

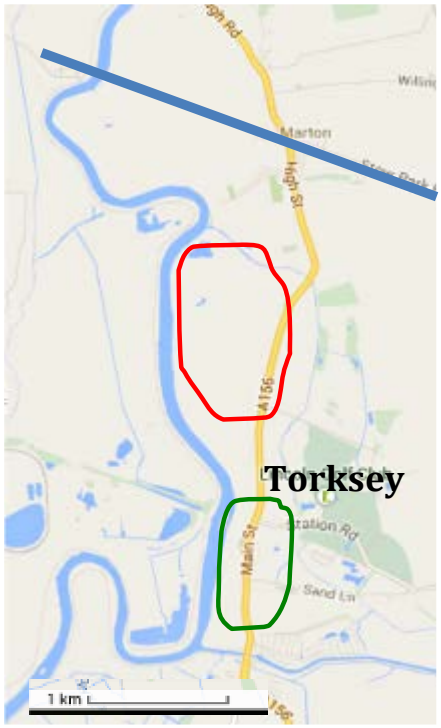
According to the *Anglo-Saxon Chronicle*, during 872-3 the so-called 'Great Army' overwintered at 'Turoc's Island', or Torksey as it is called now, beside the River Trent (Hadley and Richards 2013: 12). The modern town of Torksey lies in the county of

[1] The name is not disclosed for reasons of privacy.

Lincolnshire, about 13km north-west of Lincoln where the Fosse Dyke, a canal of possible Roman construction, meets the River Trent (Map 1). The site of the winter

Map 1: Torksey is 13km North-West of Lincoln.
Image from google maps.

camp is to the north of the modern town and covers six fields between the modern towns of Torksey, to the south and Marton, to the north. The site sits on both Roman and medieval communication routes. For example, this was on the path from the south to York in the north (Hadley and Richards 2013: 17). Following the departure of the army, during the next two centuries, the area to the south of the winter camp developed into a center of urban production (Hadley and Richards 2013, *forthcoming*)(Map 2).



Map 2: Winter Camp (red) and Borough (green) Roman road (blue)
Image from google maps.

The Great Army

The 'Great Army' or the '*micel here'* as it called in the *Anglo-Saxon Chronicle*, was part of the second wave of Scandinavian raids on the British Isles, which started in 865. Scandinavians began overwintering in England around 850, but it wasn't until the Great Army arrived that the attacks took on a more organized and strategic military nature, more focused on wresting control of territory from the current rulers for permanent settlement, than on looting (Graham-Campbell 1980: 29; Graham-Campbell 1994: 125; Downham 2008: 342). The army was also much larger than earlier raiding parties as the name 'Great Army' suggests (Hadley 2000: 111), and there is evidence that they formed strategic alliances, for example with the East Angles, and even perhaps Wessex, in their attacks against other regions (Hadley 2000: 111; Graham-Campbell 1994: 127). In addition there is evidence from three winter camp sites, Repton, Torksey, and (the Riverside site), of craft production and trade (Hadley and Richards *forthcoming*). From all of this, it is clear that the Great Army was prepared for settlement. Furthermore, overall it is clear that the Scandinavians and the Anglo-Saxons were interacting and intermingling during the Viking Age.

Torksey and the Surrounding Area

Torksey sits within the Lindsey region of Lincolnshire and passed under various ruling powers, both Saxon and Scandinavian, during the 9th-11th centuries. After the great army arrived in 865, the Scandinavians went on to conquer Northumbria, East Anglia and finally the Mercian kingdom, including Torksey, by 873. In 874 half of the army settled in Northumbria and by 877, after failing to conquer Wessex, the remaining half of the army settled in the eastern half of Mercia (Downham 2008: 342; Leahy and Paterson 2001; 181; Graham-Campbell 1994:130). . Torksey, and Lincolnshire as a whole, are

within this region, and therefore were likely settled by the Scandinavians at this point (Leahy and Paterson 2001: 182; Hadley 2000: 112; Graham-Campbell 1994: 130).

Lincolnshire then became part of the territory called the 'The Five Boroughs' within the larger area known as the 'Danelaw'. However, both of these terms are relatively ambiguous. The Danelaw has traditionally been defined by the boundaries mentioned in the treaty of 878 between King Alfred of Wessex and Guthrum, the leader of the Scandinavians in East Anglia, which specified the area of the northeastern part of England (Hadley 2008: 376; Leahy and Paterson 2001: 182). The political structure and administration of the Danelaw is unclear, as is the social structure (Graham-Campbell 1994: 133-4) and there is both place name and documentary evidence that the borders were fluid. The Five Boroughs is a term that first appears in the *Anglo-Saxon Chronicle* from 942, though we do not know when it was first used. The area encompasses the boroughs of Derby, Leicester, Lincoln, Nottingham, and Stamford. While we do not know the exact nature of the administration of the Five Boroughs we do know from the Wantage law-code in 997 and another entry in the *Anglo-Saxon Chronicle* from 1013 that the group did have some form of legal and administrative organization (Hadley 2001: 113: Leahy and Paterson 2001: 182). Furthermore, it is unclear whether this administration was Scandinavian or West-Saxon in nature (Hadley 2000: 113). Despite the fact that the West-Saxons had taken control of the Danelaw by 920 and the North by 927, Leahy and Paterson argue that there are suggestions that the region of the Five Boroughs maintained a Scandinavian identity, at least to some degree, including the Scandinavian terminology used in the 'Wantage Law code' and the division of land which was based on a Scandinavian system (Leahy and Paterson 2001: 182).

Overall, it remains unclear where and to what extent the Scandinavians actually settled in England, and how they interacted with the existing population. In Lincolnshire

specifically, only the portion of the Great Army which moved south in 874 settled in the region, and we don't know how many settled in each particular area. Therefore, despite the fact that Torksey was the site of a winter camp, it does not necessarily mean that Scandinavians returned to that site to settle. Furthermore, it is not necessarily known to what extent the Scandinavians intermingled or integrated with the existing Anglo-Saxon population (Hadley 2006). Hadley and Paterson pointed out, however, that metalwork from this period in Lincolnshire is more commonly Anglo-Scandinavian in style than strictly or definitively Scandinavian in style (Leahy and Patterson 2001: 191-202; Hadley 2008: 377).

Torksey the Urban Settlement

During the time of the Five Boroughs, starting at the end of the 9th-beginning of the 10th century, the urban area of Torksey developed and grew to be a center of industry and production. Along with other settlements in the Five Boroughs, including Thetford and Norwich, Torksey became a center of pottery production, which utilized manufacturing techniques that had not been used in England since the Roman period and were likely continentally influenced, namely the use of the fast wheel (Hadley 2008: 377; Hadley and Richards *forthcoming*). Some have suggested that Torksey was one of the 'Seven Boroughs' mentioned in the *Anglo-Saxon Chronicle* in 1015, though there is no concrete evidence for this (Hadley and Richards forthcoming*;* Hadley 2006: 159-60). By 1066, according to the Domesday book, Torksey had 213 burgesses, though the number had shrunk by 1086 (Hadley and Richards forthcoming), and by the 12th century, it had at least three churches, two monasteries, a mint, and at least four Anglo-Saxon or medieval cemeteries (Hadley and Richards forthcoming: 2).

Gareth Williams, has discussed the influence of winter camp sites on urban development in the 9th and 10th centuries. He notes that the evidence for trade and manufacture, defensive positions and structures, and the dense and large population present in the winter camps, could potentially classify them as urban towns, or at least the equivalent (Williams 2013: 20). Furthermore, the sizes of the so far excavated winter camp sites and their control of the hinterlands is similar to those of the emerging towns in the 9th and 10th centuries (Williams 2013:17). Perhaps, therefore, at Torksey, where there is no clear evidence of substantial settlement before the end of the ninth century, the presence of the Great Army contributed to the urban development of the area.

Current Ongoing Research at Torksey

Currently, an ongoing project at the Universities of Sheffield and York, led by Dawn Hadley and Julian Richards, is studying the Viking and Anglo-Scandinavian activity and impact during the Viking Age and the Medieval period at the winter camp and the later Borough. This includes studying the interaction between the Viking armies and the Anglo-Saxons who were already present in the area, and how it may have impacted or influenced the development of the town (Hadley and Richards forthcoming: 2-3). The study includes various forms of survey and analysis such as cataloguing and coordinating current evidence and finds, geomorphological and geophysical surveys, controlled field walking and metal detecting with all new finds being plotted, a study of pottery and the pottery industry, and the study of the Late Saxon burials (Hadley and Richards *forthcoming)*.

The winter camp site covers six fields north of the modern town of Torksey and was indentified by Mark Blackburn the early 2000s after cataloguing over 1,500 metal-detected finds from the fields (Hadley and Richards 2013: 13). Currently the camp is

thought to cover approximately 55ha and several thousand metal pieces have been found including coins, hack silver, lead weights, and many other examples of early medieval metalwork (Hadley and Richards *forthcoming*: 4, 14). The fields continue to be ploughed and new finds continue to rise to the surface. Around 75% of the objects found are of early medieval date and the study of the coins shows that they were mainly from the 860 and early 870s, which point to a single year of occupation that corresponds with the year the Great Army was camped at Torksey (Hadley and Richards *forthcoming*).

While so far very little iron has been found, the majority of the finds are copper alloy or lead, (40% each). Silver makes up about 20% of the total and there is very little gold. The low percentage of iron found is likely due to the fact that it is not favorable to metal-detector users (Handley and Richards *forthcoming*: 5). Iron objects can also be hard to distinguish due to corrosion, thus not immediately identifiable as medieval objects.

Among the metal objects which *have* been found at the winter camp site, are around 50 pieces of hack silver, 20 silver ingots, 11 pieces of hack gold, approximately 140 copper-alloy and lead weights, and over a hundred halved dhirams (Arabic coins). All of these objects point to the existence of a bullion economy. Similar weights have also been found at the Riverine winter camp site near York (Hadley and Richards forthcoming: 6-7).

Evidence for craft and manufacturing has also been found at the site including metal working and weaving. There are silver test strips, a fragment of a *Pressblech* die which was used to make impressions in gold, which all indicate various types of metalworking. Similar finds have also been found at the Riverine site (Hadley and Richards forthcoming: 7-8). The hack metal may also have been used for manufacture in

addition to trade. Spindle whorls, needles, and punches imply some level of textile working taking place. There are also over 100 Anglo-Saxon copper-alloy dress accessories, which may have been scrap metal, but they may also indicate some interaction between the Great Army and the Anglo-Saxons or perhaps the presence of some Anglo-Saxons at the winter camp site (Hadley and Richards *forthcoming*: 8). All together, this evidence makes it fairly clear that there was a variety of craft production and trading occurring at the winter camp.

So far, no significant archaeological features from the time of the winter camp have been found by the magnetic gradiometer and geomorphological surveys. Notably, there was no evidence of a defensive ditch or structures similar to those found at Repton and Woodstown (Hadley and Richards *forthcoming*: 10-11; Biddle and Kjølbye-Biddle 1992: 40, 2001: 56-60). However, the survey did reveal that water levels during the 9th century were 1-2 meters higher than they are now and that the site of the winter camp is on an area of naturally high ground which would have the River Trent to the west and marshy wetland to the north and east. Therefore the lack of visible defensive structures may be due to the natural defenses of the site. Furthermore, the survey showed that the site is covered by a considerable layer of windblown sand that may be obscuring archaeological features (Hadley and Richards *forthcoming*: 11, 13).

Since the 1960s, excavations on around 14 kilns in the Torksey area seem to support the theory that the pottery production industry did not begin before the late ninth century and that it continued until around 1100 (Hadley and Richards *forthcoming*: 16). Very little pottery for domestic use was found providing little insight into life at the settlement and the absence of Torksey ware pottery at the winter camp site confirms that the industry existed after the Scandinavians were there (Hadley and Richards forthcoming: 17). Analysis of the clay fabric revealed that the clay was from about 1k

away which "suggests that the motivating factor in the location of the kilns was not immediate access to the clay for pottery production but, rather, access to the waterways along which the fired pottery would be transported for sale " (Hadley and Richards *forthcoming:* 18).

Burials from the late Anglo-Saxon and medieval periods revealed that there were more cemeteries than there were parish churches in the town. As Hadley and Richards point out, this could mean that there were more parish churches that weren't recorded or didn't survive, or that there were cemeteries unaffiliated with churches (Hadley and Richards forthcoming: 20).

THE HOARD

Acquisition and Initial Analysis

When the Torksey hoard was brought to the museum in 2002, the objects were provisionally identified but no in-depth research or study has been done before now. The hoard was found by a metal-detector user and was brought directly to the museum rather than through the Portable Antiquities Scheme which was not fully up and running until the following year (Portable Antiquities Scheme). According to the museum report, the objects were "found together, [with a] hard ashy deposit found at base", and therefore has been labeled a "hoard" (The Collection).

As per standard procedure, the objects were photographed and X-radiographs[2] were taken when they were brought in. At that point, these objects had only some surface corrosion. However, upon removal from the ground objects become exposed to new conditions which may alter the rate of corrosion (Rimmer et al 2013: 4). Iron corrosion in

[2] X-radiographs and photographs taken in 2002 by the Conservation Department at the City and County Museum Lincoln.

particular can often be much larger than the original object and can obscure the original form, shape and features of the object (Watkinson and Neal 2001: 34). X-radiographs are a non-destructive, non-intrusive method of seeing through the corrosion, and according to EH should be a required procedure (Fell et al 2006: 3; Rimmer et all 2013: 8; Watson et al 2008: 9-10). X-radiographs have the potential to reveal not only shape and form, but also any forms of decoration like inlay of other metals, and hints to manufacturing processes, such as pattern welding on blades or whether an object is made of a single or of multiple sheets of metal (Watkinson and Neal 2001: 5; Fell et al 2006: 7-8; Watson et al 2013: 8; Capel 2006: 23). X-radiographs are also a visual and long term record of objects which may further decay over time (Fell et al 2006: 3). Thickness, atomic mass, shape, and other factors can affect the results of X-radiographs. Therefore it is important to take several x-rays of the same object using varying exposures and energy levels to get the most information (Fell et al 2006: 11; Watkinson and Neal 2001: 5). Most objects in the hoard were X-rayed at two exposures and there were initial tests done to determine the most effective exposure and energy level.

After they were photographed and X-rayed the objects were minimally conserved and were on display for a limited time before being put into long term storage. They were not weighed. The corrosion was not cleaned and the only action which was taken was the securing of some of the fragile fragments with glass fibre mat which was applied with Paraloid B72 acrylic resin[3] (Johns, *pers. comm.*). There are many factors which contribute to corrosion of iron, the most significant being the salts from the burial environment and humidity (Watkinson and Neal 2001: 7; Watson et al 2013: 4, 9). Ideally, iron should be kept in conditions with a relative humidity below 15%, a condition very difficult to maintain especially in exhibits and while transitioning materials from storage (Johns,

[3] These appear as grayish green strips in the first set of photographs.

pers. comm.). Therefore when the objects in the hoard were placed in their long-term storage containers, the materials used were acid free and humidity controlled. Silica gel was used to control the humidity levels in the containers and the objects were kept in a below 50% relative humidity environment (Watson et al 2013: 9, 10, 18; Watkinson and Neal 2001: 16, 21; Johns, *pers. comm.*). Since many factors can contribute to further corrosion of iron, different objects can be stable in a variety of environments and "a significant proportion of objects do not suffer from active corrosion in normal museum conditions" (Watson et al 2013: 10). With regard to the Torksey hoard, all of the standard preventative procedures were instituted to control further corrosion, yet the objects did continue to corrode. Currently, the majority of the objects have either large cracks or parts of the surface flaking off the metal cores. "These corrosion layers are often the most important part of the object, as they contain the original surface, and so disruption is very damaging" (Watson et al 2013: 6). These flakes can be re-secured to the objects during further conservation so that the original surface remains (Johns, *pers. comm.*). As a result, however, it would damage the conservation of the objects if they were to be removed from their containers in their current state, the only exception being the tripod (TIH30). What this means for the second set of photographs taken in July 2014[4] and for my analysis of the physical objects, is that only the visible surfaces of the objects could be seen and studied. Stabilization and conservation of the objects to the point that they could be removed from their containers would not have been possible within the time frame of this project (Johns, *pers. comm.*). However, this should be considered for the hoard in the future.

[4] Photographed by Shruti Dutta for the author.

Catalogue

The object catalogue is organized into separate categories: woodworking tools, blade, agricultural tools, vessels and vessel fragments, tripod, ring fittings, and miscellaneous/unidentified. Each object will receive a brief description and a larger discussion of typological analysis will be given for each category.

The identification numbers for the objects in the hoard have been changed from their original Lincolnshire Museum reference numbers for the convenience of this project. They are labeled Torksey Iron Hoard 01-31. The original numbers are listed in Appendix 1.

Table 1: Torksey iron hoard by category

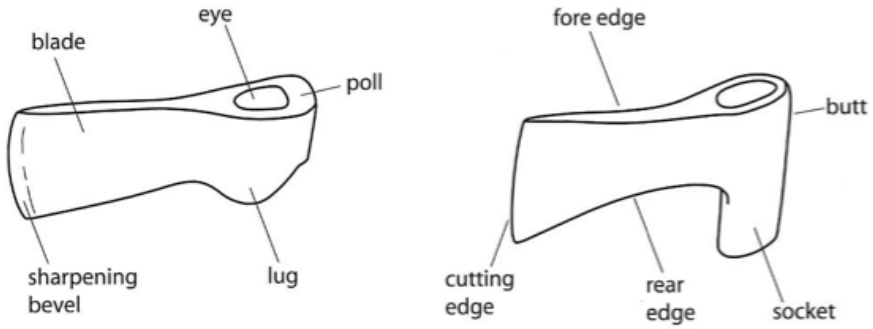
Object No.	Name	Category
TIH01	Axe	Woodworking Tools
TIH02	Axe	Woodworking Tools
TIH03	T-Shaped Axe	Woodworking Tools
TIH04	T-Shaped Axe Hammer	Woodworking Tools
TIHO5	Partial Possible T-Shaped Axe	Woodworking Tools
TIH06	Axe Socket	Woodworking Tools
TIH07	Adze	Woodworking Tools
TIH08	Blade	Blade
TIH09	Coulter	Agricultural Tools
TIH10	Plough Share	Agricultural Tools
TIH11	Ring Fitting	Rings
TIH12	Ring Fitting	Rings
TIH13	Ring	Rings
TIH14	Bowl	Vessels and Vessel Fragments
TIH15	Half Bowl	Vessels and Vessel Fragments
TIH16	Bowl Base	Vessels and Vessel Fragments
TIH17	Small fragment- Associated with TIH18	Miscellaneous
TIH18	Small fragment- Associated with TIH17	Miscellaneous
TIH19	Small fragment	Miscellaneous
TIH20	Medium Sized Fragment	Vessels and Vessel Fragments

TIH21	Medium Sized Bowl Rim Fragment	Vessels and Vessel Fragments
TIH22	Medium Sized Fragment	Vessels and Vessel Fragments
TIH23	Medium Sized Curved Bowl Body Fragment- Possibly Associated with TIH24	Vessels and Vessel Fragments
TIH24	Medium Sized Curved Bowl Rim Fragment – Possibly Associated with TIH23	Vessels and Vessel Fragments
TIH25	Large Fragment of Cauldron Rim	Vessels and Vessel Fragments
TIH26	Large Curved Cauldron Body Fragment	Vessels and Vessel Fragments
TIH27	Large Curved Cauldron Body Fragment	Vessels and Vessel Fragments
TIH28	Large Curved Cauldron Body and Base Fragment	Vessels and Vessel Fragments
TIH29	Large Cauldron Body Fragment	Vessels and Vessel Fragments
TIH30	Tripod	Tripod
TIH31	Iron Rod with Ring	Miscellaneous

Woodworking Tools

The terms indicated in Fig.1 are the terms that will be used to describe the axes in the upcoming discussion. In T-shaped axes, there is also the neck between the socket and the blade, which is not shown in this diagram.

