



WA_5001: Cannon Fragment



This item was discovered by archaeologists working on board the *Breughel* to protect archaeological material found during dredging of the Thames Estuary. It was found on the 30th July 2013 in zones 31-35.

This is recognisably part of the breech end of a cast iron gun. The breaks around its edges are worn and appear historic, although it was also gouged by the dredger's drag-head during recovery.

Charles Trollope, an expert on historic guns, studied images of the find and its measurements. He believes that this is the first reinforce (or part thereof) of a late 16th century gun potentially dating to the third quarter of the sixteenth century (1550-1575). Visible on the find is the decorative band which marks the join of the first reinforce (first reinforce ring) to the rest of the gun (centre image above). At the opposite end to this are the potential indications of the decorative band that marks the join of the reinforce and the cascabel (first reinforce astragal), which is missing.

This size of the bore indicates that this was a small gun and Charles suggests it was possibly a 1 or 2 pounder.

The historic breaks may suggest that this gun burst during firing accounting for its presence on the seabed. The Royal Navy also used unserviceable and damaged guns and gun pieces as ballast which may again explain the discovery of this find offshore.





WA_5002, WA_5006, WA_5014, WA_5037 and WA_5053: Blocks



These finds were discovered by archaeologists working on board vessels dredging the Thames Estuary in the autumn of 2013. All five of the finds shown above (from L-R top row; WA_5002, WA_5006 and WA_5014, from L-R bottom row; WA_5037 and WA_5053) have been identified as various types of block used for rigging and sailing a vessel and also for lifting tasks on-board. The examples on the top row have been interpreted as being the body of a three sheave block (WA_5002), a small single sheave block (WA_5014) and a small two sheave block (WA_5006). On the bottom row is a fragment of a block, potentially a dead-eye (WA_5037), and a heavily corroded block with rope attached (WA_5053).

The three examples on the top row are in fair condition and the swallow (or swallows in the case of WA_5002 and WA_5006) are clearly visible when the blocks are turned on their sides. These hold or held a sheave over which a rope would have run to operate the pulley. The sheave of WA_5014 is made of wood indicating that this example is likely to date prior to the 19th century, when metal became commonly used for this component. The degradation of the two examples on the bottom row, and the partial nature of WA_5037, makes further identification of these examples unlikely.

These finds are all likely to have been lost from or with a vessel operating in the estuary. WA_5037 (the potential dead-eye) was found on the same trip as two timbers (WA_5035 and WA_5038 – reported separately) and is possibly connected with them. No structural ship remains were retained alongside the other four blocks.





WA_5004: Cannon Fragment



This item was discovered by archaeologists working on board the *Breughel* to protect archaeological material found during dredging of the Thames Estuary. It was found on the 1st August 2013 in zones 37-39.

This is recognisably a fragment of an iron cannon muzzle. The breaks in the find appear worn suggesting that the damage to the find is historic.

Charles Trollope, an expert on historic guns, studied images of the find and its measurements. He believes that this is part of an English saker or demi-culverin dating from the era of the English Civil War and manufactured potentially within the period 1640 to 1670. This find was identified by the shape of the muzzle swell which is characteristic of this type of gun.

The historic breaks may suggest that this gun burst during firing accounting for its presence on the seabed. The Royal Navy also used unserviceable and damaged guns and gun pieces as ballast which may again explain the discovery of this find offshore.



WA_5007: Parachute – interim report



This item was discovered by archaeologists working on board the *Breughel* to protect archaeological material found during dredging of the Thames Estuary. It was found on the 6th August 2013 on trip 575 in zones 36-40.

Archaeologist Graham Scott identified WA_5007 as a parachute. Found with a small amount of aluminium which potentially represents the partial remains of an aircraft, the parachute appears to be in good condition although it is heavily tangled. Because of this it has not yet been possible to fully open the canopy to reveal detail (for example markings) which would enhance identification.

At present markings visible on the parachute read 'AN' which are interpreted as standing for 'Army Navy' a standard US pattern parachute manufactured by various companies and widely used during WWII by pilots, identifying this item as likely to be American. This will be clarified when it has been possible to fully open the parachute and further investigation takes place. An updated report will be issued for this find at a later date.





WA_5007: Parachute – updated report



This item was discovered by archaeologists working on board the *Breughel* to protect archaeological material found during dredging of the Thames Estuary. It was found on the 6th August 2013 on trip 575 in zones 36-40. An initial report was issued for this find prior to the canopy being fully untangled and opened (WA_5007: Parachute – interim report).