Fig. 1: Axe terminology reference image. From Goodall, 2012: 23.



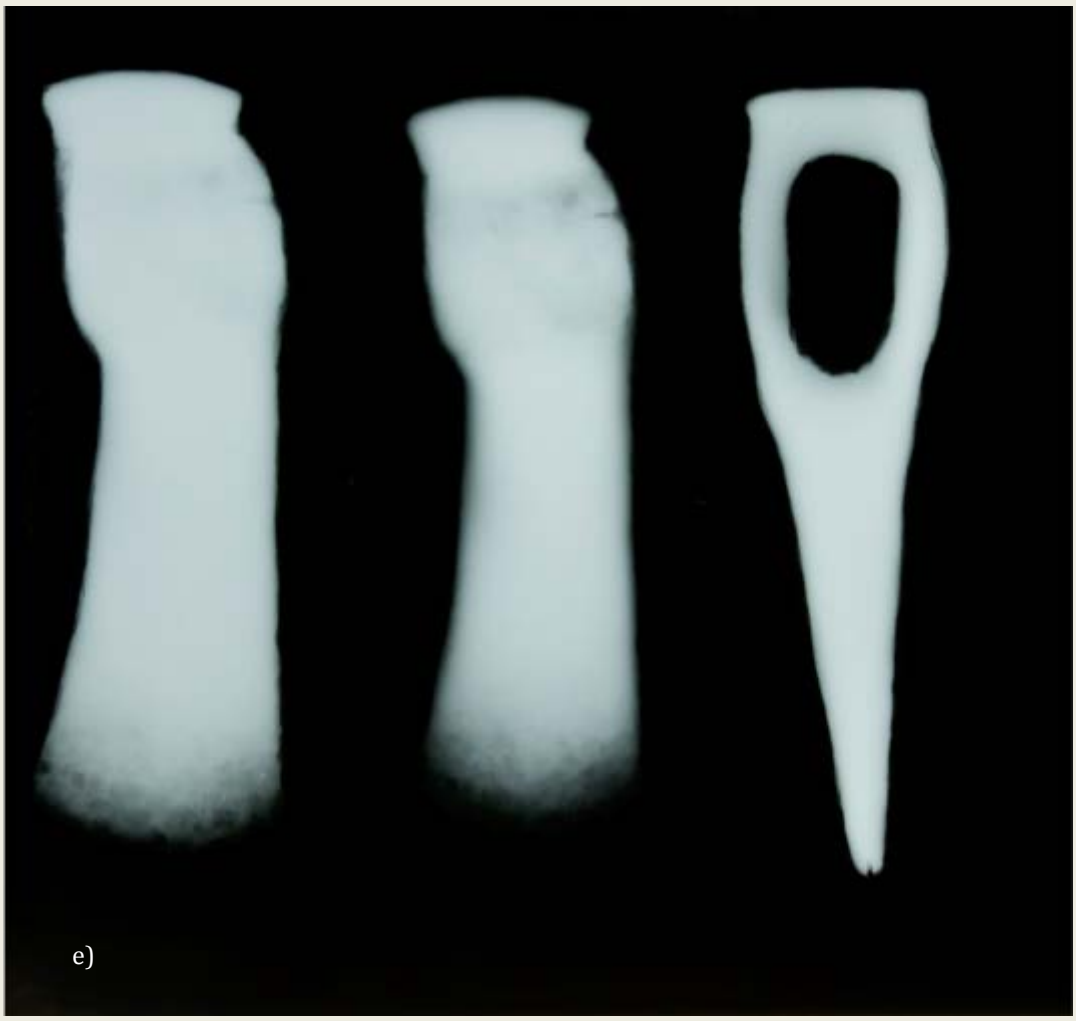
TIH01 (Fig.2)

This axe is asymmetrical in cross section, the blade extending straight from one side of the socket while slanting from the other side to make the blade. There is very slight lug on the bottom of the socket. The blade widens towards the cutting edge and the fore edge remains straight while the rear edge flares outward. There is a defined poll and the butt is flat and possibly either used as a hammer or was hammered. The eye of the socket is oval but it could not be accurately measured because the eye is not visible while the axe is in its container.

A small slit visible in the profile view of the cutting edge in the X-radiographs, may indicate the presence of one iron alloy being sandwiched by another, which is one method of attaching a steel edge to an iron tool. It also may be an indication that the axe was manufactured using a single piece of iron folded in half to form the eye of the socket then joining together to make the blade, though there is no other clear evidence of this type of manufacture so far revealed. Further evidence supporting that there was a steel edge are lines running parallel to the cutting edge which likely indicate either different iron alloys or different layers of metal. Perhaps the seam is where the iron ends and meets the steel. There is also a small crack visible on the top of the socket, but it may not have affected the utility of the axe. However, it does seem that the tool was not new when deposited.

Overall length	17.4cm
Width of socket base	4.3cm
Width of widest part of socket	5.4cm
Blade edge width	6 cm

Fig. 2: TIH01. Photos from 2002: a, b. Photos from 2014: c, d. X-radiographs: e.



TIH02 (Fig.3)

This axe is also asymmetrical in cross section. There are lugs on the top and bottom of the socket and the eye is rectangular. In profile the blade widens towards the cutting edge. The fore edge is straight and the rear edge flares outwards towards the cutting edge. There are two distinct cracks in the socket visible in the X-radiographs. One is on the side of the socket continuing about half way through. The other is a more substantial crack where the socket meets the blade. It is likely that currently, the socket at this crack is only being held together by corrosion product. The placement of this crack or break may indicate a point of weakness in the manufacture and that the axe was made by the end of a piece of iron being folded over to form the eye of the socket and welded at the edge of the socket and blade. There are similar lines running parallel to the cutting edge as in TIH01, which may indicate a steel edge. The cracks do seem to suggest that the tool was used before it was discarded.

Overall length	14cm
Blade edge	4.1cm
Socket end width	4.3cm
Widest part of the socket	4.7cm
Width where the blade meets the socket	2.7cm

TIH03 (Fig. 4)

This is a T-shaped axe. It is unclear if it is asymmetrical in cross section or not because the X-radiographs could not capture the angle and the object cannot be removed from its container to observe first hand. The axe is symmetrical in profile but the width of the blade is different on the portion above the socket and the portion below the socket. The blade is gently curved along the cutting edge and is triangular in section. Faint lines run along the cutting edge which may indicate the presence of a steel edge. The neck is very short and is wider than it is thick. A crack is visible in the butt of the socket in the X-

radiographs, though it is not visible as to how far along the socket it runs. It therefore may not necessarily have harmed the utility of the axe.

Overall length	13.5cm
Length of blade edge	20.2cm
Blade width	3.2-6cm
Socket width	6.8cm
Width of neck	3.4cm

TIH04 (Fig. 5)

This is likely the remains of a T-shaped axe hammer. It is symmetrical in cross section. There are lugs both above and below the socket which appear circular in profile. The eye of the socket is oval in shape and there is a small notch where it meets the blade. This may indicate that the socket was formed by a single piece iron being folded in half. The sides of the socket itself are very thin. The poll is very large and was most probably used as a hammer. The butt appears flat on the X-radiographs. The vast majority of the blade is missing, but the small portion of the edges near the neck that do remain, seem to flare outwards parallel to the socket and perpendicular to the neck, similar to the other T-shaped axe in the hoard (TIH03). In addition, the neck is rectangular near the socket and flattens out as it reaches the blade which is also similar.

Overall length	12.5cm
Widest part of socket width	5.2cm
Base of socket width	2.8cm
Width where neck meets blade	2.2cm
Socket depth	c. 3cm

Fig. 3: TIH02. 2002 Photographs: a, b. 2014 Photographs: c, d. X-radiograph: e.

Fig.4: TIH03.
2002 Photographs: a, b.
2014 Photograph: c
X-radiograph: d

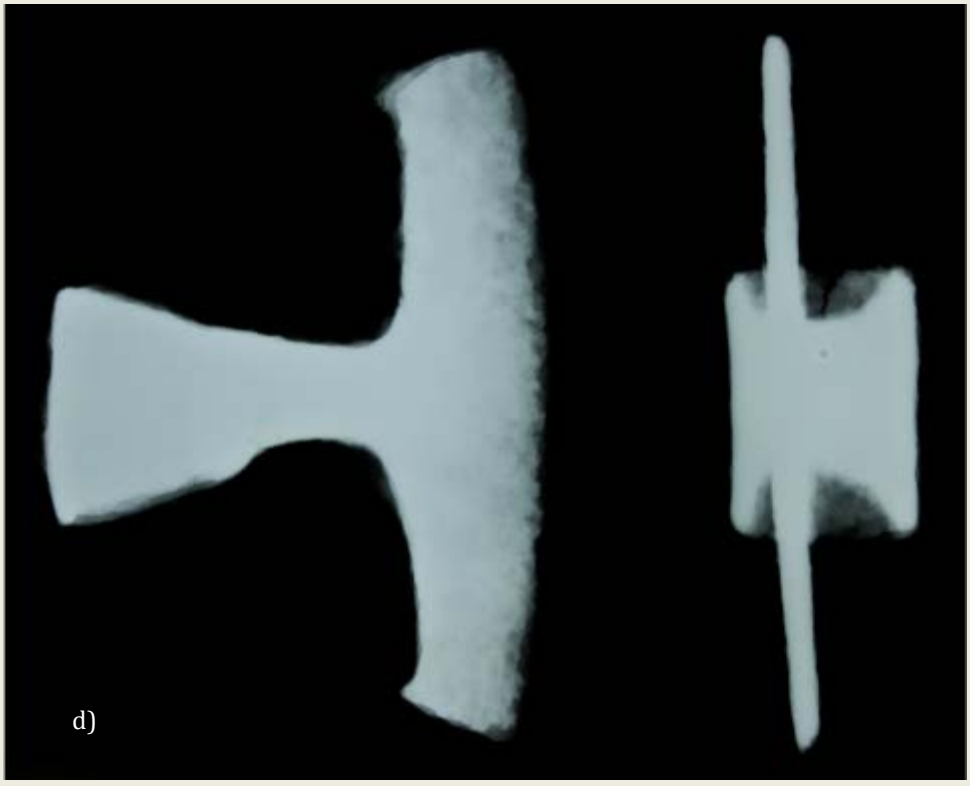
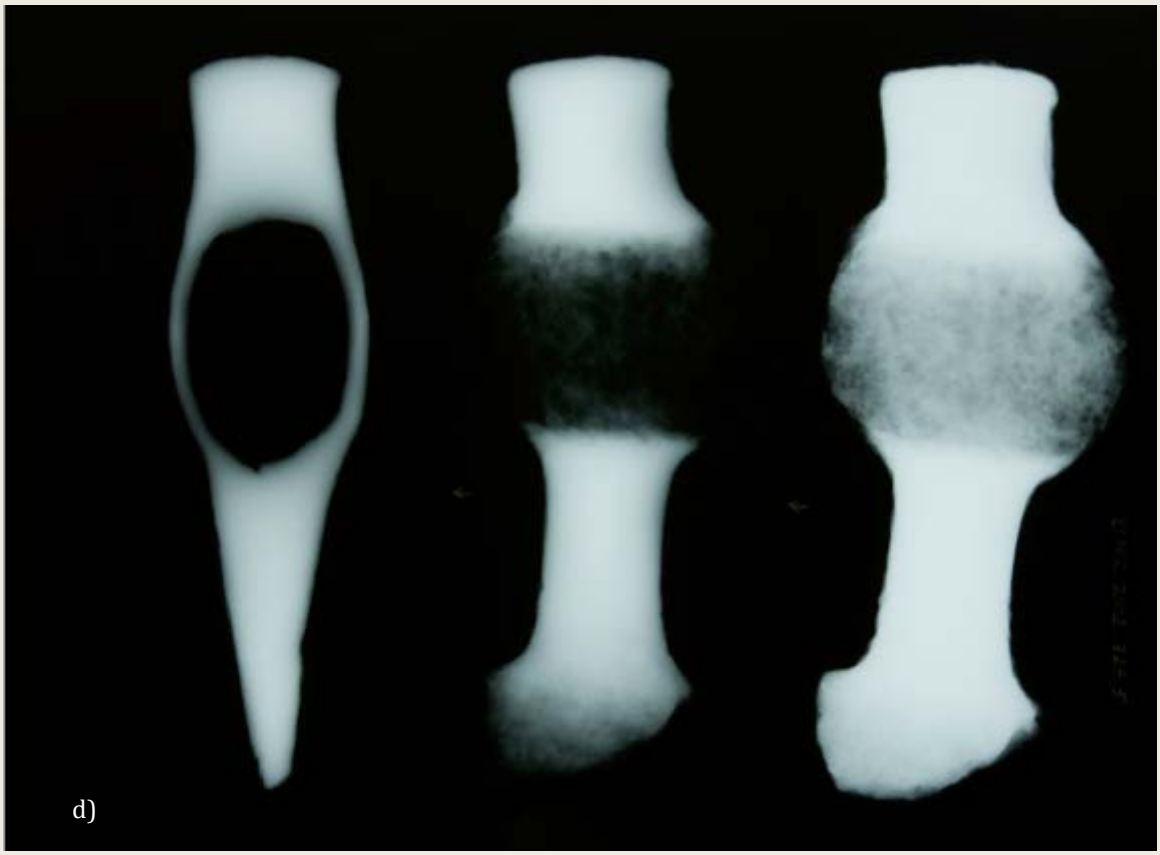


Fig.5: TIH04.
2002 Photographs: a, b.
2014 Phtotographs: c.
X-radiographs: d.



TIH05 (Fig.6)

This partial axe is asymmetrical in section. In profile the neck is bent slightly to one side. There is no distinct poll, and though the butt seems flat, it was not likely used as a hammer. The socket eye is rectangular with a pinched end near the center on the side near the neck. This may indicate a single piece of iron folded in half to form the socket. This method of manufacture is made more probable by the notch in the broken end of the neck, visible in the X-radiograph. It appears as if the left and right sides of the neck broke unevenly which may indicate a point of welding or of weakness within the neck. The remaining portion of the neck itself is rectangular but flattens towards the broken edge. In profile it also slightly flares outward at the broken edge perhaps indicating that this too was a T-shaped axe originally.

Overall length	9.5cm
Width of socket	4.5cm
Width of neck where it meets the socket	2.8cm
Width of neck at the end	2 cm
Thickness of neck	1.8cm

TIH06 (Fig.7)

This is the socket of what was most likely an axe. It is not clear whether the overall object was symmetrical or not. The eye of the socket is a rounded rectangular shape. However, where it meets the neck, there is a triangular indentation which continues to a crack through the neck, which is visible on the X-radiograph. Though the crack runs all the way through the remaining piece of neck, the actual object appears to be solid because the corrosion product has filled the gap. The two sides of the neck on either side of the crack appear to be even which may indicate that the socket was formed by a single piece of iron being folded in half. The very small amount of remaining neck seems to be relatively

square which is similar to the T-shaped axes (TIH03, TIH04), and therefore this may too be a fragment of a T-shaped ax.

Overall length	6.3cm
Width at socket base	3.9cm
Width at blade/neck end	2.2cm
Depth of socket	c.4cm

TIH07 (Fig.8)

This adze seems to remain undamaged. The socket itself is D-shaped and bulges below the blade. The eye is pear-shaped and there is a clear indication of the joint or seam where the two sides of the socket were welded together. There is a faint triangular shape which may be where the end of the iron bar was folded over and welded to form the socket part way down the blade on the left of the seam which can be seen on the X-radiograph. Indeed, on the more recent overhead photo a faint line can be seen slanting away from the socket and veering towards one side which may be the same line. The socket itself bulges out slightly to one side when the adze is viewed from overhead. This would make the adze uneven and also unbalanced. The blade curves gently from the top of the socket. It widens towards the cutting edge. There are two faint lines in even increments away from the cutting edge which may indicate the presence of a steel edge.

Overall length	18.4cm
Width at socket end	2.6cm
Width of blade edge	5.4cm
Blade width at socket	2.6cm
Socket depth	2.4cm
Depth of blade at socket	1cm

Fig.6: TIH05.
2002 Photographs: a, b.
2014 Photographs: c, d.
X-radiographs: e.

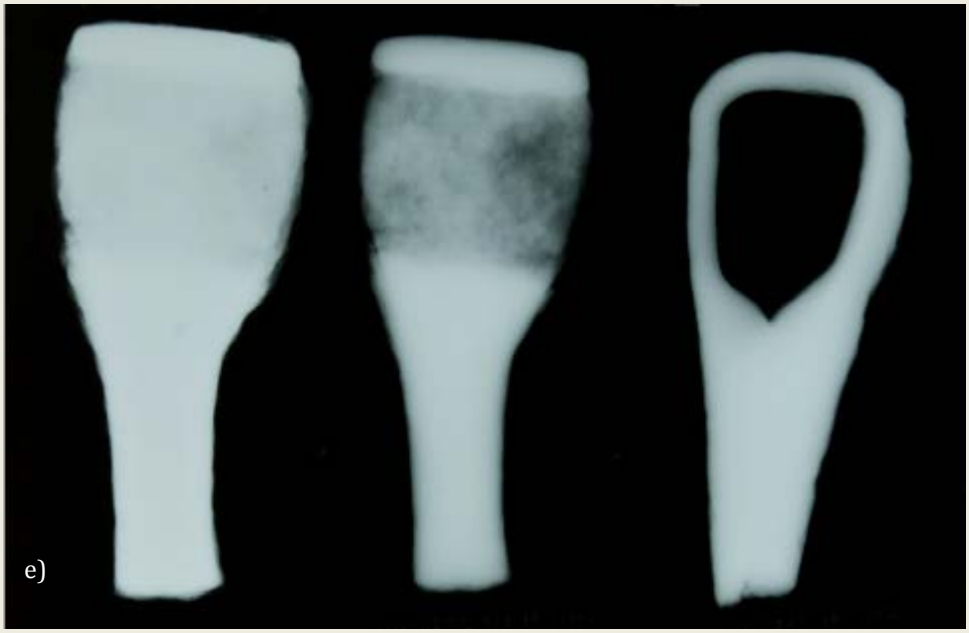


Fig.7: TIH06. 2002 Photographs: a, b. 2014 Photographs: c, d. X-radiographs: e.

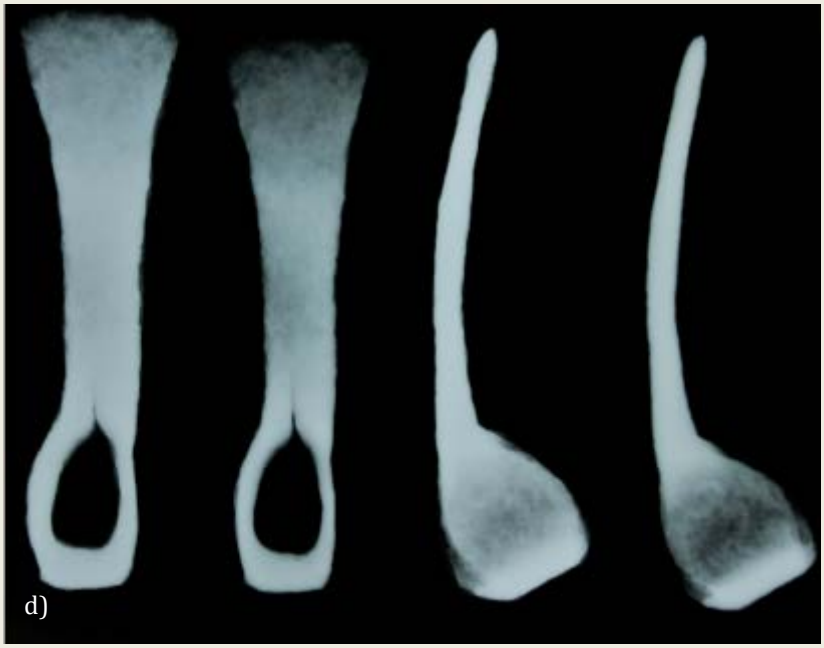


Fig.8: TIH07.
2002 Photographs: a, b.
2014 Photograph: c.
X-radiograph: d.

DISCUSSION

The axes in the Torksey hoard are relatively small and were most probably woodworking tools. Axes were one of the primary tools of the carpenter and were used for a variety of tasks including felling, chopping and shaping. These tools are likely from the early medieval period since by the later period axes had reached an even greater degree of specialization (Walker 1985: 355).

A notable observation about this collection of axes is the lack of the pointed lugs on either side of the socket which are nearly ubiquitous in Scandinavian axes, both weapon axes and tool axes and both in Scandinavian and British contexts in Viking Age. These lugs are also usually paired with a flared blade and cutting edge which is also not present in these axes. Examples from England include various axes found in the River Thames, axes from Ely, Cambridgeshire, Dunrobin Castle, Sutherland (Grieg 1940: 17), and significantly both axes found at the winter camp site at Repton in 1923 (Bjørn and Shetelig 1940: 14; Biddle and Kjølbye-Biddle 1992: 39, 2001: 56-70). Numerous axes with pointed lugs were found in graves in Scotland including those from Kiloran Bay, Colonsay, Ballinaby, Islay, Reay, Caithness, Loch of Doon, among others (Grieg 1940: Graham-Campbell and Batey 1998: 123; Ritchie 1993: 80, 88). They were also found in Ireland, at Kilmainham and the River Boyne (Bøe 1940: 32,88). Examples from Scandinavia come from sites including Birka and Asa, Skedsmo, Akershus, Norway (Arbman 1943: 14; Williams 2014: 111). Furthermore, the vast majority of axes referred to by Petersen in his typology of Viking Age weaponry had the pointed lugs (Petersen 1919: 36-47).

So far most of these examples have been from grave contexts and are therefore likely weapon axes as opposed to tool axes, and so it could be argued that tools would not

necessarily have the same pointed lugs. However, the woodworking axes from the Mästermyr tool chest from Sweden have pointed lugs below the socket (Arwidsson and Berg 1999). None of the woodworking tools in the Torksey hoard have pointed lugs, and therefore it seems likely that these tools were not brought from Scandinavian by the Great Army or manufactured by them. However, this does not invalidate the possibility that these tools were used by the Great Army.

The axes from this hoard are most similar to the tools from Flixborough, the axe from Scraptoft, the adze from Skerne, and axe fragments from York. These are all Anglo-Saxon or Anglo-Scandinavian contexts.

TIH01 and TIH02 are both asymmetrical in cross section which is typical of shaping axes. In contrast, felling axes more often have a symmetrical thick blade in cross section and are large and heavy (Morris 2000:2105). TIH01 is very similar in shape to axe 2452 from the Flixborough tool hoard (Ottaway 2009a: 256, 260). 2452 has slightly more rounded lugs but they both are asymmetrical in cross section, have rounded lugs, defined poll with a flattened butt and a similar blade shape. TIH01 is also similar to two other axes, one from York (11th century) the other from Weoley Castle, Birmingham (1270-1600), however, though they have the rounded lugs and the defined poll, they both have symmetrical blades in profile and cross section (Goodall 2012: 28-9). TIH02 most closely resembles another axe from Flixborough, 2423, since the socket shape is relatively similar (Ottaway 2009b: 253-4). 2423 however, has a symmetrical blade.

The four T-shaped axes in this hoard (TIH03, TIH04, TIH05, and TIH06) were likely used in a similar manner to the two previous axes, for shaping wood. T-shaped axes have not been found in contexts dated reliably before the 9th century or after the 14th (Ottaway 2009: 257h; Leahy 2013: 229; Goodall 2012: 22). They are depicted on the

Bayeux Tapestry from the 11th century, being used to build a ship and in the Caedmon Manuscript being used by Abraham to construct an altar (Stenton 1957: pl. 38; Ottaway 2009a: 257).

TIH03 is most similar to the T-shaped axes 2456 and 2454 from the Flixborough tool hoard. 2456 in particular has a short neck like TIH03 and similar blade shape. As for the axe hammer TIH04, the T-shaped axe found at Scraptoft is extremely similar in shape and in features. It has rounded lugs on both sides of the socket, a short neck and a very defined poll which was likely used as a hammer, which is the same as TIH04 (Leahy 2013: 228-9). A T-shaped axe from Winchester also has rounded lugs however, the neck is extremely narrow and both the blade and the lugs are larger than those of TIH04 (at least as we can tell from the small amount of blade remaining) (Goodall 1990c: 273-4). The slightly bent neck of TIH05 strongly resembles the T-shaped axe 2455 from the Flixborough tool hoard. In both cases the neck bends slightly downwards from the socket. In addition the socket shape is similar (Ottaway 2009a: 257, 262). Lastly, the small socket TIH06 is similar to the four T-shaped axes from the Flixborough hoard, but it most resembles the small socket fragment 2256, from 16-22 Coppergate, York (Ottaway 1992: 528). From what remains of the socket and the eye, 2256 seems to have a similar shape and size to TIH06, especially the small amount of neck which remains. T-shaped axes have also been found in Hurbuck, Durham (Goodall 1981: 52-3; Wilson 1976: 256-7; Hodges 1905: 213-5), Crayke, Yorkshire (Shepprd 1939: 278-9), and Stidriggs, Dumfries (Leahy 2013) among others, however the shapes of these axes varied too much from those of the axes in the Torksey hoard.

Adzes like TIH07 were used alongside axes to shape and clean timbers. Again, most similar in comparison to this adze is adze 2458 from the Flixborough hoard (Ottaway 2009a: 257, 264). However, while the sockets are similar in shape and size, the

blade of TIH07 is longer and narrower than that of 2458. The blade of the adze from Skerne is more similar, but the socket is extremely different (Dent 2000: 231). There are other adzes from Thetford (Rogerson and Dallas 1984: 77-8) and Goltho, Lincolnshire (Goodall 1981: 52-3: Goodall 2012: 32-3), but the shapes of the blades and sockets vary greatly from TIH07. Furthermore, the adze from the Scandinavian grave in Ballinaby, Islay, Scotland is much smaller than TIH07 (Graham-Campbell and Batey 1998: 123; Ritchie 1993: 88).

Blade

TIH08 (Fig.9)

This blade is a flat, double-edged and slightly curved or bent near the non-point end and symmetrical when viewed from over head. It gently tapers to the point. It is not complete, but rather seems to have been severed from another portion of the original object. The non-point end seems to be a straight cut across the blade, but as is visible in the X-ray of the profile it has a slanted and somewhat jagged cut across the thickness of the blade where it was likely severed. The X-radiograph revealed a series of lines on both sides of the blade, (though the bottom lines are more clear), running from approximately midway down the blade to the point parallel with the cutting edges which likely indicates that there is some type of added steel edge to the blade. Furthermore, there is a more defined point visible. There also seem to be a particular wear pattern around the non-point end of the blade as if that was bound or treated differently than the rest of the blade, or it could be from the time it was broken. There was no decoration revealed.

Overall length	27.7cm
Maximum width	6cm

DISCUSSION

This is a curious object as it is very large and the shape is not quite similar to the blades of knives or of spears. Furthermore, there is no remaining tang to suggest that it was a type of knife. The Scandinavian spears categorized by Petersen in 1919 all have raised ridges down the center of both faces creating a diamond shaped cross section of the blade (Petersen 1919: 22-36). Similarly, the spearheads found at Birka have a diamond shape in cross section (Arbman 1943: 12). TIH08 lacks these ridges and is very flat in cross section. Though it is unclear how much of that is due to deterioration. The thickness of the blade also could not be accurately measured without damaging the object. Most knives from Anglo-Scandinavian York were substantially smaller that TIH08 and mainly single edged (Ottaway 1992). The shape of the blade may be similar to the tip of a sword. Scandinavian swords were often pattern welded and had a polished groove that ran down the center, called a 'fuller', to lighten the blade (Graham-Campbell 1994: 54; Pedersen 2008: 204-5). While there is no evidence that such a groove exists on TIH08 it may have stopped before the place where this object would have been cut. Geibig's classification of Viking Age swords include a long sword which had an elongated, tapering point which was used in the 10th and 11th centuries (Pierce 2002: 21-2). Perhaps it could have been from such a sword.

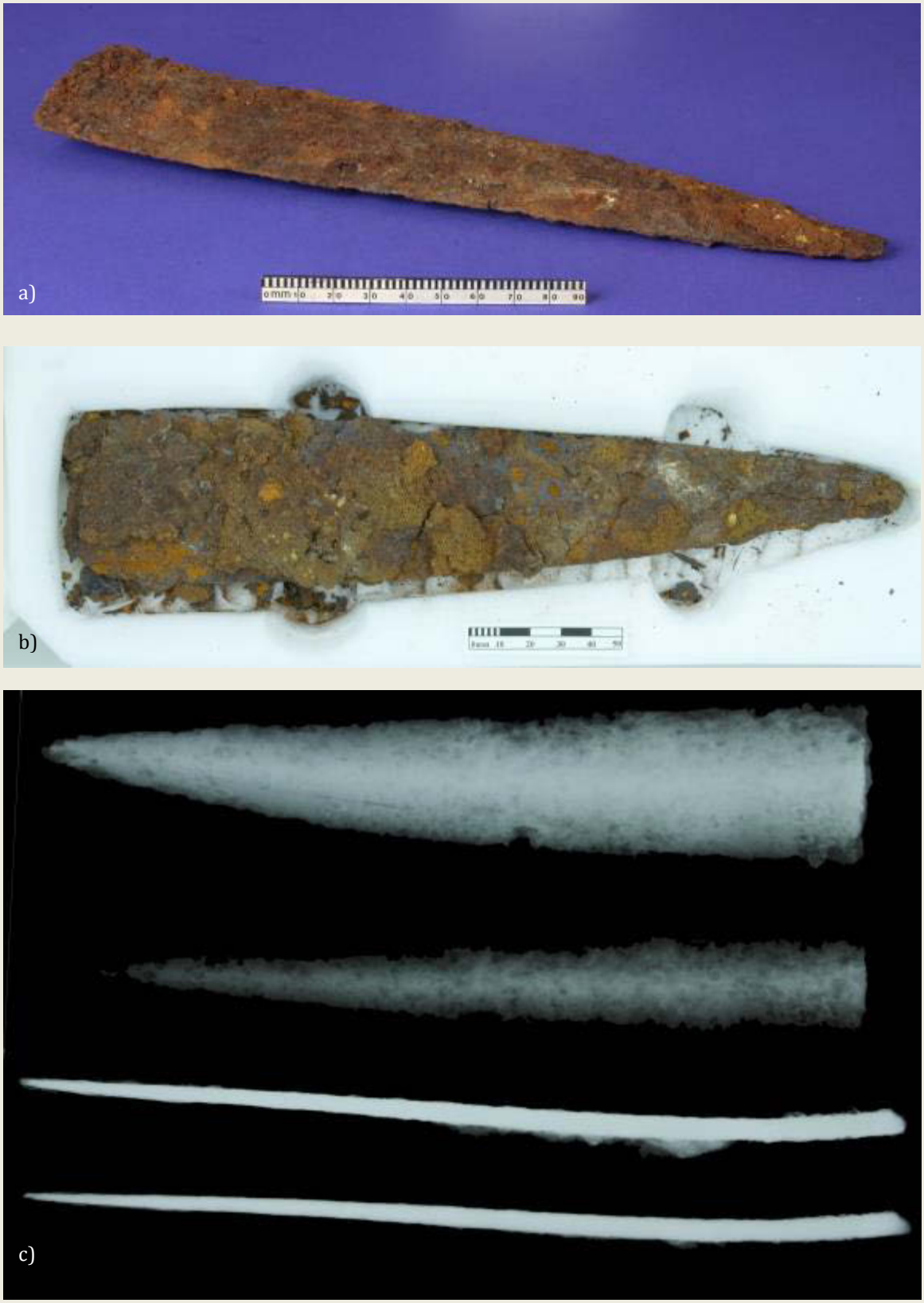


Fig.9: TIH08. 2002 Photograph: a. 2014 Photograph: b. X-radiograph: c.

Agricultural Tools

TIH09 (Fig.10)

This coulter consists of a thick rectangular handle which stretches and curves into a thick blade. Unfortunately there were no x-rays of the coulter and the original photos have been lost. In addition, because of the corrosion the surface of the object is not clearly visible. Therefore, it is not currently possible to determine the manufacture of the coulter; whether it was made from a single piece of iron or multiple pieces welded together. There is also a + or X shape stamped on the upper portion of the handle.

Overall length	44.6cm
Width at handle base	3.9cm
Maximum width of blade	6.5cm
Cross impression arm lengths	2.7cm x 2.8cm
Thickness at handle end	3.3cm
Thickness at blade	c.1.7cm

TIH10 (Fig.11)

This object is a flat single sheet of iron which curves around at the edges. One end is rounded and has a large rivet or peg hole and the other seems to start to flare outwards, but is very fragmented. There seem to be minor cracks that run all along the object. Though the section view X-radiograph of the object shows it being very uneven, the thickness on the left side may be a result of distortion in the X-radiograph, since in the overhead and profile X-radiographs the edge that curved around seems to bulge out and not be flush with the center-piece. It is likely that this object is part of either a ploughshare or something like a bill hook. The part that remains here would be the section which secured onto a wooden beam or rod and the flared end would be where the blade would have extended.

Maximum Length	13.4cm
Maximum width	9cm

DISCUSSION

Until 2012 it was thought that the heavy plough was not used in Britain until the 10th century. However a coulter from the 7th century was found in Lyminge, Kent which showed that heavy ploughs existed in Britain by the 7th century (Thomas 2012: 1-2). The coulter is used in the heavy plough to break up hard ground before the ploughshare turned up the soil (Leahy 2013: 224). It allowed the plough to create deeper furrows. The coulter from Lyminge (Thomas 2012: 1-2) along with the coulter from Scraptoft and the two from Stidriggs, Dumfrieshire (Leahy 2013) are among very few examples of early medieval coulters to compare with TIH09. Both the Lyminge and the Scraptoft coulters are larger than TIH09 however the two from Stidriggs are about the same length. While the shape of the Lyminge and the Scraptoft coulters are generally the same as TIH09's, the one from Scraptoft has a "beaked" blade (Leahy 2013: 225). Furthermore, the Scraptoft coulter and likely the Lyminge coulter were made of several pieces of iron. It would be useful to determine if this was the case with TIH09 as well. There are two more coulters which were listed in Ward-Perkins *London Museum Medieval Catalogue* from some medieval date, however they are thinner and longer than any of the afore mentioned coulters as well as TIH09 (Ward Perkins 1954: 123-5). A coulter is also depicted being used in the 11th century Bayeux tapestry (Stenton 1956: detail no.12). The + or X shaped stamp may be a Christian cross, a makers mark, or some type of instructive mark, though, there is nothing to suggest one of these is more likely.

If TIH10 is in fact a ploughshare, then both blades of a heavy plough have been found together in this hoard. Ploughshares, which look like a wide triangular blade with the end curved inward on either side, have been found in Flixborough, Thetford, Bishopstone, St Neots, Westley Waterless, and a Viking-Age farm in Norway (Ottaway

2009b: 245; Rogerson and Dallas 1984: 82; Thomas 2009: 362-3; Graham-Cambpell and Kidd 1980: 62). TIH10 forms the gripping “handle” of the ploughshare if it is indeed one. TIH10 is likely slightly larger than the Bishopstone and Flixborough ploughshares. Despite this, the size difference is merely a few centimeters. None of the other examples have a rivet or peg hole. The ploughshare from the Bishopstone iron hoard also had uneven flaps (Thomas 2009: 362-3).

TIH10 could also possibly be a bill hook. Like ploughshares, the handle portion of the tool wraps around a piece of wood while the blade extends outward. They are used for trimming branches, and is also sometimes used by woodworkers. There are two from Flixborough, 2465 and 2361 (Ottaway 2009a: 258). 2465 has a peg or rivet in the upper portion of the handle in a similar place to the hole in TIH10. The length of the Flixborough bill hooks are similar to TIH10 however they are substantially thinner. There are also bill hooks from Stidriggs, Dumfriesshire, and from Hurbuck (Ottaway 2009a: 258). Overall the shape of TIH10 seems more similar to the ploughshares.

Fig.10: TIH09.
2014 Photographs: a, b.
b is a detail of the cross stamp.

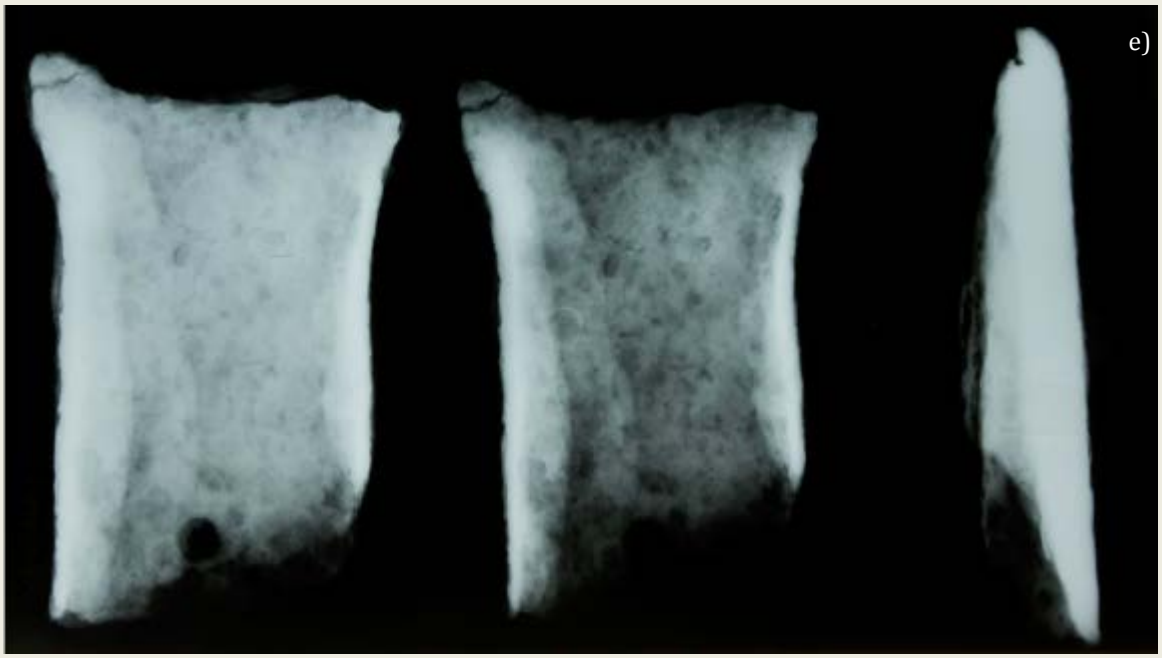


Fig.11: TIH10.
2002 Photographs: a, b.
2014 Photograph: c.
X-radiographs: d, e.