It was hoped that untangling the find would reveal a data panel containing information on which a more detailed interpretation could be based. The find was thoroughly examined in March 2014 and no data panel was present.

Printed markings on the canopy read 'AN' (interpreted as standing for 'Army Navy and reported previously) and the number '24' (pictured and revealed during the opening of the canopy). This is likely to indicate that this was a 24ft canopy constructed of 24 individual panels. Each panel should have been marked along the edge of the parachute though the incomplete nature of the find sadly means that only the 24th panel has a remaining mark.

This find is a standard US pattern parachute manufactured by various companies and widely used during WWII by pilots. It is likely to be American.



WA_5008 and WA_5009: Aircraft Material



These items were discovered by archaeologists working on board the *Breughel* to protect archaeological material found during dredging of the Thames Estuary. They were found on the 6th September 2013 on trip 575 in zones 36-40.

Images of these two finds were shown to Ewen Cameron of the Royal Air Force Museum. He agreed with the initial interpretation given to the finds by Wessex Archaeology staff – both are believed to have come from aircraft.

WA_5009, shown on the left above, is a thin aluminium skin that has suffered considerable damage before, during or after entering the water which has left it misshapen. The fabric seen in the image above is part of a parachute (WA_5007 – reported separately) which was discovered on the same trip. WA_5008, on the right above, appears to be part of a casing from an aircraft and it clearly displays the holes where it would have been riveted to the rest of the craft. Some of the rivets are still in place, and these can be seen in the image above.

It is not possible to identify which aircraft these finds have come from as they display little in the way of diagnostic features. It is plausible, though not certain, that they date from the Second World War when many planes of various nationalities flew over the estuary to attack or defend the country.

WA_5010: Wood and Iron Artefact



This item was discovered by archaeologists working on board the *Breughel* to protect archaeological material found during dredging of the estuary. It was found on the 6th August 2013 on trip 577 in zones 36-40.

The find consists of a wrought iron spike, hafted into a round wooden pole with a thin iron sheet wrapped around the outside. The iron sheeting would originally have extended most of the way along the find as pictured above, finishing before the break in the item. The wood that was unprotected by the metal plating has suffered some degradation and exhibits barnacle growth acquired during its time in submersion.

Identifying this find is problematic given the partial nature of the item. Initially it was considered as a possible harpoon but this was discounted as harpoons were typically barbed, unlike this item. Wessex Archaeology's Bob Davis put forward the plausible hypothesis that this is one foot of a tripod. The iron spike may have been intended to secure the leg into the ground and the iron sheeting shielded the wood from moisture, giving it a degree of protection. It is not possible to confirm this identification on current evidence, as the partial nature of the find gives only a glimpse into its nature.





WA_5015: Leather Rope Protector



This item was discovered by archaeologists working on board the *Breughel* to protect archaeological material found during dredging of the estuary. It was found on the 7th August 2013 on trip 577 in zones 36-39.

This item is made of leather and currently measures approximately 50cm long by 20cm wide, though originally it may have been larger. Holes have been pierced along the edges of the leather and these are clearly visible in the image above.

Archaeologist Graham Scott believes that this find may have been a rope protector - a leather sheet which would have been stitched around a rope or ropes in order to protect them from wear during use or from the elements. This find is likely to have originated on a vessel operating in the estuary. Providing a date for it is difficult, though given the relatively good level of preservation this item was likely made in the post-medieval or modern periods (1500 – present). Leather can survive well underwater, especially if buried, but can degenerate rapidly if allowed to dry out in uncontrolled conditions. The artefact is currently in submersion at Wessex Archaeology's offices to protect it from degradation.



WA_5016, WA_5063 and WA_5068: Bullets



These three bullets were found by archaeologists monitoring material being dredged from the estuary by the *Marieke* and the *Breughel* in 2013. As always, archaeological reporting took second place to health and safety and these finds were only investigated once declared safe by an EOD expert.

Images of all three finds were shown to Jonathan Ferguson, Curator of Firearms for the Royal Armouries Museum in Leeds. He identified the two bullets above as .303 Lee-Metford or Lee-Enfield rifle bullets of the Mk.II or Mk.VI pattern. These were produced between 1888 and 1914 but statistically, Jonathan tells us, these may be more likely to be Mk.II rifle bullets which dates them to 1888 - c.1900.