Vessels and Vessel Fragments

TIH14 (Fig.12, 13)

This is a complete circular iron bowl with straight sides and a rounded base. The bowl was brought to the museum half filled with sediment. It seems to be made from a single sheet of iron since there are no visible weld lines or seams. There is what seems to be a small rectangular plate in the upper right corner of the bowl visible in the X-radiographs, with two rivet holes, one of which appears to have the remainder of a ring or a piece of chain. This may be the small bump on the rim in the foreground of the original set of photos. It is unclear whether there is a matching plate and rivet holes on the other side of the bowl since X-radiographs were only taken from one side. There may be a dent in the base as seen on the X-radiograph, however since the flakes of corrosion product have fallen down the side to the bottom of the bowl, they obscure the current base from view.

Diameter	23cm
Maximum Height	10.8cm

TIH15 (Fig.14)

This object is roughly half a bowl which would have been a similar size to TIH14. The sides slightly slant outwards and the base is rounded. There is a triangular or rectangular plate, or patch, which stretches from the rim to partway down the base on the left side of the bowl. It is held in place by at least five rivets, some of which appear on the outside of the bowl as well. Only part of this patch is clearly visible on the X-radiographs, however it is very clear that the rivets extend to the outside of the bowl. The rivets are rectangular. Alternatively the ‘patch’ may be a fitting which originally held something to

the bowl such as a handle. There is a second patch in the center of the bowl which is partially on the side and partially on the base. This patch is either made of a single square sheet of iron or a few overlapping strips of iron held in place by around five rivets. Unlike the other patch, this one is not visible in the pictures. Under the patches the bowl seems to be made of a single sheet of iron. The approximate diameter of the base was calculated using the formula: radius= (H/2) + (W^2/8H). For more detailed explanation see Appendix 2.

Length from edge to edge	21.4cm
Length of base	c.14cm
Height	9.5cm
Approximate diameter of base	c.16.7 cm

TIH16 (Fig.15)

This is a curved circular base of a bowl, likely similar to TIH14 and TIH15. The green which appears in the original photographs does not indicate that this was made of copper but rather is the product of the material which was on the base (Johns, pers. comm.). It has since turned black. A small scratch in the shape of a 7 appears in the X-radiograph on the center right.

Widest Diameter	21cm

TIH20 (Fig.16)

This is a slightly curved fractured piece of iron. On the X-radiograph the bottom side is substantially cracked but there is another crack along the upper portion as well. Together they make a sideways V. There are no rivets, rivet holes, or patches.

Maximum length	13cm
Maximum width	7cm

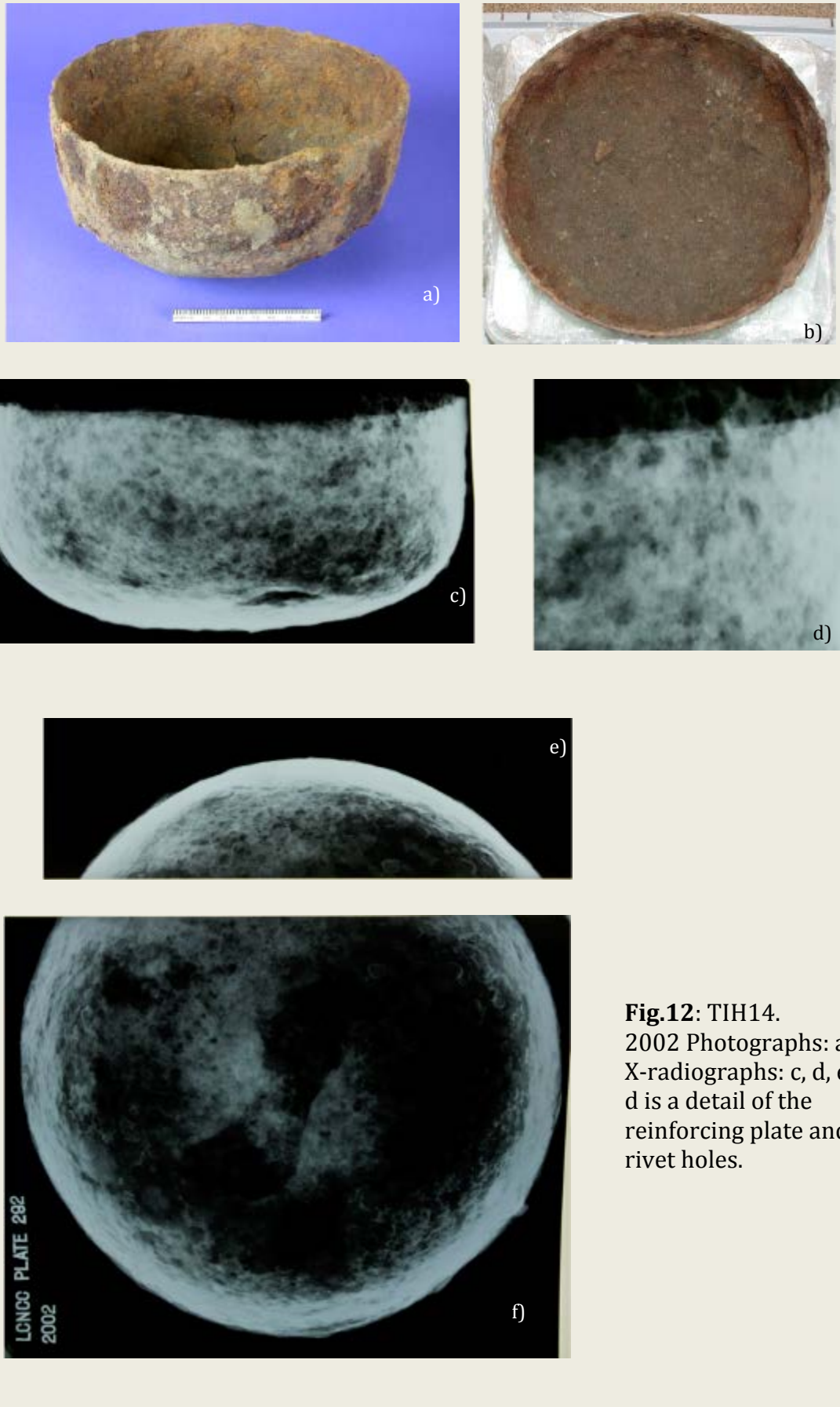


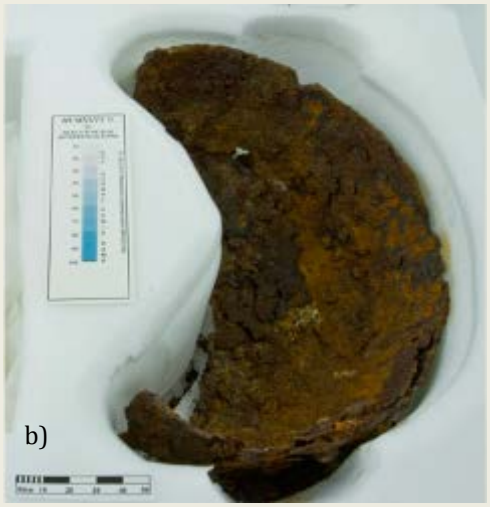
Fig.12: TIH14.
2002 Photographs: a, b.
X-radiographs: c, d, e, f.
d is a detail of the reinforcing plate and rivet holes.

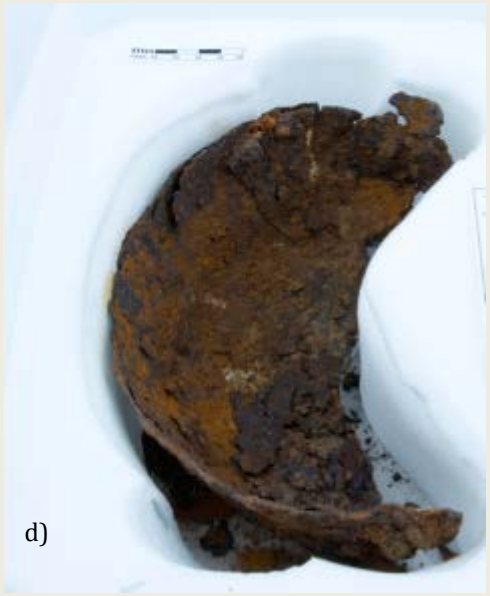
a)

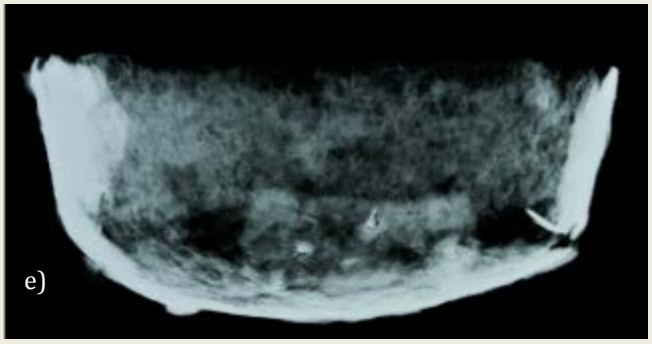
Fig. 13: TIH14.
2014 Photographs: a, b, c.
b and c taken from opposite sides.

b)

c)







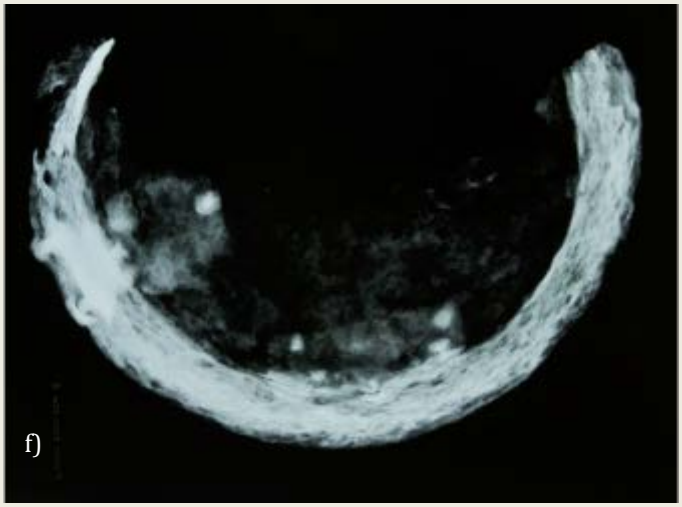
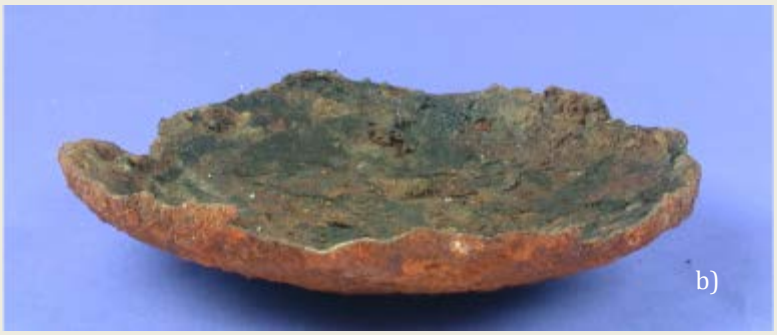


Fig. 14: TIH15.
2002 Photograph: a.
2014 Photographs: b, c, d.
c and d are taken from opposite sides.
X-radiographs: e, f.



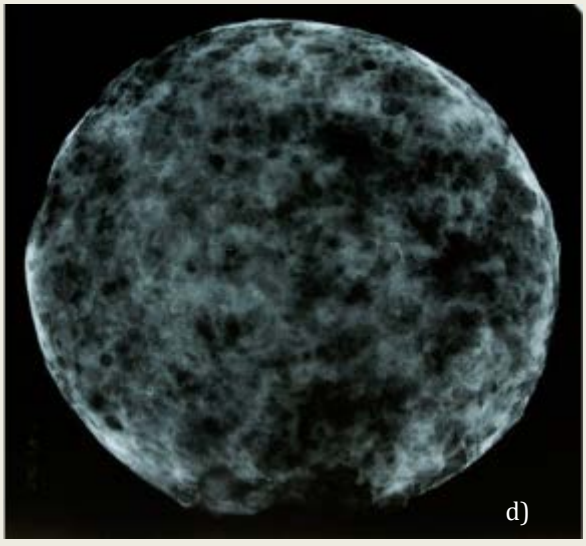


Fig.15: TIH16.
2002 Photographs: a, b.
2014 Photograph: c.
X-radiographs: d, e.

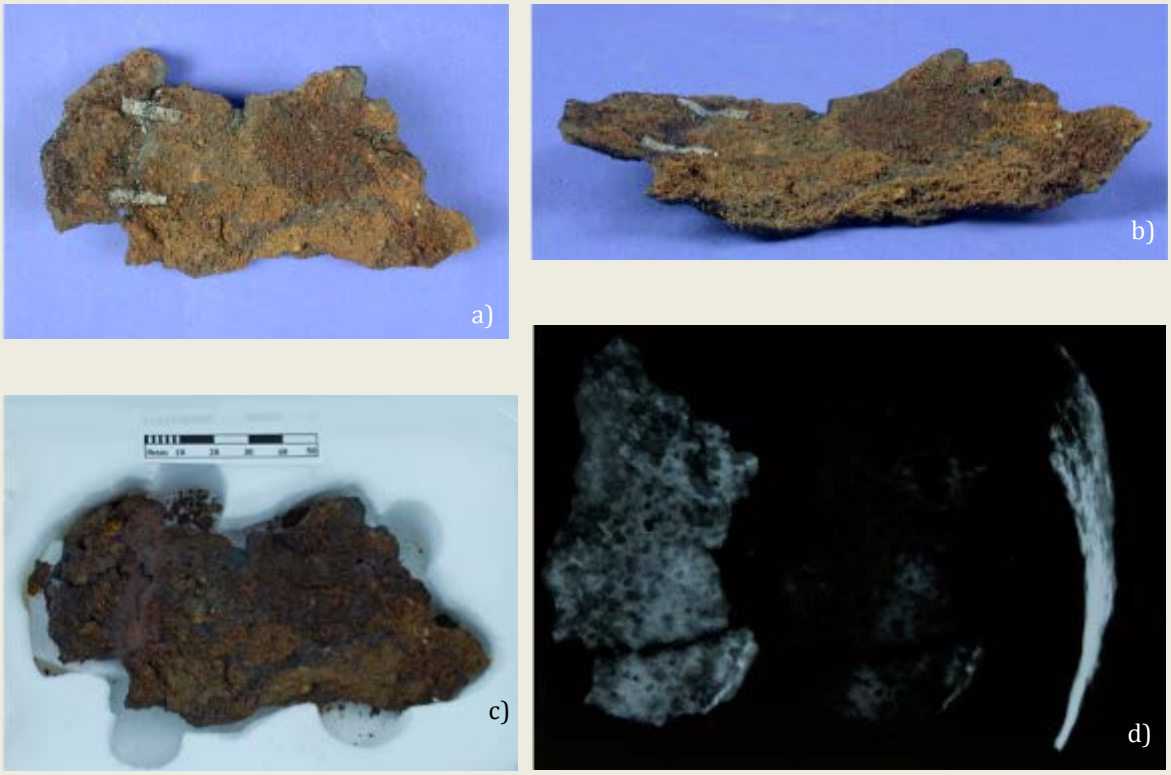


Fig.16: TIH20. 2002 Photographs: a, b. 2014 Photographs: c. X-radiographs: d.

TIH21 (Fig. 17)

This is a curved rim fragment from an iron vessel. The rim consists of a no more than one centimeter long flare. There is one rivet and one rivet hole in the upper-right edge of the rim which may indicate where this piece of iron was attached to another. The center of the fragment is riddled with cracks and seems to have broken off the original piece of iron very raggedly.

Overall length	14.7cm
Length of rim	13.2cm
Overall depth	6.2cm

TIH22 (Fig.18)

Unfortunately we do not have the original photos for this object. This curved rim fragment has no rivet holes or rivets but is extremely cracked and fragile. The rim flares out no more than a centimeter. The two main fractures seem to form a sideways V. Because of the extremely cracked state of the object paired with the lack of photos from 2002, it is difficult to distinguish what patterns on the x-radiograph are due to corrosion or what could indicate possible welding patterns. Both sides of the object perpendicular to the rim seem to be very straight and parallel to each other, as if deliberately cut.

Overall Length	12.1cm
Overall height	9.8cm

TIH23 (Fig.19)

This vessel body fragment which curves on both sides is associated with, and likely formerly attached to, TIH24. The main center portion of the object appears to be flat or it was flattened. There are many cracks throughout this piece, particularly on the left side. There are no rivets, rivet holes or any obvious patching. It appears to be made of a single sheet of iron. There are three indented lines across the right side of the fragment, the right most one being very visible on the photographs and is slightly curved. It can also be seen continuing on to TIH24. These lines do not seem to have cracked the fragment.

Overall width	22.8cm
Overall height	16.8cm
Length of Sides	6.2cm, 6.4cm

TIH24 (Fig.20)

This rim fragment is associated with TIH23. It seems to have originally fit on to the right side of the body fragment. The rim flares about 1 centimeter outwards. There is

a rivet hole in the upper left corner right where it would have joined with TIH23 and there may be a washer or some type of reinforcement plate around the hole. There also might be a larger rectangular sheet of iron along the upper right hand side. Faint lines appear on the X-radiograph. The linear indentations which appeared on TIH23 continue across the bottom of this fragment.

Overall width	10.7cm
Overall height	11.9cm
Width of rim	c.1cm

Fig.17: TIH21.
2002 Photograph: a, b.
2014 Photograph: c.
X-radiograph: d.

a)

b)

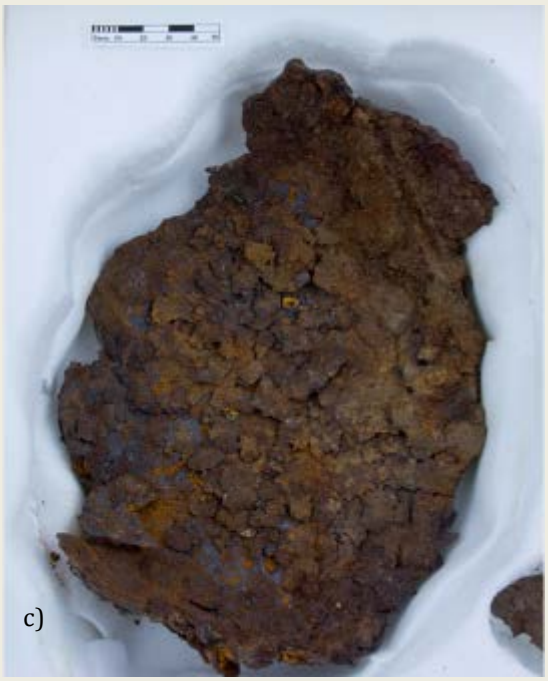
c)

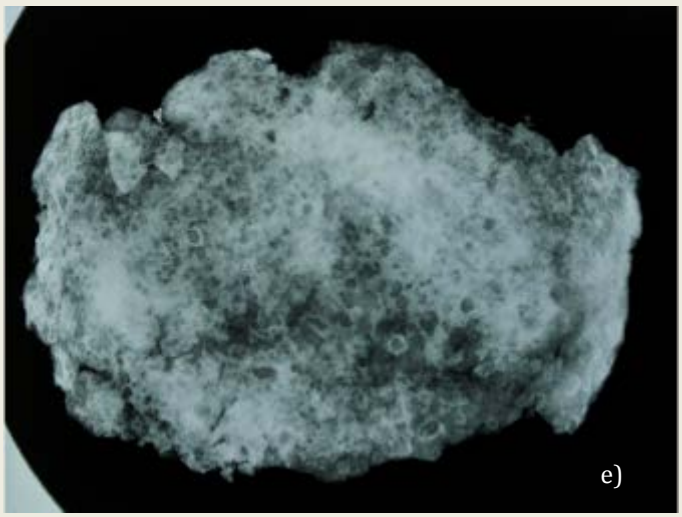
Fig. 18: TIH22.
2014 Photographs: a, b.
X-radiographs: c.

Fig.19: TIH23/4.
2002 Photographs: a.

TIH23:

2014 Photographs: b,c.
X-radiographs: d, e.





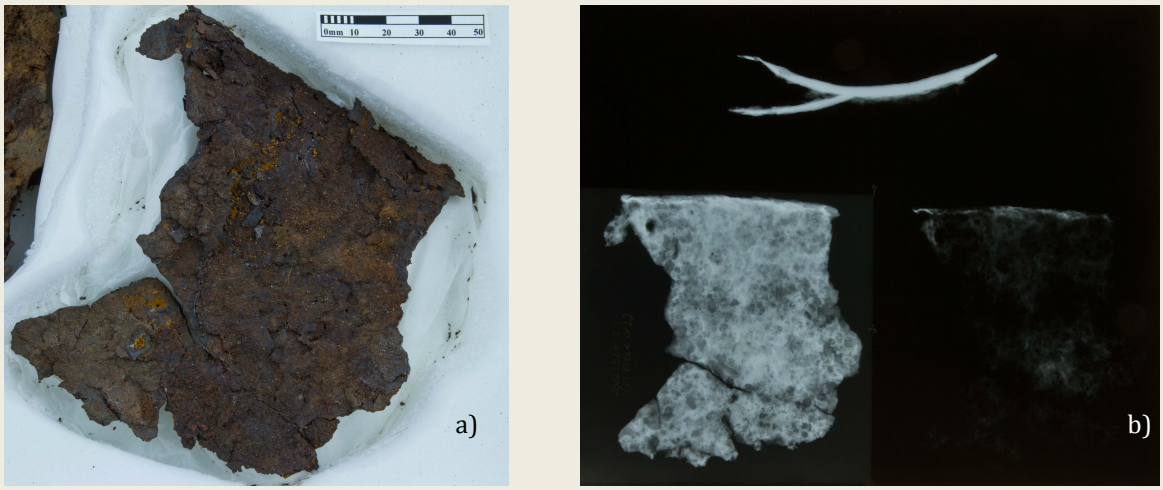


Fig.20: TIH24. 2014 Photographs: a. X-radiographs: b.

TIH25 (Fig.21)

This is a rim fragment from a very large iron vessel. The rim flares outward about 2 centimeters. Portions of the broken edge have been bent over. The rim was likely made from one piece of iron but some lines which appear on the X-radiograph between the two groups of rivets on the right side of the rim, may suggest it was made of multiple sheets of iron. There also seems to be a rectangular plate around the rivets on the left side of the rim. Overall there are at least two rivets and one rivet hole on the left side of the rim and six rivets and five rivet holes on the right. There is also one rivet in the center of the objet and at least one more rivet and rivet hole in the flared rim. The rivets are difficult to distinguish but seem to be either rectangular or oval in shape. The $R=(H/2)+(W^2/8H)$ formula was used to calculate the estimated diameter of the original vessel (see Appendix 2).

Length from edge to edge	57.5cm
Length of curved rim	66.0cm
Depth of rim	2cm
Maximum height	11cm
Estimated diameter	68.8cm

TIH26 (Fig.22)

This is a very large curved body fragment of an iron vessel. It is now extremely fragile and fragmented; some portions may have separated from the main portion of the object. There are many strips of iron which are likely reinforcing seams between different sheets of metal as is displayed on the left side of the object. One line of iron strips appear to have been running horizontally around the curve and two others seem to be stretching vertically up the sides parallel to each other. There are at least 18 rivets overall and at least two rivet holes. The rivets all appear to be square. The fragment may be bent from original shape.

Length between the uppermost edges	c.29cm
Maximum height	c.21cm

TIH27 (Fig.23)

This larger curved vessel fragment seems to be made from a single sheet of iron. One side seems relatively straight with two rivets which may suggest that it was attached to another sheet of iron at that point. There may have been a reinforcing piece of iron along those rivets. Unfortunately, the curved nature of the object makes it difficult to determine an angle which will accurately show the rivets along the bottom of the object in the X-radiographs. Therefore it is difficult to see any real pattern in the rivets other than that they run along the lower portion of the object. There are at least 10 rivets and they seem to be relatively square and tight to the holes.

Overall length	27.5cm
Overall width	17.0cm

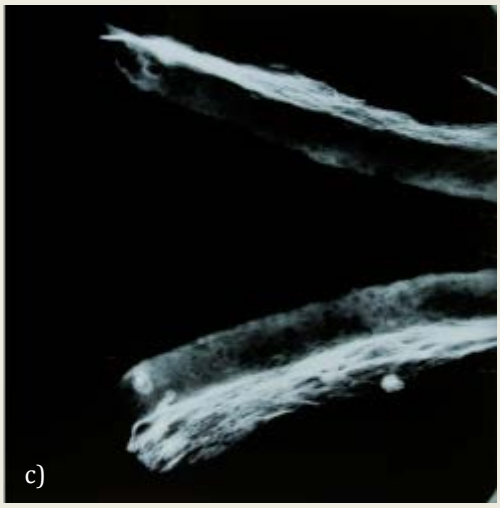
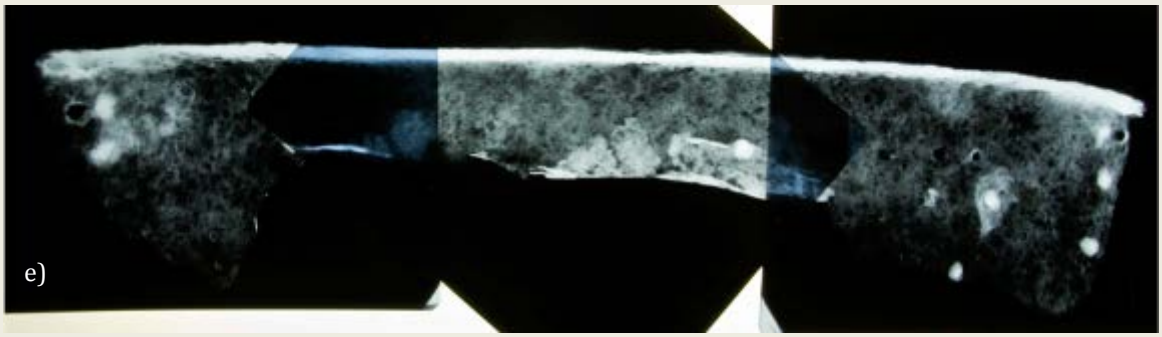


Fig.21: TIH25.
2002 Photographs: a, b.
2014 Photographs: d, f.
X-radiographs: c, e.



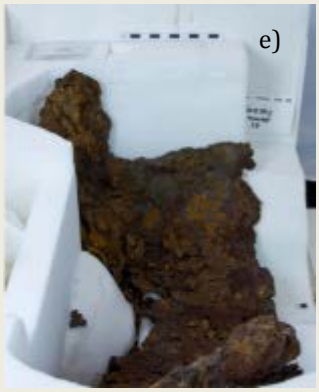
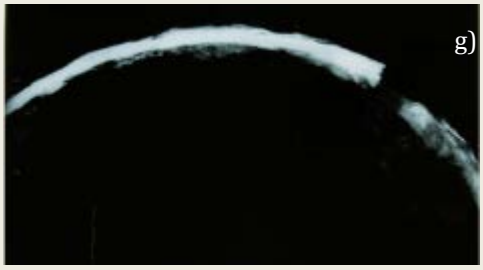
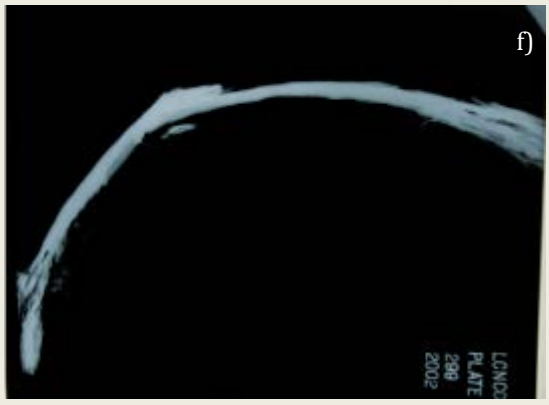
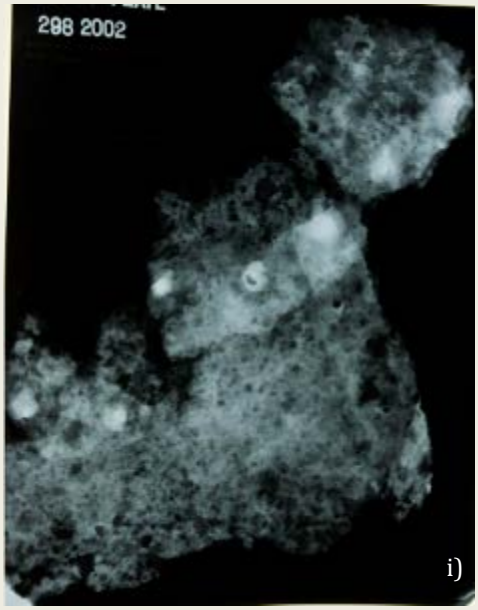
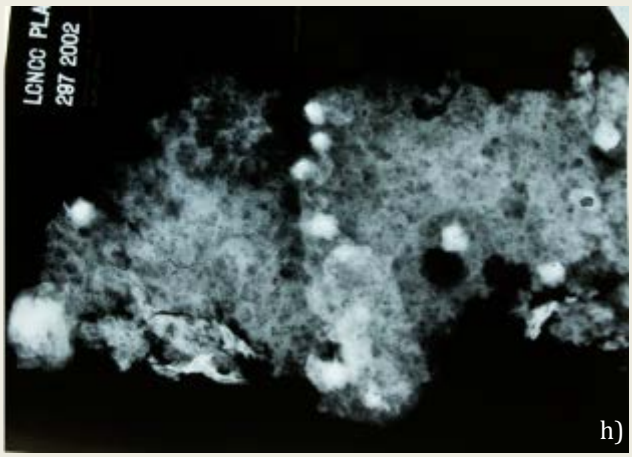


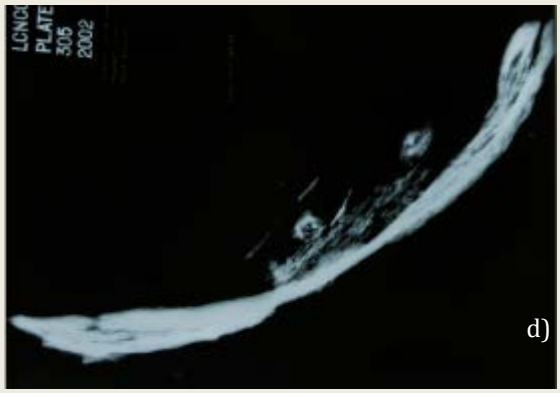
Fig.22: TIH26.
2002 Photographs: a, b.
2014 Photographs: c, d, e.
X-radiographs: f, g, h, i.
f and g correspond with h and i.











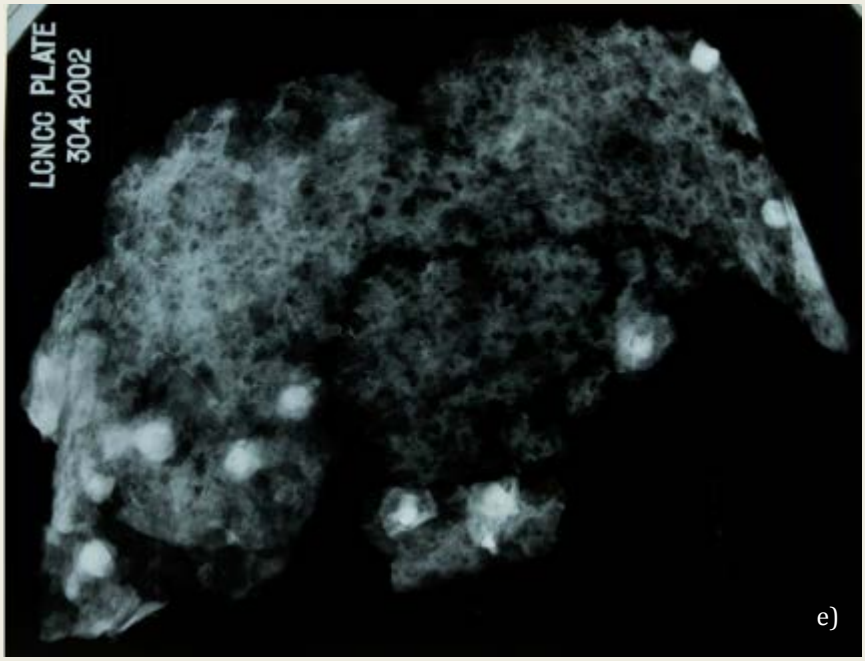


Fig.23: TIH27.
2002 Photographs: a, b.
2014 Photographs: c.
X-radiographs: d, e.

TIH28 (Fig.24)

This object is a large fragment of the body and base of a large iron vessel. The sides are not perpendicular to the base but slant slightly outwards. There is a line of rivets that runs along the edge of the base. It appears that two squares of iron are also riveted in place along the center of the side of the object. The top square also appears to overlap yet another iron strip riveted in place which runs parallel to the base. Another strip also runs upward from the base on the far left side. There are 16 or 17 rivets in total. 11 rivets run along the base and 5 or 6 secure the plates or strips. The rivets appear relatively square and sit snugly in the rivet holes.

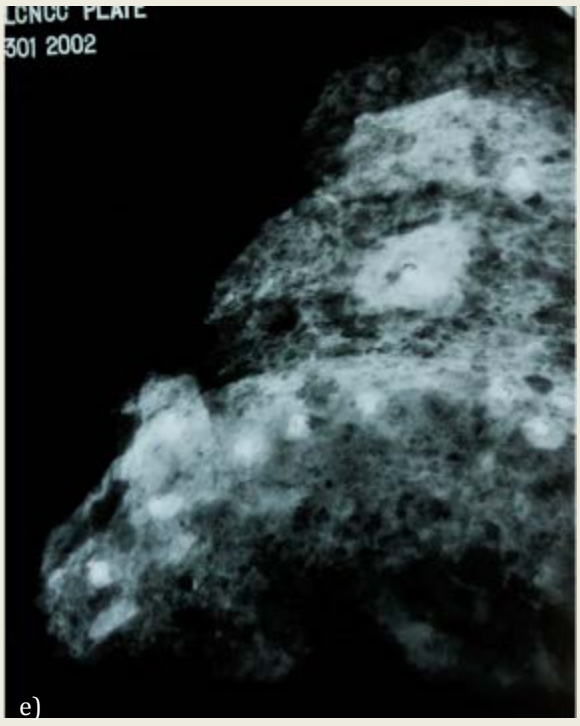
Overall length	26.6cm
Overall width	30.9cm
Maximum height of side	16.8cm
Maximum height of base	9.8cm

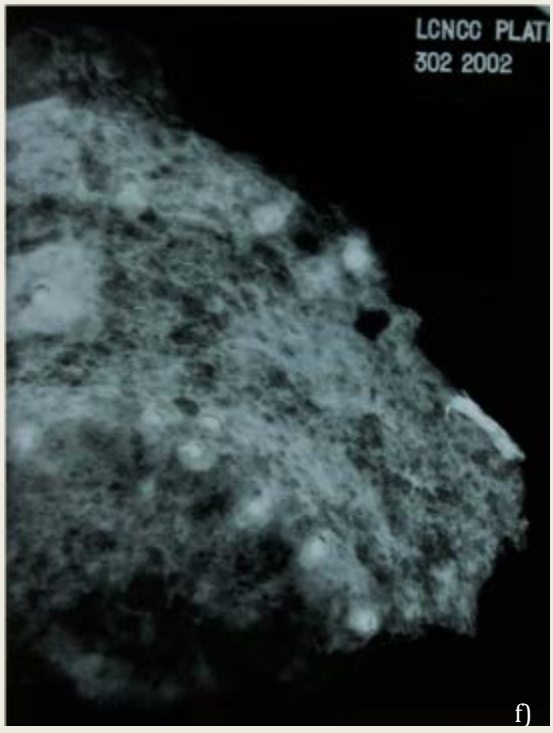
TIH29 (Fig.25)

This is a slightly curved fragment likely from an iron vessel. There is a clear line of 4 rivets running along the bottom edge. A faint line connects the outer two while the two middle rivets might be securing a rectangular piece of iron.

Maximum height	17.1cm
Maximum width	16cm

Fig.24: TIH28.
2002 Photographs: a, b.
2014 Photographs: c, d.
X-radiographs: e, f.





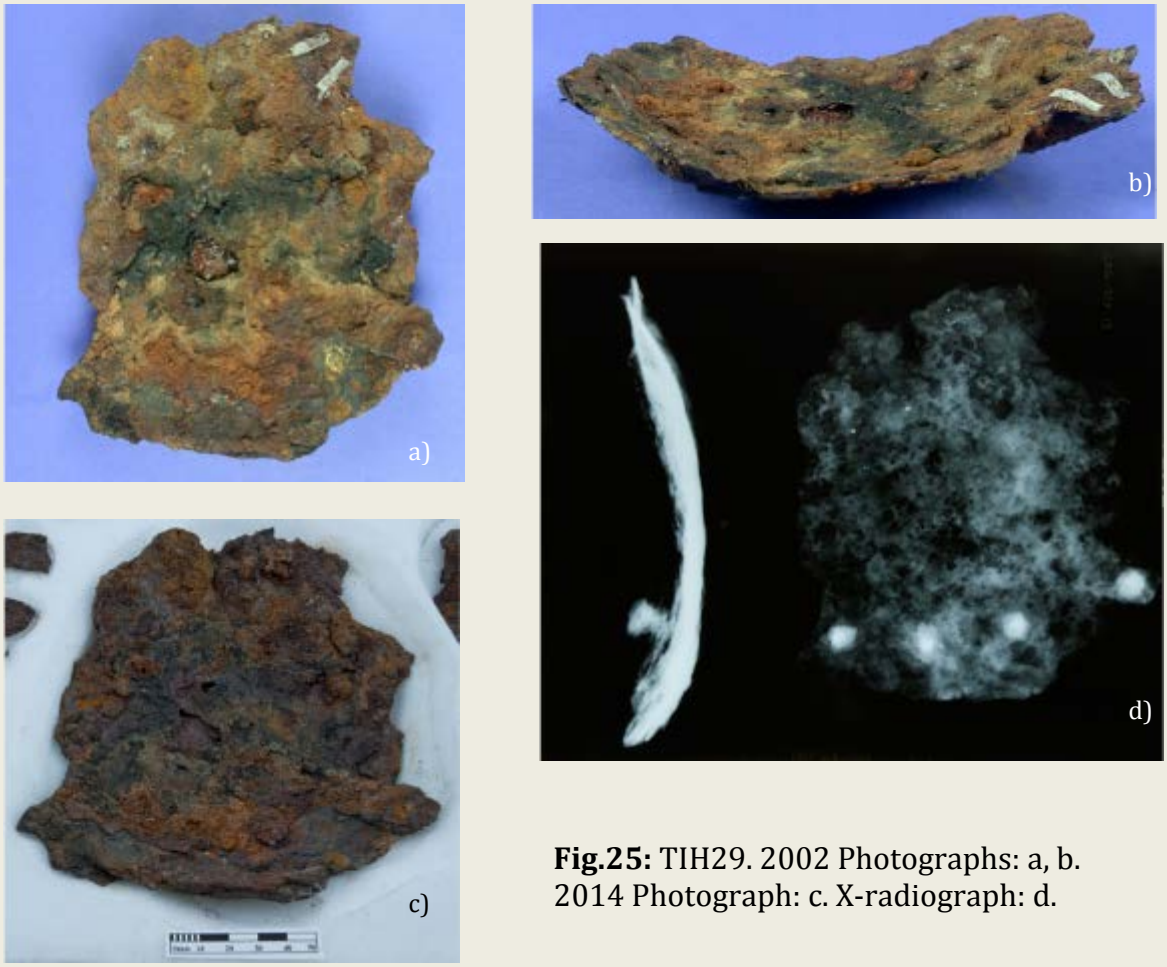


Fig.25: TIH29. 2002 Photographs: a, b. 2014 Photograph: c. X-radiograph: d.