The projectile below is older. Jonathan has identified this as a lead bullet for a Snider rifle (1867 - c. 1880) which was produced two generations prior to the Lee rifles which fired the bullets above. Though the dates given are accurate for the production of the weapons mentioned, there was an overlap in service as older weapons were retained for use away from active front-line service. These projectiles are likely to have been deposited in the estuary after firing, probably during training.



WA_5017 – WA_5025: Timbers



The nine timbers shown above were discovered by archaeologists working on board the *Breughel* to protect archaeological material found during dredging of the Thames Estuary. They were discovered on 7th August 2013 amongst material recovered from zones 36-39 during trip 586.

WA_5017 (top row, left): This timber measures approximately 42x13cm and has a square profile. It has suffered damage whilst in the water or during recovery and has been bored by marine organisms. Concretion on one surface suggests that a metal nail is preserved within the wood and a small section of one side appears to have been protected from weathering by the attachment of a rectangular object, such as a plaque or an abutting timber.



WA_5018 (top row, centre): This timber measures approximately 10x15cm and is interpreted as a plank. A treenail hole is evident which extends fully through the width of the timber, a method of securing timbers known as 'through-fastening'. It has suffered damage, possibly during retrieval from the water, and shows evidence of having been bored by marine organisms. One end appears bevelled, the other has been broken and the indentation seen on the left in the image above has occurred post-deposition, presumably during recovery by the dredger.

WA_5019 (top row, right): This timber measures approximately 64x20x14cm and is interpreted as a plank. Three treenails are visible *in situ* and three are missing (evidenced by the remains of treenail holes) and they are set in an alternating pattern. Each hole measures approximately 28mm. The treenails and treenail holes are regularly spaced at approximately 25cm horizontal distance, taken from the centre of one treenail to the centre of the next. Both ends of this plank have been broken.

WA_5020 (second row, left): This timber measures approximately 85x25x22cm and is potentially part of a frame. This large fragment has been damaged but displays two worked sides, one of which has a treenail which extends all the way through and which measures 2cm diameter. The end seen on the right in the image above is bevelled and a concretion on one surface suggests the presence of metal fastenings with this piece. The timber shows some evidence of bio-infestation and boring.

WA_5021 (second row, centre): This timber measures approximately 84x24x10cm. It has a rectangular cross-section and is in fair condition, apart from being broken at both ends. One end (on the left above) shows evidence of having been bevelled though this is curtailed by damage. A concretion on one surface suggests the presence of a metal fixing (though this has not been confirmed). No other fixings were noted on the item.

WA_5022 (third row, left): This timber is interpreted as being a plank measuring approximately 90x20cm. It has four treenails (three *in situ* and one missing, evidenced by a hole). This timber has sustained damage which obscures a potentially worked edge visible on the item.

WA_5023 (second row, right): This timber is interpreted as being a small plank measuring approximately 44x14x9cm. Three of its surfaces have been worked and are smooth, whilst the fourth has sustained damage. It is bevelled for part of its length and has one small treenail.

WA_5024 (third row, right): This is a rectangular plank with four worked sides and broken ends. It measures approximately 105x24x10cm. Three treenails are *in situ* and one is missing, and each treenail diameter measures approximately 3cm. Interestingly, one of the flat surfaces of this timber has damage and abrasion believed to be historic which is absent from its opposite side.



This potentially indicates that one surface of this plank was exposed to natural or human elements whilst in use, whereas the other side was protected. The narrow edges of this plank display lightly incised diagonal lines interpreted as being saw marks.

WA_5025 (bottom row): This possible plank measures 137x12x3cm. It is heavily damaged (potentially during retrieval) making interpretation difficult. 2 worked sides are in evidence though no further diagnostic features were noted.

These nine timbers were found during the same trip by the Breughel. Whilst it cannot be confirmed that they are associated, it is likely given their discovery together. The most plausible origin for worked wood found offshore is from a vessel, potentially one wrecked and lying on the seabed. The planks and timbers reported here are likely, based on form and features, to have originated on a vessel although it cannot be confirmed whether the rest of the ship is lying within the shipping channel of the estuary, or whether they have entered the water in some other way. It is possible that they are from a wreck which is broken up and widely dispersed.

Extensive work has been conducted in the estuary prior to the start of dredging and mitigation put in place to protect known or suspected sites of archaeological significance. However, it is possible that some archaeological remains may have been overlooked due to being masked by sediments or because any geophysical anomaly that represented these remains was difficult to interpret.