DISCUSSION

There is a tradition of using hanging iron cauldrons, or larger bowls, in Viking Age Scandinavia and there was a similar tradition in Anglo-Saxon England. However, while cauldrons have been found in Scandinavia, none have yet to be found in an Anglo-Saxon context (Graham-Cambpell and Kidd 1980: 80; Graham-Campbell 1994: 62; Frantzen 2014: 134). Two examples of Scandinavian cauldrons come from Norway (Graham-Campbell 1994: 62) and from Sweden (Graham-Campbell and Kidd 1980: 81). They both are relatively large, have escutcheons and very minimally flaring rims. Furthermore the bases appear to be made from a separate sheet of metal. Scandinavians

also used steatite (a form of soapstone) bowls to cook in, which often had relatively straight sides and rounded bases. Small strips of iron would be riveted to the edge of the bowls leaving a portion above the rim to create a loop for the handle as can be seen in two examples from Coppergate, York from the 10th century (Mainman and Rogers 2000:541-2) and one from Asak, Norway (Williams 2014: 111).

TIH14 -15 have a somewhat similar shape to the Scandinavian cauldrons but they are much smaller, do not have styled rims, lack identifiable escutcheons and are made from a single sheet of iron. The shape and the method of hanging TIH14-15 may be more similar to the soapstone bowls, however the soapstone bowls are again much larger.

Though there are not any examples of iron cauldrons from Anglo-Saxon context, what does survive are the chains and hooks used to hang them over the fire, such as the suspension chain (1777) found at Flixborough (Ottaway et al 2009: 174).

Though they are not strictly cauldrons, two iron pans also exist. Both the iron pan from the late 9th to early 10th century found at Winchester (Goodall 1990a: 820-1) and the vessel from Coppergate, York (Ottaway 1992: 604-5) are made from a single sheet of iron, have gently slanted sides and no stylized rim or escutcheons. However, these two iron pans are wider and shorter than TIH14 and TIH15. The Winchester pan has a handle welded to the side and the vessel from York has fittings which would have once riveted a handle in place. These fittings are very similar to the 'patch' on TIH15 which has rivets going through the 'patch' to the outside of the bowl, as was done on the York vessel (Fig.26). However TIH14 still was likely hung, perhaps using rings like 1760 from Flixborough (Ottaway et all 2009: 172-3) and 3545 from Coppergate, York (Ottaway 1992: 648-9) which was attached to the bowl by a thin metal sheet which looped through the ring and then was riveted or fastened to either side of the bowl rim.

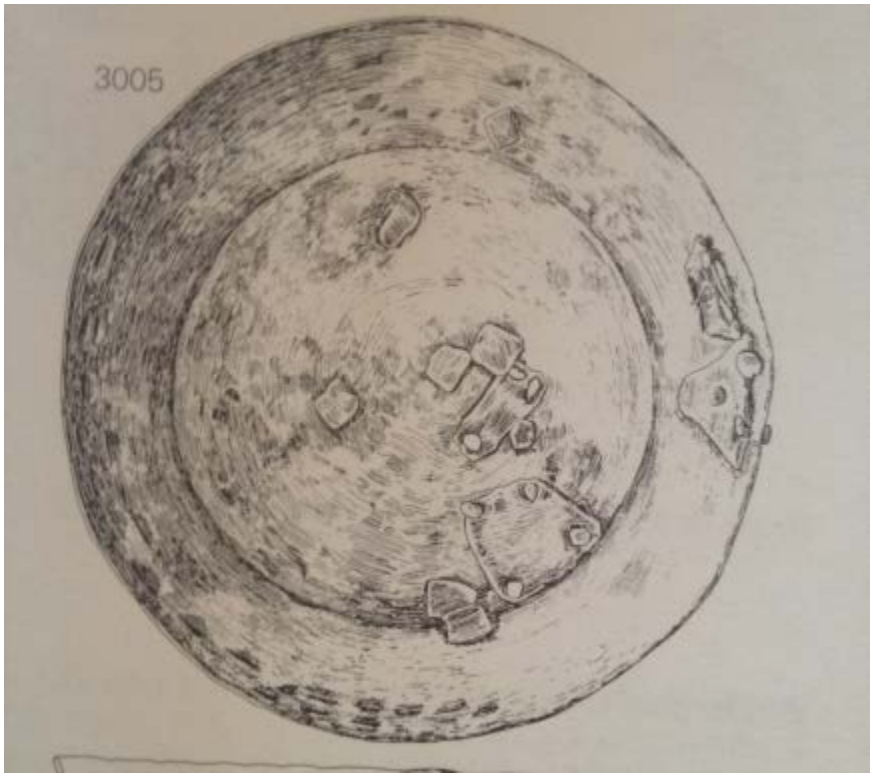


Fig.26: Iron pan from 16-22 Coppergate, York. From Ottaway, 1992: 605.

By the later medieval period, the 13th century and onward, especially once cast iron was introduced to Britain in the sixteenth century, smaller cauldrons were made of cast iron and often had three legs and could support themselves. However, manuscript illustrations through the early modern period still depict cauldrons being hung. An image in the *Reiner Musterbuch* (fol. 2v) from the 13th century depicts a hanging rounded cauldron with a flared rim and various scenes depicted in the *Tacuinum Sanitatis* (BNF No. ac.: fol. 46, 50v, 74v; BNF L. 9333: fol.41, 73v, 78v) from the end of the 14th century show smaller cauldrons hung over fire with flat bases and flared rims. Even an illustration from 1610 in the *opera/di Bartolomeo Scappi M. dellarte del cucinare*, (Albala 2003: 90) depicts straight sided cauldrons being hung over a fire. The smaller body and rim piece from the Torksey hoard (TIH20-23, TIH27, and TIH29) may be from similar vessels as depicted in these illustrations, or possibly precursors to them. The flared rims of TIH21 and TIH22 especially may be similar to the 13th century illustration.

Larger cauldrons appear in manuscript illustrations as well, and could be very tall, narrow or wide. They also appear to have varying shapes, some straight sided and some bulbous. In the Luttrell Pslater (fol. 207r)(Fig.27) from the 14th century, large bulbous cauldrons with flared rims are seen sitting in the fire. Similarly, a very large cauldron without a flared rim sits in the fire in an image from the *Tacuinum Sanitatis* (BNF No. ac.: fol. 55v). TIH25 is from a very large cauldron with a flared rim, and the body/base fragment TIH28 comes from a vessel whose sides flare out from the base, and they may have come from cauldrons similar to the two illustrations in these manuscripts.

Fig.27: Scene from Luttrell Psalter (Brit. Lib. Add. 42130 fol.207r)

Both TIH23/4 and TIH26 seem to come from vessels with straight sides, the TIH26 may curve a little at one end. However, TIH23/4 does not seem to come from the same vessel as TIH26 since the rivet patterns are extremely different. In particular the strips of metal riveted in place which are present on TIH26 appears similar to the cauldron on a crane depicted in the *opera/di Bartolomeo Scappi M. dellarte del cucinare* (Albala 2003: 95) which has strips of metal going around the circumference of the vessel

and up the sides. TIH26 and TIH28 could potentially be from the same vessel since their rivets are similar as are the strips of metal. On the other hand, neither TIH23/4 nor TIH26 seem to be from a vessel as large as the one TIH25 was part of. The rivets along the edge of the base in TIH28 also are similar to the cauldron from Sweden mentioned earlier, which seems to have a base made from a separate sheet of iron (Graham-Campbell and Kidd 1980: 81).

It should be kept in mind, while reading this discussion that just as there are no physical examples of cauldrons from the early medieval period, there are also very few, if any, illustrations of iron vessels. Therefore this analysis is largely based on comparative material from later centuries. For that reason, just because there are similarities between the objects in this hoard and the cauldrons in the later manuscripts, does not mean that the objects were not from an earlier period. This possibility is strengthened by the existence of the supporting materials such as hooks, chains, and vessel handles from the early medieval period.

Tripod

TIH30 (Fig.28)

This is a tripod, which is made from at least two, and likely three, rods of iron. The X-radiograph clearly depicts how the arms from two U-shaped rods were welded together to form a leg of the tripod. It is likely that the other two legs were made in a similar manner. The rods are rectangular in cross section and the corners of the legs are rounded and not sharp. All three sides of the triangle are nearly the same length. One of the legs is clearly, and likely deliberately, bent. In the X-radiograph it appears to not be

cleanly broken. The other two legs are shorter but are similar in length to the broken leg from the top of the curve to the point where it is broken. The leg to the right of the broken leg also has a jagged end and may indicate that that leg was also broken. If this is the case then the third leg is likely broken as well.

Side Lengths	25cm-30cm
Height	c. 10cm

DISCUSSION

This tripod may be a trivet or a brandreth. In medieval Britain a trivet held pots *off* the fire while a brandreth held pots *over* a fire (Goodall 2012: 297). Brandreths had a vertically sided ring in addition to the horizontal ring which was present in the trivet (Goodall 2012: 298). TIH30 does not have a vertically sided ring. A Brandreth can be seen in an illustration from the *Tacuinum Sanitatis* (BNF Latin 9333, fol.14) from the 15th century. It has very long legs to hold the pot over the fire. However, no physical examples have yet been found (Goodall 2012: 297). On the other hand, multiple trivets have been found. The one from 13th-14th century Northampton is most similar to TIH30 (Goodall 2012: 306-7; Goodall 1981: 59-60). The shape is nearly identical. However the Northampton trivet is made of much flatter bars of iron than TIH30. Three other trivets from the 14th -15th centuries which are made of flat pieces of iron are from Llawhaden Castle, Dyfed, from Winchester, and-from Cambokeels, Durham (Goodall 2012: 304-7). These three have circular rings, not triangular ones. Perhaps since TIH30 is thicker than these other four examples, it was meant to be used over a fire rather than off the fire. Furthermore, it was likely originally taller than these other examples. The one from Durham was only roughly 10cm high (Goodall 2012: 305). Perhaps more likely, is the thickness implies that it was from an earlier date.

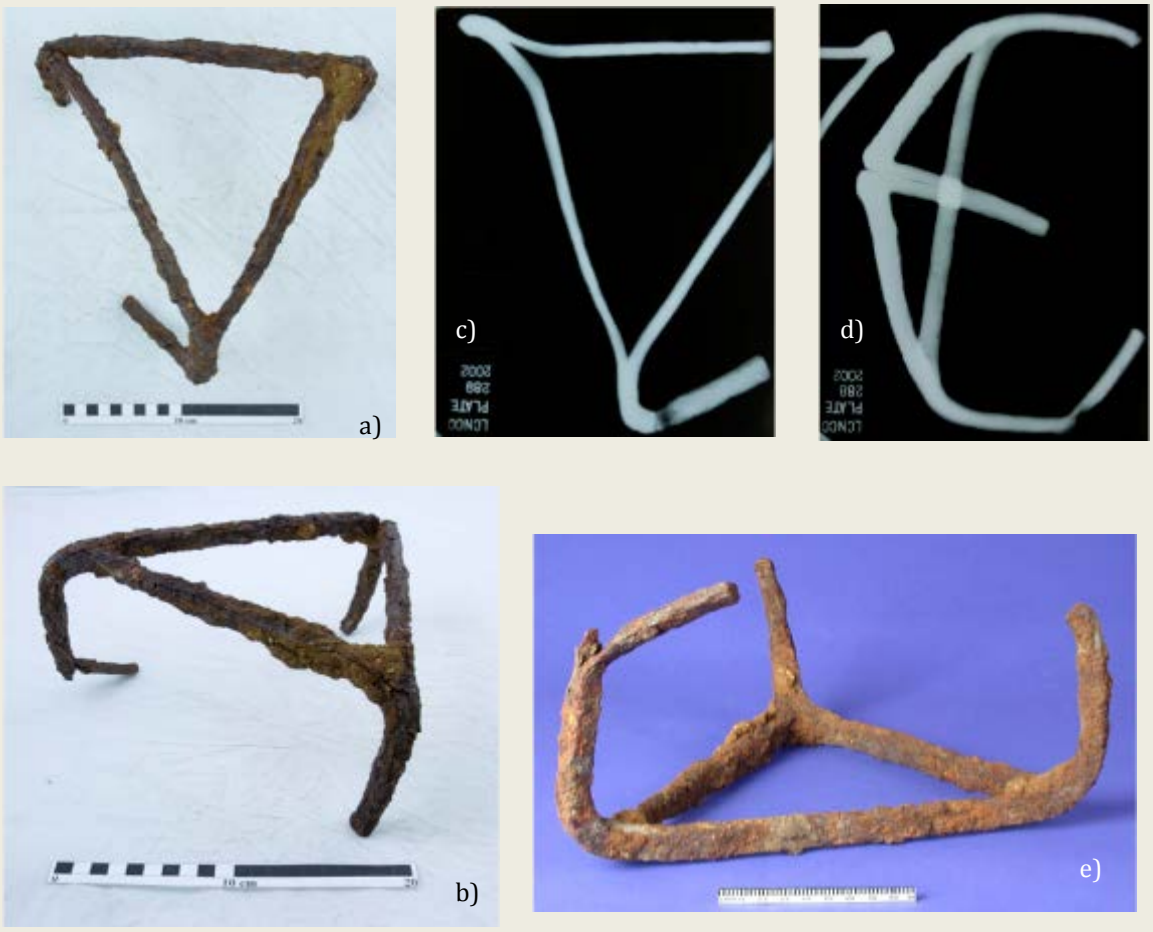


Fig.28: TIH30. 2002 Photographs: e. 2014 Photographs: a, b. X-radiographs: c, d.

Rings

TIH11 (Fig.29)

This is a flat ring with a flared bifurcated fitting. It is likely made from a single rod of iron which has overlapped and been riveted or fastened in some manner as there is a small circular mark visible and a possible scarf weld line around it. One of the flared prongs is shorter than the other and may have been broken off. There is no evidence of how the fitting was secured to another object. As can be seen in the photos from July, the fitting could not be seen.

Diameter of overall ring	10cm
Width of ring	1.2cm - 1.8cm
Width of fitting loop	2.6cm
Length of fitting could not be measured	?

TIH12 (Fig.30)

Unfortunately there were no real X-radiographs completed of this ring fitting and the only ones that exist are from the exposure test X-radiographs. Therefore the image quality is not very good. The ring itself is flat and rectangular in cross section and was likely made of a single piece of iron, the ends of which overlapped and were welded together. There seems to be a patch which was riveted onto the main ring on the (blah) side. The strap fitting was secured with two square rivets, only one of which remains. The fitting gradually narrow as it nears the end, then flares out into a slightly bifurcated shape. There is another square rivet in this end piece. Both rivets in the fitting do not fill up the entire holes indicating the holes were made before the rivet was placed. There is a faint rectangular shape which appears near the rivet and the rivet hole, but it is unclear what it is.

Maximum diameter	11.4cm
Width of ring	1.7cm – 1.9cm
Length of fitting	15.4cm
Maximum width of bulge in fitting	4.6cm
Width of flared end of fitting	3.4cm

TIH13 (Fig.31)

This ring is flat and rectangular in cross section. It appears to be made of a single piece of iron the ends of which do not seem to overlap where they were welded together. The weld line can be seen on the right side of the X-radiograph.

Maximum diameter	14.3cm
Width of ring	1.7cm - 1.9cm

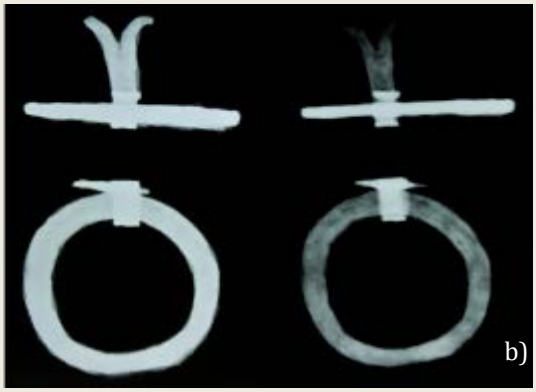


Fig.29: TIH11.
2002 Photographs: c, d.
2014 Photograph: a.
X-radiograph: b.

Fig.30: TIH12. 2002 Photographs: c, d.
2014 Photograph: b. X-radiograph: a.

DISCUSSION

All three rings (TIH11-13) are relatively similar sizes and had similar forms of manufacture. They are all flat and only had a single weld line, meaning they were all made from a single piece of iron. They are relatively large rings and could have been used as handles. Rings of such size were used as vessel handles at Birka (Arbman 1943: 207; Ottaway 1992: 648), however those rings were rounded and not flat. Ottaway mentions other rings used as handles from Århus in the 10th century, and from a grave in Tuna, Uppland, Sweden which "may have formed handles for heavy chests which were carried by passing poles through a series of such rings" (Ottaway 1992: 648). A similar flat ring, which is a few centimeters smaller in diameter than TIH11-13, was found at Coppergate, York, in addition to two smaller rings with strap fittings, 3544 and 3545 (Ottaway 1992: 648-9). 3544 is a flat ring but the strap fitting is not like that of either TIH11 or TIH12.

There are a few hinge fittings which have similar shapes to the strap fittings of TIH11 and TIH12. Four 13th to 15th century fittings from Stonar, Kent, the Mount, Princes Risborough, Buckinghamshire, King's Lynn, Norfolk and Waltham Abbey, Essex, have a similar tapering fitting which flares outward at the end to TIH12, but none are bifurcated (Goodall 2012: 204-9). In addition, strap fittings from Bishopstone (Thomas 2009: 364-7), Stonar, Kent, Kiln Combe, Bullock Downs, East Sussex (Goodall 2012: 204-9), and Coppergate, York (Ottaway and Rogers 2002: 2838-9), have a similar bifurcated edge to TIH11.

There is a possibility that TIH12 originally attached to TIH25, the large cauldron rim, however it is unclear if the rivets and rivet holes actually match up because object size gets altered in X-rays, and the physical objects could not be taken out of the cases to

compare them. However, the rivet type and how the rivets fit in the rivet holes is not consistent between the two, which makes it unlikely that they were originally part of the same piece.