Even taken together as an assemblage, these timbers have only a limited capacity to inform our archaeological knowledge of the vessel they originated from or of any sites of significance connected to them that may yet lie in the estuary, though further finds from the same area may enhance our understanding.



WA_5026, WA_5027 and WA_5028: Part of a Propeller



These items were discovered by archaeologists working on board the *Breughel* to protect archaeological material found during dredging of the estuary. They were found on the 12th August 2013 on trip 586 in zones 38-39.

Archaeologist Graham Scott tentatively identified WA_5026, shown at the bottom above, as part of the blade of a small variable pitch propeller, possibly from a fixed wing aircraft or part of the tail rotor from a helicopter.

The two other finds reported here are a thin steel rod with gear teeth (top left, WA_5028) and an unidentified tubular metal object (top right, WA_5027), both of which are believed to be associated with WA_5026.

These twentieth century finds may have come from an aircraft downed in the estuary or they may have been discarded at sea with waste from a terrestrial context. Military aircraft are protected by law (Protection of Military Remains Act 1986) and further work in the area should be conducted carefully in case future discoveries suggest a site of archaeological significance in zones 38-39.



WA_5029: Wooden Artefact



This item was discovered by archaeologists working on board the *Breughel* to protect archaeological material found during dredging of the estuary. It was found on the 11th August 2013.

This heavy cylindrical object is made of wood. It has bevelled ends and a square hole cut into both ends of the item. Around this hole is a rectangular indentation which would have held a metal plate.

It bears some similarities to a wooden drill round recovered from the estuary in 2011. WA_1051 was a cartridge case section of a 'drill' or practice round. These were inert versions of ammunition, used to train gun crews in 'dry' firing practices. WA_1051, found in 2011, is longer than WA_5029 and has been hollowed, unlike WA_5029. Images of the find above were shown to Nick Hall, Curator of Artillery at the Royal Armouries Museum who agreed that despite similarities, this find is unlikely to be a drill round.

WA_5029 has instead been interpreted as a wooden roller. Metal rods inserted into either end, and secured by a plate, would have allowed the object to spin on its horizontal axis. This would have allowed rope to be played out, reeled in or stored on deck. A narrowing of the centre of the item, as seen above, might have been caused by wear, though degradation suffered by the find whilst submerged prevents confirmation of this.

This item may have come from a vessel – either being discarded when damaged or worn, or no longer required or it could have been lost with a vessel wrecked in the estuary.



WA_5031: Belt Buckle



This find was discovered by archaeologists working on board the *Breughel* between 9th and 12th August 2013. It was found during trip 579 in zones 13, 16 and 22.

This belt buckle measures 5cm in length and has a two-pronged pin. Wessex Archaeology's Graham Scott, the archaeologist who discovered it, noted its similarity to buckles issued by the RAF which also have two-pronged pins and bevelled corners.

RAF buckles are produced from 2 main materials – brass and Staybrite, a trade name for anodised aluminium. Staybrite was introduced from the 1950's as an alternative to brass which required less polishing.

This buckle is likely to date to the 20th century. How it came to lie offshore is unknown.



WA_5032: Base of Stoneware Jug



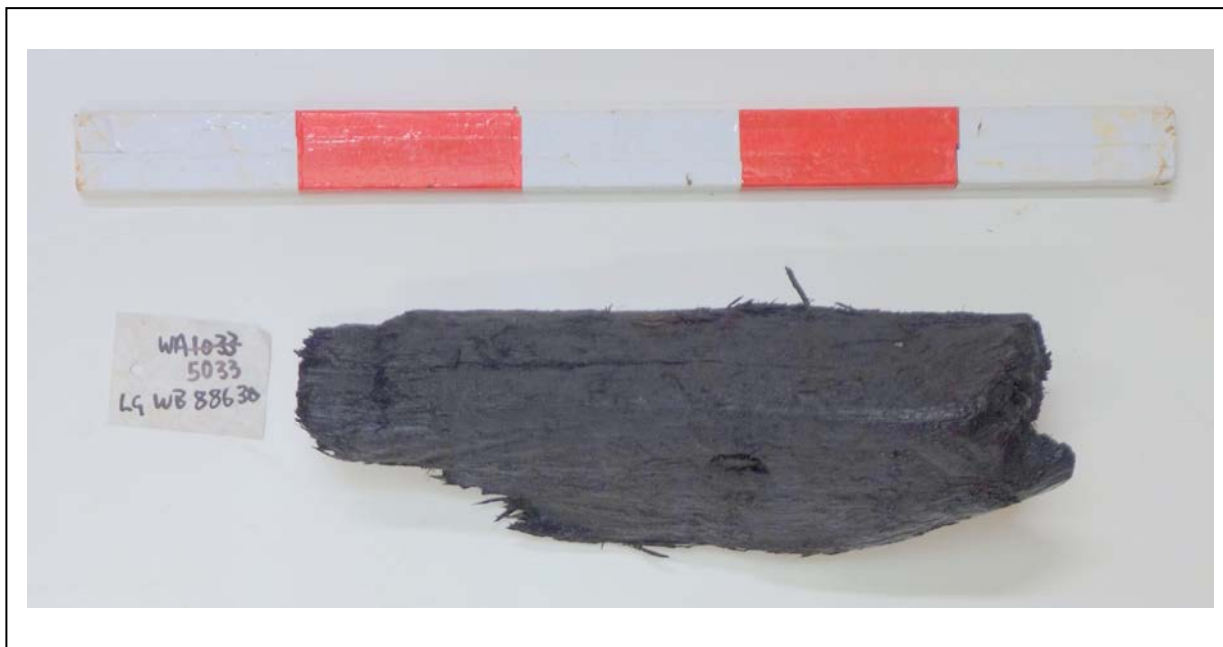
This find was discovered by archaeologists working on board the *Breughel* to monitor dredging of the estuary for archaeological material. It was dredged between the 9th and the 12th August 2013 in zones 38 and 39 (trip 585).

This find was shown to Lorraine Mephram, Senior Project Manager for Finds and Archives at Wessex Archaeology. Lorraine identified the pottery as being the base of a stoneware jug.

This type of vessel was manufactured in the late 16th and 17th centuries in Continental Europe, specifically in Cologne and Frechen in Germany. This is a robust pottery which is relatively hard-wearing making it ideal for transporting liquids such as alcohol, sauces or oil for use or for trade. It was likely to have been deposited in the estuary from a vessel, potentially after being broken, though the break seen above is relatively 'sharp' suggesting that it may have been caused during recovery.



WA_5033: Worked Timber



This item was discovered by archaeologists working on board the *Breughel* to protect archaeological material found during dredging of the Thames Estuary. It was dredged between 9th and 12th September 2013.

This timber measures approximately 35cm long x 15cm wide (at its widest point) and displays a broadly triangular cross-section, although this has been affected by damage to the item that has occurred post-deposition. Two of the sides are smooth where they have been worked whilst the third is obscured by damage. One treenail is in evidence (measuring approximately 28mm diameter) and another treenail hole has been truncated. Two steps have been cut into the wood, one of which is visible on the left in the image above, but neither is thought to represent a joggle or scarf.

This worked timber is in fair condition with no signs of infestation by marine borers. The most plausible origin for worked wood found offshore is from a vessel, potentially one wrecked and lying on the seabed. The timber reported here is likely to have originated on a vessel though it cannot be confirmed whether further remains of an associated ship are lying within the shipping channel of the estuary, or whether it has entered the water in some other way. Given the absence of further timbers within the same load it may be that this is a loss from a vessel, rather than with one, or that this timber has come from a dispersed site.



WA_5034: Architectural Carved Stone



This stone artefact was recovered by archaeologists monitoring material dredged from the estuary. It was found in August 2013 by the Breughel on trip 579.

This is a carved granite architectural element displaying a scrollwork pattern similar to that seen on Ionic columns. It is broken and has been discoloured by its time spent in submersion. Providing a date for finds like this one is problematic as stone artefacts are commonly identified purely on stylistic elements. The design of the carving on the item pictured originated in ancient Greece over 2500 years ago but has been much copied since and this example could be a Victorian reproduction of a much earlier design, or it could be significantly older. Without its original context, it is difficult to tell which.

How this find came to lie in the estuary is unknown but given its compact size and heavy weight it could potentially have been used to weight fishing pots or nets to the seabed. Alternatively, it may have been disposed at sea after its removal from the structure it originally graced. Evidence from the south coast suggests that blitz rubble was deposited at sea to the east of the Isle of Wight and it is possible that similar events took place in the Thames Estuary.



WA_5035 and WA_5038: Worked Timbers



These timbers were discovered by archaeologists working on board the *Breughel* to protect archaeological material found during dredging of the Thames Estuary. They were dredged on the 14th August 2013 during trip 590 in zone 38-39.