TIH11-13 do not seem to come from the same object and none seem to convincingly be related to any of the other objects in the hoard.

Miscellaneous / Unidentified

TIH17 and TIH18 (Fig.32)

Two small fragments which seem to originally be connected and therefore are from the same object. TIH17 is the rectangular fragment and TIH18 is the triangular fragment. They are not curved and there are no noticeable features. They are very thin.

17:		
	Overall width	4.4cm
	Overall height	1.9cm
18:		
	Overall width	4.6cm
	Overall height	3.8cm

TIH19 (Fig.32)

This is an extremely small iron fragment with no defining features.

Overall width	4.7cm
Overall height	2.6cm

TIH31 (Fig.32)

This is an iron U-shaped rod which is bent near the center of the object and which has a small ring on one of the corners. The ring likely was used to hang or support

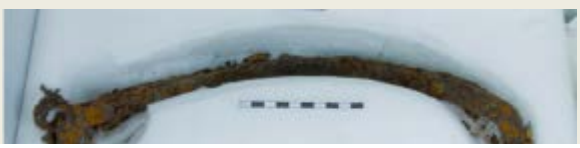
something , however, nothing like this seems to exist. The bends to form the arms seem to be very deliberate and are clean 90-degree angles. The bend in the center, on the other hand is not sharp and the apex is an uneven distance from either side. Therefore this bend is not likely part of the original shape of the object. The object seems to be made from a single rod or piece of iron. It is unclear if the ring was made from a separate piece of iron, though it seems likely. The X-radiograph does not reveal any evidence of the object being secured to anything else and there are no sharp ends which would have been pushed into a wall or something similar.

Length from corner to corner	37.2cm
Length between ends of legs	36cm
Length of curve	44cm
Length from apex of curve to ring side	19.5cm
Length from apex of curve to non ring side	16.5cm
Diameter of ring	2.5cm
Length of ring-side leg	16cm
Length of non ring-side leg	16cm


a)

b)


c)



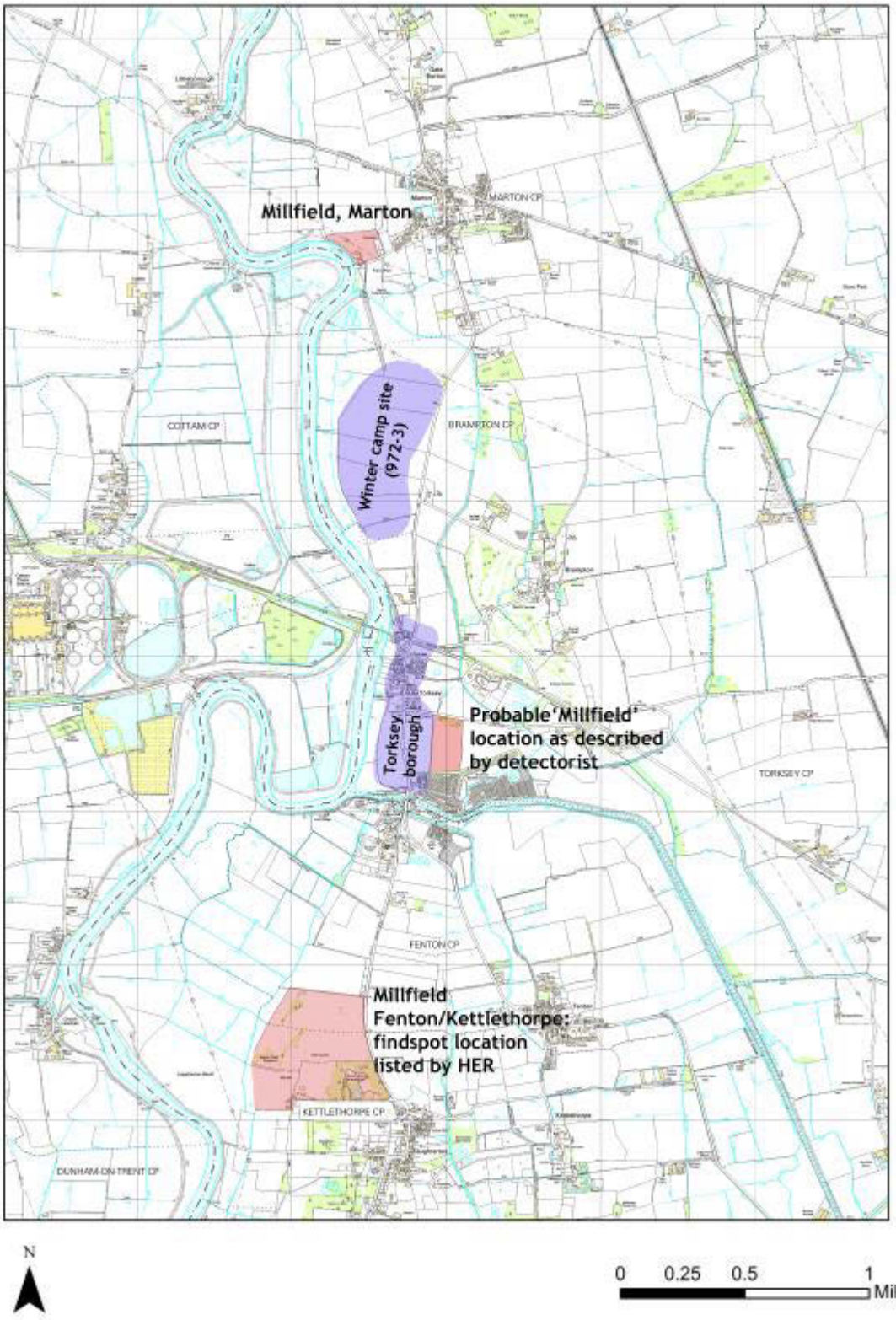
DISCUSSION

Provenance

Location of Deposit

There is a great deal of ambiguity about the exact find spot of the hoard. No specific grid coordinates were supplied when it was brought in to the museum and the only information given was that it was found at the 'Millfield, Torksey, Lincolnshire'. The Historic Environment Record similarly only lists that it was found at Millfield, Torksey. However, there is no such location in existence. Furthermore, the HER lists three possible parishes for the hoard: Fenton, Kettlethorpe, and Torksey, all in West Lindsey, Lincolnshire, and the record places the find spot in Fenton near Laughterton (Map 3). There is a field with that title south of modern Torksey in Fenton beside the

current Millfield Golf Complex. Metal-detector users sometimes refer to the ‘millfield near the golf course’ and it is likely in reference to this golf course in Fenton (Stein, *pers. comm*.). This site is also not far from the river. Despite this, the hoard is rumored to come from the winter camp site north of modern Torksey. There is another golf course, the Lincoln Golf Club, which is in Torksey and across from the fields where the winter camp and the later borough were located, and there is a possibility that ‘millfield near the golf course’, was misunderstood to be near this golf course in Torksey. A third possible location mentioned is a ‘millfield’ near Marton, directly north of the winter camp site, also near the river and the old Roman road leading to Lincoln.



Map 3: Map showing three possible find locations in red. The borough and winter camp marked in purple. Map courtesy of Samantha Stein. **Ordnance Survey © Crown copyright and database right 2014**

The acquisition records from the museum also list that the hoard was 'found together, [and a] hard ashy deposit found at [the] base'. The 'hard ashy deposit' is likely either mudstone or sand outcrops (Stein, *pers. comm*.) The millfield area in Fenton is on a marl outcrop with sand and terrace deposits on top and was not wetland during the early medieval period. The area in Torksey near the golf course however, was wetland during the late medieval period and therefore the hoard would not likely have been found on an 'ashy' deposit if it were deposited in that area. Furthermore, the only areas near the golf course in Torksey which would have been dry during the early medieval period are not near other Saxon finds (Stein, *pers. comm.*).

The ambiguity of the provenance also extends to the context of the find. Other than that this hoard was 'found together' with the same sediment below the objects, there is no information about how the objects were arranged, which objects were adjacent to which others, or how close they were to each other. For all we know, the tools were gathered together and the vessel fragments were somewhat separated. We also do not know if they were tightly gathered, though because the corrosion product did not bond any objects together, this may be unlikely. The pieces may have been spread out, and if so how they were spread out is unknown. Furthermore, there may have been more objects which were not picked up, but which are associated with this hoard.

Unfortunately, since over a decade has passed since this hoard was found, it would be difficult to get further credible details on the actual find. The individuals who worked at the museum in Lincoln and were involved with the hoard no longer work there. The museum itself has also moved and switched names (Lee, *pers. comm*.). As noted above, the identity of the original metal detector user remains confidential for privacy reasons.

Dating of the Hoard

Based on the typological study above, it seems that the widest date range for this complete hoard is likely between the 8th and 14th centuries. Though the larger vessels are similar to examples from the 13th through the 17th century, and the closest examples to the tripod TIH30 are from the 14th to 15th centuries, T-shaped axes were only in use until the 14th century (Leahy 2013: 229; Goodall 2012: 22). Similar coulters to TIH09 were used from as early as the 7th century and used at least through the 11th (Thomas 2012: 1; Stenton 1956: detail no.12). The woodworking tools are most similar to those from the tool hoard from the Anglo-Saxon settlement at Flixborough and overall the styles match tools from the 8th to 10th centuries.

What is very important to note about this hoard, is that there are no specifically Scandinavian characteristics present in any of the objects. The tools do not have the Scandinavian pointed lugs, the bowls and cauldrons are different in size and manufacture from Scandinavian cauldrons, and the agricultural tools have no traits that would link them with Scandinavians any more than with Anglo-Saxons. Therefore, even if the hoard were from the time that the army over wintered, it seems that the objects in the hoard were not manufactured in Scandinavia nor using Scandinavian traditions, however that does not necessarily mean that they were not *used* by Scandinavians.

Nature of the Hoard

There are extensive traditions for metal hoards and deposits in Anglo-Saxon and Viking-Age Britain and Scandinavia. Ottaway defines a hoard as "a group of artefacts, considered at the time of their assembly to be in some way of unusual value, which was deliberately buried or otherwise concealed" (Ottaway 2009a: 258). This sometimes

occurs for safe keeping and other times for a ritual purpose. Furthermore some of these hoards were meant to be retrieved while others were not. Therefore if this collection of objects is indeed a hoard it should be considered in these contexts.

Tool hoards/Tool sets

One of the most prominent categories in the Torksey hoard are the 'tools', and it is important to consider this hoard in comparison with other types of tool hoards from England, Scotland and Scandinavia.

Seven out of nine of the tools in this hoard are used for woodworking but they do not form a complete set of tools. As mentioned above the axes in this hoard are used for shaping, especially the T-shaped axes, whose long blades are very good for shaving the faces of beams and boards (Morris 2000:2108). Larger, and likely heavier, axes were used for felling (Morris 2000: 2104). Other tools used included adzes, various types of augers, draw knives, hammers, wedges, chisels, shaves, gouges, files, whetstones, and in later periods, planes and saws (Morris 2000: 2104; Goodall 2012: 21-28: Hodges 1989: 113-117). Not every woodworker used all of these tools, but even so, the current collection does not fit the set needed for any particular craft. Though axes are the most important tool in ship building, including axe hammers like TIH04, shaves were used to smooth and finish the boards, various augers were need to drill rivet holes, chisels were need for joints and knives were used for a variety of small tasks (Christensen 1982: 331-4). Likewise, this was not a set of tools used for coopering which would require a round shave (Morris 2000: 2114). Chisels and augers were used when creating more precise joints used in timber construction, so this collection of tools would not be enough for building structures (Darrah 1982: 220-223). This collection may be suited to shape boards

and planks from felled and split timber, however, they would not have been used to fell and split the timber (Morris 2000: 2108).

The Flixborough woodworking tool hoard, in contrast , has a wider variety of tools including axes, adzes, shaves, and spoon augers, along with two agricultural tools. There are no axes for felling in that hoard either, and it is also not a full set of tools (Ottaway 2009a: 256-267). The Mästermyr hoard from Sweden is thought to be the tool set of a traveling craftsman who could complete a variety of smithing and woodworking tasks. It includes axes both for felling and shaping, adzes, draw knives, chisels, augers, saw blade, and hammers along with a variety of smithing tools (Ardwisson and Berg 1999).

Iron Hoards From Early Medieval Britain

The Torksey hoard fits into a tradition of iron hoards from the 8th to 11th centuries in Britain. Including this hoard, there are twelve hoards that fall into this category and they have been explored and compared by Ottaway, Thomas, and Leahy, in their discussions of the Flixborough tool hoard, Bishipstone hoard, and the Scraptoft hoard, respectively (Ottaway 2009a: 258-261; Leahy 2013: 229-235). (For a list of the objects in each hoard see Table 1 in Leahy 2013: 231-2 and for a list of publications on these hoards see Appendix 3).

Table 2: Iron hoards from late 7th to 11th century Britain.

Location	Date	Categories of objects	Holding Vessel
Asby, Winderwathe, Cumbria	9th century or later	Woodworking, Agricultural, Structural	
Bishopstone, East Sussex	680-990 AD	Woodworking, Agricultural, Structural, other	
Crayke, East Yorkshire	?	Woodworking, Weapons, Structural,	

		horse equipment, scrap iron	
Flixborough, Lincolnshire	8th to 10th centuries	Woodworking, Agricultural, Bell	Two lead vessels
Hurbuck, County Durham	Late 9th to 10th centuries	Woodworking, Agricultural, Weapons, Structural	
Lea Green, North Yorkshire	?	Woodworking, Agricultural, Weapons, Structural, other	
Nazeing, Essex	11th century	Woodworking, Agricultural, Weapons, Structural, Vessels	
Scraptoft, Leicestershire	10th century	Woodworking, Agricultural, Weapons	
Stidriggs, Dumfries	Around 775-892 AD	Woodworking, Agricultural, Structural	Lead tank
Torksey, Lincolnshrie	Probably 10th -11th centuries	Woodworking, Agricultural, Vessels	
Westley Waterless, Cabridgeshire	?	Woodworking, Agricultural, Weapons, Structural	Two lead tanks
York, St. Saviourgate	?	Woodworking, Structural, Leatherworking, Scrap metal	Lead tank, iron cauldron

While the types of objects in the Torksey hoard are very similar to the other iron hoards in Table 2, the condition and deposition of the Torksey hoard stand in contrast with a large percentage of them. The two most prominent types of objects found in these other hoards are woodworking and agricultural tools, two of the main categories in the Torksey hoard. With the exceptions of the Flixborough hoard which includes axes, adzes, spoon bits, and draw knives, and the Stidriggs hoard, which includes axes, spoon bits, and a gouge, the hoards do not seem to have what could be called full tool sets. Thomas suggested that at Bishopstone, and potentially at other sites, this was because the objects played a more symbolic than strictly functional role (Thomas 2009: 385-393). I will discuss this further below. It should be noted, though, that *all* the hoards included woodworking tools in some quantity.

Furthermore, axes are the most common woodworking tool found, appearing at eight of the twelve sites, and T-shaped axes specifically have been found in Crayke, Flixborough, Hurbuck, Lea Green, and Scraptoft in addition to Torksey. Spoon augers are the next most common found at six sites (Leahy 2013: 231-2)

Agricultural tools were found at ten of the twelve sites and coulters have been found at Scraptoft and Stidriggs. In addition, ploughshares were found at Bishopstone, Nazeing, and Westley Waterless, and bill hooks were found at Flixborough, Lea Green and Westley Waterless. However, in no hoard other than the one from Torksey does either a plough share or a bill hook appear alongside a coulter. (Leahy 2013: 231-2)

What distinguishes the Torksey hoard from the other eleven hoards is the significant number of large iron vessel fragments. With the exception of the iron cauldron used to contain the York, St Saviourgate hoard, none of the other hoards contain any iron vessels or vessel fragments. The Bishopstone and Lea Green hoards do contain vessel chains, however. Still, the sheer quantity of vessel fragments (thirteen of the thirty one total objects in the hoard), stand in stark contrast with the other iron hoards. Furthermore, only the hoards from Asby, Crayke and York, St Saviourgate contain scrap metal fragments, which may be comparable to the smaller fragments in the Torksey hoard. (Leahy 2013: 231-2; Ottaway 2009a: 259)

Like the other eleven iron hoards from Britain, the Torksey hoard is very different from the iron tool hoards found in Scandinavia. Of the six Scandinavian Viking-Age hoards discussed by Ottaway, carpentry tools were only present in four: Dejbjerg, Halleby Å, Veksø, and Mästermyr. Also, in contrast with the British hoards, smiths' tools were present in and made up significant quantities of five: Dejbjerg, Halleby Å, Ålebaek, Tjele, and Mästermyr. The Veksø hoard alone is somewhat similar to the British hoard in

that it consists of eleven spoon augers, a coulter and other agricultural tools (Ottaway 2009a: 259). Furthermore, the Scandinavian hoards are more identifiably connected with a particular craft. The Mästermyr hoard was likely the tool kit of an itinerant craftsman who worked in metal and wood. The Ålebaek and Tjele hoards belonged to smiths and the Veksø hoard was probably the possession of a farmer who may have also been a craftsman (Ottaway 2009a: 261). Similarly to the British hoards, the Torksey hoard does not fit into specific categories like these Scandinavian hoards do, nor does it reflect a particular trade,

Another important factor to consider when discussing hoards is the presence or absence of a containing vessel. The Mästermyr hoard was found in a wooden chest which would have been very portable and appropriate for a traveling craftsman. It is likely that three of the other Scandinavian hoards, Dejbjerg, Tjele, and Veksø, were also in chests. Since these were collections of objects in containers which were meant for transportation, it is likely that they were meant to be retrieved. In contrast, the British hoards which were clearly deposited within containers were mainly held within lead vats. The Flixborough and Westley Waterless hoards were each deposited within two lead tanks and the Stidriggs hoard was deposited within a single lead tank. The hoard from York, St Saviourgate was supposedly found within an iron cauldron and a lead tank (Ottaway 2009a: 261). These lead tanks used in Britain were not likely meant for travel. Having said that, just because they were not containers meant for long term travel, does not necessarily mean that they were not intended to be recovered. Lead was valuable at the time and was regularly recycled. Cowgill notes that the Flixborough hoard may have been an emergency deposit of the "less portable valuables of a community" (Cowgill 2009: 269). On the other hand, Ottaway assigns a possible ritual meaning to the deposit, which I will discuss in the next section. The crucial point is that the hoards which are either in

large heavy containers, or were not buried within a container, were less likely to be the tool set of a traveling craftsman Therefore the Torksey hoard is even more likely not the tools of a particular craftsman, at least not a mobile one, nor is the hoard of likely Scandinavian origins.

Ritual Deposits

Ritual deposition is the main context for hoards which are intended to remain in the ground. The types of deposition that relate to the selection of British hoards in Table 2 are abandonment/ termination deposits, foundation deposits, religious or votive deposits, and deposits of iron objects and weapons in wetlands.