These two timbers were retrieved on the same trip as WA_5037 (pictured right and reported separately) which is believed to be part of a dead-eye block. If these two timbers are confirmed to be of nautical origin it is plausible that the three finds are connected.



WA_5037: Potential dead-eye block

WA_5035, right above, is the end of a small plank with no visible treenails present, measuring approximately 78x17x3cm. Damage is visible on one end and across one side of the timber though the rest is in fair condition with minimal damage from infestation by marine borers. A square end, visible on the left would have allowed it to form a butt joint with adjoining timbers.

WA_5038, left above, is a flat and badly damaged plank measuring approximately 43x17cm. Boring caused by shipworm (*Teredo navalis*) is visible on both sides. A small hole for a treenail or spike is present which measures 2cm diameter.

The two planks reported here are likely to have a maritime origin, and probably originated on a ship using the estuary. The discovery of three wooden finds with maritime potential together suggests that they are connected and therefore likely contemporary, though this cannot be confirmed.





WA_5036: Mule Shoe



This iron artefact was discovered by archaeologists monitoring material on board the *Breughel* in August 2013. It was found in zone 38-39 on trip 590.

Rachael Seager Smith, finds expert at Wessex Archaeology, dispelled the initial identification of this find as a horseshoe, as horses' feet are rounder and not elongated like the u-shaped shoe above. Farrier Steve Griffin, drawing on his vast experience of shoeing animals, provided the identification of mule shoe. Mules, the offspring of a male donkey and female horse, typically have feet smaller and narrower than those of horses.

How this find came to be in the estuary is unknown. Mules have in the past been transported by ship (notably to the Continent during WW1) and it is possible that this shoe was discarded from such a vessel. Alternatively, it may have been used to weight fishing gear down to the seabed, accounting for its loss in the estuary.



Horseshoes have a more rounded Shape – these examples were reported through the Marine Aggregates Protocol.



WA_5039: Floor Tile



Part of a medieval tile excavated in Somerset
© Wessex Archaeology

This report relates to the larger find seen on the right above, WA_5039, which is a tile. This find was discovered by archaeologists working on board the Breughel on the 14th and 15th August 2013 to monitor dredging of the estuary for archaeological material. It was found during trip 589 in zones 38 – 39.

This find was shown to Lorraine Mephram, Senior Project Manager for Finds and Archives at Wessex Archaeology. Lorraine confirmed that it is a tile and that it is likely to date from the medieval or post-medieval periods (generally agreed to span 1066 - 1800). It appears to be plain with no decoration and it was likely to have been square (similar to other tiles from the period) though this cannot be confirmed due to abrasion to the artefact.

This type of tile was used for flooring and some examples (such as that shown on the left above which was excavated by archaeologists in Somerset) are intricately decorated. These are robust tiles designed to withstand the fall of thousands of footsteps. It is not known how this item came to be lost in the estuary.



WA_5040: Red Ware Pottery Sherd



This report relates to the smaller find seen on the left in the image above, WA_5040, which is a sherd of pottery. This find was discovered by archaeologists working on board the Breughel to monitor dredging of the estuary for archaeological material. It was found in zones 38-39 during trip 591.

This find was shown to Lorraine Mephram, Senior Project Manager for Finds and Archives at Wessex Archaeology. Lorraine confirmed that it is pottery and identified it as post-medieval red ware. This is a rim sherd, although given the small size of the artefact it is not possible to suggest what type of vessel it may have been part of.

This type of pottery was widely produced in the post-medieval period (1500-1800) and would have formed the basis of the everyday domestic pottery collections of people of all social classes. Several production centres have been identified in and around London so it is plausible that this piece was manufactured locally, although given its discovery offshore it could also have originated further away.





WA_5042, WA_5043, WA_5044, WA_5046 and WA_5050: Ships' Timbers



Several timbers were discovered by archaeologists working on board the *Marieke* to protect archaeological material found during dredging of the estuary. Those detailed in this report were found on the 13th September 2013 on trip 1233 in zone 38. Sadly they do not seem to have been recovered from the dredger after initial reporting and so only limited identification can be made.

WA_5042, WA_5043 and WA_5044 were described on discovery as being wooden ship timbers or frames, two of which had treenails. WA_5050 is described as a ship timber with treenails and WA_5046 as a floor timber. These finds are likely to have originated on a vessel or, more likely, on vessels using the estuary. Many similar finds have been identified during years of archaeological research into the Thames Estuary, which has been an active waterway for thousands of years.