Abandonment/termination and foundations deposits consist of either votive or ritual items buried in or around structures upon their construction or destruction. In her discussion of Early Anglo-Saxon 'Special Deposits' Hamerow noted that abandonment/termination deposits were more common in England and foundation deposits were more common in the North Sea area and Scandinavia (Hamerow 2006: 26-8; Thomas 2009: 385). Despite the onset of Christianity, termination deposits were part of the Anglo-Saxon ritual vocabulary through the Conversion period (Thomas 2009: 386). The Bishopstone hoard is a good example. . It was found in the cellar of what was a tower, and appears to have been buried in the cellar when it was filled shortly after the destruction of the superstructure (Thomas 2009: 382). Thomas sees this hoard as representing the social and economic conditions of the estate which incorporated the former structure. Four separate categories of objects, 1) tools, 2) structural fittings, 3) locks and keys, and 4) horseshoes, each represented an aspect of life at the estate. These include 1) domestic, crafting, and agriculture, 2) structure of the tower, 3) security of the estate and the estate itself, 4) transportation available at the estate (Thomas 2009: 391-3).

Setting aside the fact that the Torksey hoard was not recorded to have come from a building, the objects in the hoard do not fit into similar kinds of categories. The woodworking tools (TIH01-07) and the agricultural tools (TIH09-10) could represent the agricultural and craftwork, and the cauldron and bowl fragments (TIH14-16, TIH20-29) could be said to represent the hearth or domestic part of the estate. However, the blacksmith, who was essential to an estate is not represented, nor is transportation. Furthermore, nearly all the vessels are fragmented and incomplete.

The Lea Green and Asby hoards are not single deposit hoards but rather scatters of objects in a particular area. Both come from locations which include multiple structures around which the objects were dispersed and where the ground has not been ploughed (Leahy 2013: 230, 233). Since the Torksey hoard is recorded as being 'found together' and was not listed as being associated with a building, it is not likely to have been a similar deposit.

The tool hoard from Flixborough is possibly an example of a religiously affiliated deposit. Because of the eight pointed cross on the bell and the six pointed cross on one of the lead containers, along with the presence of what is thought to be the remains of a chapel nearby, Ottaway has proposed that the hoard may be the collection of tools used to build the church. The tools, which had become holy by constructing a sacred building, could not be used to construct any further buildings without being sullied along with those who used them. He also mentions that the number of woodworking tools (twelve) may represent the apostles and makes the connection between the woodworking tools and Jesus the carpenter (Ottaway 2009a: 261). The Torksey hoard should also be considered in a similar context since there is what may be a cross on the handle of the coulter (TIH09). Again, setting aside the fact that the hoard was not found in relation to a structure, the cross on the coulter (TIH09) could imply a Christian connection. If the

contexts of the Torksey hoard are assessed similarly to those of the Flixborough hoard, then the seven woodworking tools could have a multitude of biblical and Christian associations. However, other factors make this seem unlikely. To begin with, the cross in the Flixborough hoard is on a religiously associated object, the bell (Ottaway 2009a: 261), while in the Torksey hoard it appears on the coulter which does not have religious significance. In addition, the woodworking tools in the Torksey hoard alone would not be sufficient to construct a building, and likely not something like an altar either. Furthermore, the other objects in the hoard should not be ignored. They do not have any connection to construction.

An important aspect of the Flixborough hoard which allows for the possibility that it was a ritual deposit is the seemingly unused or barely used nature of the objects in the hoard (Leahy 2013:235). Other than one axe socket all of the objects in the hoard are intact. The Scraptoft hoard also contained tools which would have been undamaged when deposited (Leahy 2013: 235). The fact that *all* or virtually all the tools in these hoards were undamaged is significant, and may imply that the tools were specifically chosen, or manufactured , to be deposited in a ritual context. The vast majority of the Torksey hoard however, is damaged to varying degrees. There are only a few objects, the adze (TIH07), the coulter (TIH09), and the bowl (TIH14), which appear to be undamaged. Furthermore, the nature of the damage seems to be more a result of use than a form of ritual damages like the 'ritually killed' swords and weapons found in Scandinavia (Price 2014:180-1).

The ritual deposition of iron objects in watery or wetland contexts existed in Britian and Scandinavia stretching back to prehistoric times (Richards 2008: 368). However only three of the twelve hoards in Table 2 were found in wetlands. The Hurbuck and Nazeing hoards come from riversides, however there is a chance that they were actually deposited on the river bank and slid to the river over time. The Stidrigss hoard

was found in moorland (Leahy 2013: 230). The Torksey hoard fits in this pattern as the presence of the 'hard ashy deposit' likely means it was originally deposited on dry land, as mentioned earlier. This is particularly significant for the Torksey hoard since there was a considerable amount of wetland in the area, so it would not have been difficult to deposit in a wetland context if it were that type of ritual. However, as Leahy pointed out, too many of the 7th-11th century iron hoards were found on dry land for "these deposits [to] replicate the pattern of votive deposition of weaponry seen in many periods of the past" (Leahy 2013: 230).

Thus, it does not seem likely that the Torksey hoard was a ritual deposit.

Coin/Precious Metal Hoards

Coin and silver hoards have been found across Britain and Scandinavia dating to the Anglo-Saxon periods and the Viking Age. One theory about their deposition is that of safe keeping (Richards 2013: 238/2854). In times of danger or threat, which happened frequently in Anglo-Saxon and Scandinavian contexts, valuables or money would be hidden in the ground so it would not be stolen. However, the owner may have died or was not able to retrieve the money and it subsequently remained in the ground. Some notable examples of these hoards include the Curedale silver hoard from around 905, which contained coins and hack silver and is a typically Scandinavian hoard, and the Bolton Percy hoard which was an English hoard only containing Anglo-Saxon coins (Richards 2013: 297/2854; Richards 2008: 368).

Though the contents of the Torksey hoard are in no way similar to these, the reason for its deposition may be related. The hoard may have been deposited for safekeeping.

Scrap Metal Hoards

From the above discussion it seems probable that the Torksey iron hoard was a significant collection of scrap metal. There are very few "complete" objects in this hoard. Also, corrosion of the objects was not so great when found to believe that other parts corroded away. Iron was an incredibly important material during the medieval period since it was used to make tools, weapons, hinges, locks, nails and a variety of other things needed in everyday life (Goodall 1990b: 36-7). Scrap iron, or broken pieces of iron, were still extremely useful as the metal could be recycled or re-forged, and used to form new objects or patch others (Ottaway 1992: 503-6). Metal workers received iron from the smelters in bar or ingot form, which they would then shape into different objects, leaving fragments as scrap metal which is found in hoards (Ottaway 1992: 481). For example, bars or bar fragments were found in the hoard from Crayke, which was likely a blacksmith workshop (Shepard 1939: 280-1). Similarly, ingot fragments were found at York, St. Saviourgate and bar forms along with other small iron fragments were found in the Mästermyr hoard. A large block of iron was found in Stidriggs (Ottaway 2009: 259; Arwidsson and Berg 1999*;* Leahy 2013: 232). However, none of these are hoards *strictly* of scrap metal.

In contrast, the Nazeing hoard is believed to be all scrap metal and includes damaged axes, spearheads and other fragmentary or broken objects (Morris 1983: 28-36). Though the Torksey axes are similar to those in the Nazeing hoard, the vessel fragments in the Torksey hoard are considerably larger than any of the so far mentioned pieces of scrap iron. It is also important to consider that large iron objects are not often found at Anglo-Saxon sites which may be due to the fact that they were efficiently recycled. This was a possible explanation given by Ottaway for the low percentage of agricultural tools

found. He said that, at least in rural areas, iron was recycled to a greater degree (Frantzen 2014: 134). Therefore I do not think that the larger sizes of the objects in the Torksey hoard discount them from being scrap metal. Additionally, because of the value of iron, especially of steel, it would make sense for a large collection of scrap metal that included steel edged tools, to be hidden in the ground for safe keeping, similarly to precious metal hoards.

CONCLUSIONS AND SUGGESTIONS FOR FURTHER STUDY

The Torksey Iron hoard clearly presents us with many challenges, and great potential for adding to the understanding of the development of medieval the Torksey borough and the surrounding area. Despite the ambiguity related to the nature and location of its deposition, from available evidence a strong hypothesis can be made that the Torksey Hoard is scrap metal, likely from the 10^{th}-11^{th} centuries and was probably found in the fields south of Torksey on the southern side of Foss Dyke canal, which is now in the parishes of Fenton and Kettlethorpe.

Scrap metal would have been material belonging to metalworkers, and therefore despite the woodworking tools in the hoard, it was more likely either in possession of, or on its way to, a metal worker. During the Early and Middle Anglo-Saxon periods, smiths were primarily itinerant in Britain and it was only during the Viking Age with the growth of large urban centers that smiths started to settle and ironworking became largely a town based industry (Richards 2013: 1666/2854). During the earlier periods there were some smiths based in the small developing towns or estates however it was not as common as the smith traveling and tending to the needs of people across the rural landscape. Additionally, large and more complex objects were more likely developed once smiths

had permanent workshops (Richards 2013: 1659/2854). Evidence for ironworking has been found in Stamford, Lincoln, York, and Northampton. While Torksey was not as large as Lincoln or York, for example, according to the Domesday book, in 1066 it was a prosperous and considerably large urban area (Hadley and Richards *forthcoming: 2*). Because, iron was an essential part of everyday life it would not be surprising for at least one smith to be working in Torksey, and the presence of the scrap metal hoard may help confirm this. Furthermore, while the collection of scrap metal does not necessarily indicate what type of metal work was being done, the collection of woodworking tools does indicate that some type of woodworking, likely to do with the shaping of boards, was taking place as well.

If a metal worker was settled in the town, then why might this hoard be found so far outside of the boundaries of the borough? The large scale smelting of iron probably took place near the sources of the ore and near a source of fuel, large quantities of wood, instead of in town (Richards 2013: 1673/2854). Also, perhaps small scale smelting took place outside, but nearby the town for the resmelting of scrap metal. What is more likely is that these objects were to be reforged.

Another possible reason for the hoard of scrap metal to be so far outside the borough may have to do with the reputation of smiths and of ironworking itself. Leahy discusses a possible taboo regarding iron among the Anglo-Saxons, which may have lead to the scrap metal being kept outside the town (Leahy 2103: 235).

Another perspective to explore is that perhaps the borough was either wider than is understood, Or, the placement of the hoard could indicate that the borough had control or influence stretching at least as far as the modern parish of Kettlethorpe. Either way, it

would likely be useful to study this area in relation to the Torksey borough, in particular looking for any evidence of metalworking.

On the other hand, if the hoard is from the winter camp site, perhaps it does indicate that the fields were used for some other purpose beyond agriculture after the great army moved on, and the evidence is obscured below the sand.

There is the possibility that this hoard was not actually from the Torksey borough at all, but rather from one of the larger urban centers in the region such as Lincoln or even York. As mentioned earlier, Torksey is an important crossing point on the road from the southern part of England to York and the northern part of the country. This is in addition to the Foss Dyke canal which connects this area to Lincoln. Consequently, the Torksey hoard may have been the possession of a traveler moving through the area to or from a larger urban area where there was more likely a large ironworking industry. Ironworking was taking place in both Lincoln and York during this period, and the smiths were likely permanent craftsmen (Richards 2013: 1682/2854; Ottaway 1992).

The objects in the hoards themselves hold important significance for the study of this time period as they are unique objects and examples of things that are not often found. This is especially true for the bowl and cauldron fragments of all sizes. Since the evidence points to this hoard being from the 10th-11th centuries, these may be the first examples of cauldrons from this early a period. While handles and suspension chains such as those found at Flixborough (Ottaway et al 2009: 172-5) suggest the presence of iron cauldrons and vessels, the cauldron and vessel fragments from the Torksey hoard may provide clearer evidence that they were used in the Late Anglo-Saxon period.

Having said that, the objects are currently very fragile and since they are extremely uncommon finds, it is critical to further conserve them. Conservation would

also allow for a more detailed study of the physical objects as they could be picked up and removed from their containers. In addition, the flakes would be either reattached or cleared so that the surfaces of the objects could be more closely studied. Areas that are unclear on the X-rays could be examined more precisely.

The coulter, (TIH09) and the ring with the strap fitting (TIH12) for which X-radiographs were not completed, should be X-rayed in the future. This may reveal information about their manufacture. In particular it will likely be visible on an X-radiograph if the coulter was manufactured from multiple pieces of iron like those from Scraptoft (Leahy 2013: 224) and from Lyminge (Thomas 2012: 2), which would help clarify the dating of TIH09. Similarly, additional X-radiographs of TIH12 may clarify how it was made and where the rivets in the ring are and whether it is similar to the other two rings. This potentially could imply that all three rings, despite being mismatched, were made by the same smith or at least in the same smithing tradition.

Scientific analysis which might further reveal important information about the use and manufacture of the objects in the hoard include metallographic analyses of the edged tools (TIH01-03, TIH07-08), and analysis of the sediment that was found inside TIH14 and on the surface of TIH16. Metallographic analysis would identify the method of attaching a steel edge to the tools, whether a steel core was sandwiched by ferritic iron, or if just a cutting edge was welded to a blade of ferritic iron (scarf or butt welding). This can help solidify the dating of the edged tools. For example, the steel core method was more prominent in later Anglo-Scandinavian period in York while the butt welding method was used in earlier Anglo-Scandinavian period (Ottaway 1992: 484-5). The analysis may also indicate what types of iron were used and in what amounts. Ferritic iron, phosphoric iron, and carbon steel were used in varying quantities and combinations in different regions. For example, blades or edged tools with less phosphoric iron may

come from closer to North Yorkshire which has a larger amount of phosphorus-free iron (Ottaway 1992: 485). In addition patterns in both iron content and tool manufacture may indicate the presence of one or multiple smiths or smithing traditions.

The analysis of the sediment may provide information about how the bowls were used, for example are there any organics which may indicate that they were used for cooking? This is especially the case for TIH16 because of the dark black corrosion only on the top surface. One of the original theories about the bowls and vessel fragments was that they were used for dyeing. Dyeing was a component of textile production which was largely associated with women. However, the use of iron tubs for dyeing would distort or muddy the intended colors.

There are clearly many challenges in interpreting the significance of the Torksey hoard, made even more difficult by the ambiguity regarding the location of the find. Only a small number of early medieval iron hoards have been found, and this particular hoard is distinct in many ways, including the variety of objects, but perhaps especially by the inclusion of fragments from large vessels. Knowing where the "millfield" is actually located would open up a much wider discussion about the hoard's deposition and the connection with its surroundings. Was it in proximity to a building or church, or water? Was it found along the trade routes? Can the location of this large iron hoard of scrap metal direct further exploration of the landscape? Was it close to the site of the winter camp, in the town, or neither? Ultimately, there is a lot more to learn from these materials, through conservation and further study.

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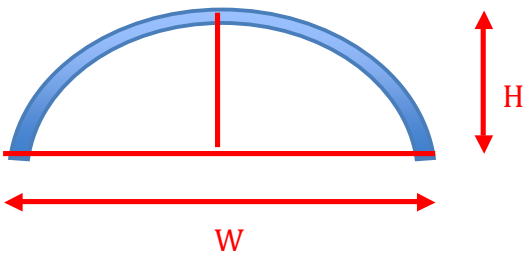
APPENDIX 1

Torksey Iron Hoard No.	Lincoln Record Number/Index Entry	Torksey Iron Hoard No.	Lincoln Record Number/Index Entry
TIH01	LCNCC: 2002.324.2	TIH17	LCNCC: 2002.324.15A
TIH02	LCNCC: 2002.324.10	TIH18	LCNCC: 2002.324.15B
TIH03	LCNCC: 2002.324.17	TIH19	LCNCC: 2002.324.22
TIH04	LCNCC: 2002.324.5	TIH20	LCNCC: 2002.324.21
TIH05	LCNCC: 2002.324.1	TIH21	LCNCC: 2002.324.14
TIH06	LCNCC: 2002.324.9	TIH22	LCNCC: 2002.324.19
TIH07	LCNCC: 2002.324.4	TIH23	LCNCC: 2002.324.27
TIH08	LCNCC: 2002.324.7	TIH24	LCNCC: 2002.324.27
TIH09	LCNCC: 2002.324.29	TIH25	LCNCC: 2002.324.20
TIH10	LCNCC: 2002.324.8	TIH26	LCNCC: 2002.324.28
TIH11	LCNCC: 2002.324.11	TIH27	LCNCC: 2002.324.23
TIH12	LCNCC: 2002.324.18	TIH28	LCNCC: 2002.324.26
TIH13	LCNCC: 2002.324.12	TIH29	LCNCC: 2002.324.13
TIH14	LCNCC: 2002.324.3	TIH30	LCNCC: 2002.324.24
TIH15	LCNCC: 2002.324.16	TIH31	LCNCC: 2002.324.25
TIH16	LCNCC: 2002.324.6		

APPENDIX 2

To calculate the estimated radius of the cauldron where the arc was a known length and height the equation **Radius = (H/2)+(W^2/8H)** was used, where W is the length of the line defining the base of the arc and H is the height between the midpoint of the base and the arc (see diagram below). The Radius was then used to calculate the Diameter using the equation: Diameter = 2 x Radius.



APPENDIX 3

Site	Publications
Asby Winderwathe, Cumbria	Edwards, B N J 2002, 'A group of pre-Conquest metalwork from Asby Winderwath Common', *Trans Cumberland Westmorland Antiq Archaeol Soc* **2**, 111–43.
Bishopstone, East Sussex	Thomas, G 2008, 'The symbolic lives of Late Anglo-Saxon settlements: a cellared structure and iron hoard from Bishopstone, East Sussex', *Archaeol J* **165**, 334–98. Thomas, G. 2010 *The later Anglo-Saxon settlement at Bishopstone: a downland manor in the making*. York: Council for British Archaeology. Pp. 102-106
Crayke, East Yorkshire	Sheppard, T 1939, 'Viking and other relics at Crayke', *Yorkshire Archaeol J* **34**, 273–81. Thomas, G 2008, 'The symbolic lives of Late Anglo-Saxon settlements: a cellared structure and iron hoard from Bishopstone, East Sussex', *Archaeol J* **165**, 386-7. Adams, K.A. 1990. "Monastery and Village at Crayke, North Yorkshire". *The Yorkshire Archaeological Journal.* **62.** Pp. 29-50
Flixborough, Lincolnshire	Ottaway, P. 2009. "The Flixborough tool hoard". In Evans, D. H. and Loveluck, C. (eds) *Life and Economy at Early Medieval Flixborough, c. AD 600-1000: The Artefact Evidence.* Excavations at Flixborough Vol. 2. Oxford and Oakville: Oxbow Books. Pp. 256-66.
Hurbuck, Co. Durham	Hodges, C C 1905, 'Anglo-Saxon remains', in W Page (ed), *The Victoria History of the County of Durham Vol 1*, London: Archibald Constable, 213–15. Wilson, D. M. 1976. "Craft and Industry". In Wilson, D. M. (ed). *The Archaeology of Anglo-Saxon England.* Cambridge: Cambridge University Press. Pp. 255-9.
Lea Green, North Yorkshire	Portable Antiquities Scheme records, search under Lea Green
Scraptoft, Leicestershire	Leahy, K. 2013. "A Deposit of Early Medieval Iron Objects from Scraptoft, Leicestershire". *Medieval Archaeology*. **57**: 223-237.
Nazeing, Essex	Morris, C A 1983. "A Late Saxon hoard of iron and copper alloy artefacts from Nazeing, Essex". *Medieval*

	Archaeology. **27**, 27–39.
Stidriggs, Dumfries	Leahy forthcoming
Westley Waterless, Cambridgeshir	Hughes, Prof 1881, 'Report presented to the Cambridge Antiquarian Society at the AGM, May 26th, 1879', *Proc Cambs Antiq Soc* **4**, xv– xvi. Fox, C 1923, *The Archaeology of the Cambridge Region*, Cambridge: Cambridge University Press.
York, St. Saviourgate	Unpublished