WA_5045: Iron Tongs



These iron tongs were found on board the *Marieke* by archaeologists monitoring material recovered during the dredging of the Thames Estuary (Zone 38 Trip 1231).

They are constructed of wrought iron and measure approximately 0.5m long.

The length of these tongs suggests an industrial role – similar tongs are used by blacksmiths to extract material from a forge when it is red hot. The length is crucial to prevent the smith getting too close to the heat.

These tongs may have been similarly employed or, given their discovery offshore, they may have come from a vessel where they could have been used in the furnace or engine room. The bend seen in the tong arm at the bottom of the image on the left above is believed to have occurred post-deposition, and is not thought to be an original feature of the tongs.





WA_5047 and WA_5052: Lead Blocks



These two lead blocks were discovered by archaeologists monitoring material found during the dredging of London Gateway. The example shown above bears the inscription 'MOUNT ISA'. The inscription on the other example, shown right, is not complete.

Mount Isa is a mining town in North-eastern Australia famed for its production of metals including lead. This lead ingot has been produced for sale and transport and was manufactured during the 20th century.



The second lead block reported also bears an inscription though sadly it is not fully legible. The grooves seen crossing the find may have allowed it to be broken for easier use or may have allowed it to be tied or strapped to another item.

How these came to the seabed is not known. Heavy scrap metals are sometimes used to weight pots or nets but these are ingots shaped for ease of transport and trade, and unlikely to be deemed 'scrap'. They may have been lost from or with a vessel operating in the estuary.



WA_5048: Iron Wall Tie Plate



This iron plate was discovered by archaeologists monitoring dredging activity on board the *Marieke* in September 2013. The scale in the image above measures 20cm and the find is approximately 1cm thick.

The find was shown to Wessex Archaeology's historic buildings team where Bob Davis confirmed its initial identification as a wall tie plate. These plates were used to secure rods through brick or masonry buildings to prevent bowing and improve structural stability. A rod would have passed through the square aperture in the centre of the find above and been secured. The plate braces the pressure of the rod against the wall. As these plates were visible on the outside of buildings they were sometimes cast in decorative styles though the example above may be a rarer style as Wessex Archaeology staff have not seen a parallel.

The face of WA_5048 shown above would have been the outer face – it is decorated with lightly incised curving lines and a depression in the centre of the find indicates where a bolt was positioned. The reverse of the find displays a pattern similar to wood grain which may indicate that the mould used to cast this find was constructed of wood. In terms of date, this type of building technique was prevalent in the 19th century and so WA_5048 is likely in the region of 200 years old.



WA_5051: Timber



This item was discovered by archaeologists working on board the *Marieke* to protect archaeological material found during dredging of the estuary. It was found on the 13th September 2013 on trip 1233 in zone 38.

This find measures approximately 60x20cm and is interpreted as a plank. It has been broken at both ends but shows few signs of boring by marine organisms so was potentially buried in seabed sediment, prior to its recovery.

Two treenails (pictured above) and one broken treenail hole (on the left above) are present with the two intact treenails measuring approximately 3cm diameter.

The most plausible origin for worked wood found offshore is from a vessel, potentially one wrecked and lying on the seabed. The timber reported here is likely to have originated on a vessel though it cannot be confirmed whether the rest of the ship is lying within the shipping channel of the estuary, or whether it has entered the water in some other way. Given the absence of further timbers within the same load it may be that this is a loss from a vessel, rather than with one, or that this timber has come from a dispersed site.



WA_5054: Curved Timber



This item was discovered by archaeologists working on board the *Marieke* to protect archaeological material found during dredging of the Thames Estuary. It was found on the 16th September 2013 on trip 1239 in zone 38.

This find measures approximately 50x22cm and displays a characteristic rounded shape, visible above. It is interpreted as being a broken part of frame. Four holes, shown on the lower surface in the image above, are present which are likely to have been nail holes. The narrow gauge suggests metal nails were used and the remaining profile suggests that the nails were square profiled. Two metal nails and a treenail are present on the curved face (left above) and four holes were counted on this same face which may have held nails (two of these holes were clearly visible and two lie within a broken section). A further treenail is present on the face of the timber (shown above) which measures 2cm diameter.

The most plausible origin for worked wood found offshore is from a vessel, potentially one wrecked and lying on the seabed. The timber reported here is likely to have originated on a vessel though it cannot be confirmed whether the rest of the ship is lying within the shipping channel of the estuary, or whether it has entered the water in some other way. Given the absence of further timbers within the same load it may be that this is a loss from a vessel, rather than with one, or that this timber has come from a dispersed site.





WA_5055: Iron Find



This item was discovered by archaeologists working on board the *Marieke* to protect archaeological material found during dredging of the Thames Estuary. It was found on the 17th September 2013 on trip 1240 in zones 37 and 38.

This find measures approximately 46cm from the broken end seen on the left above to the attachment of the curved cross-piece, and has a projected diameter of 27cm across the broken ends of the curving section shown on the right.

It is manufactured from wrought iron and has suffered from corrosion whilst submerged. Some fibres were noted around the joining of the curved head, suggesting that this find was part of a composite item which included ropes or fabric.

Identifying this find with any degree of certainty has not been possible. However, it is possible that this may be the badly corroded remains of a swivel gun mount. Swivel guns were small cannon in widespread use on vessels as anti-personnel weapons. It may also be a gimbal mounting for some other device, such as a compass.

Given its discovery offshore this is likely to be a maritime find and is likely to have had an association with vessels using the estuary. The absence of further maritime material within the same load would suggest that this find was lost from a vessel, rather than with one, or that this find has come from a dispersed site.



WA_5056: Leather Shoe



This item was discovered by archaeologists working on board the *Breughel* to protect archaeological material found during dredging of the estuary. It was found on 17th September 2013 on trip 1241 in zones 37-38.

This is recognisably a leather shoe which is likely to have been manufactured and lost in the latter half of the twentieth century. The shoe is a brogue of the style quarter brogue, characterised by perforated decoration along the edge of the toe cap. Leather used to be a common material for shoe soles but is now largely used only for dress shoes and survives relatively well underwater in the right conditions.

The regular stitching on this item suggests that it has been manufactured using a machine. Machines capable of stitching the soles to the uppers of shoes were first invented in the mid-1850's but it was a long time before they were used universally.

Based on the evidence above, this find is currently thought to have been manufactured at some point within the last 60 years. This is likely to be an isolated find, lost or discarded over the side of a vessel.



WA_5057, WA_5041 and WA_5049: Musket Balls



These five musket balls were found by archaeologists assessing material dredged from the Thames Estuary. They were found over the course of several days on board the *Marieke* in September 2013

Images of these finds, along with a description and calibre measurement, were sent to Jonathan Ferguson, Curator of Firearms at the Royal Armouries Museum. At approximately 18mm calibre, these lead shot are likely to be British military or naval musket balls. Muskets designed to fire these shot, Jonathan tells us, include the Land Pattern 'Brown Bess' muskets (pictured), equivalents used by the East India Company and the Navy's Sea Service Musket, which became popular in the late 18th century and continued to dominate naval firearms well into the 19th century.

These are likely to be common finds in British waters given the large number of battles, naval skirmishes and training activities that have occurred around our coastlines. They are difficult to recognise given their small size and sometimes corroded nature. Despite the five of these being reported together, they are not thought to represent a further site of archaeological significance, such as a shipwreck, as their discovery occurred over several days.



WA_5050: Refractory Brick



This find was discovered by archaeologists working on board the *Marieke* to monitor dredging of the Thames Estuary for archaeological material.

Images of the find were shown to Bob Davies, one of Wessex Archaeology's experts on historic buildings and building materials. He identified it as a 'refractory brick' or 'firebrick'. Sadly this example does not have a makers mark on it which would allow further identification but mortar seen on the back of the item does suggest that this find has been used.

These are used to line boilers, flues and kilns due to their ability to withstand high temperatures without cracking due to their composition which includes high aluminium oxide content. Factories creating them are well evidenced in Scotland and the Midlands where they developed to provide for the flourishing iron and steel industry in nearby towns. The superior quality of the bricks led to them being shipped all over the world to places such as Russia, Canada, India, Australia, South America, and Continental Europe. This example is likely to date from the 19th century onwards. Interestingly, the mortar on the back suggests that this was not carried as cargo on a vessel using the estuary. It may have been discarded at sea when it fell out of use or taken on board a vessel to serve some purpose such as weighting nets or lobster pots.





WA_5060: Carburettor



This find was discovered by archaeologists working on board the *Marieke* to protect archaeological material during dredging of the Thames Estuary. It was found on the 17th September 2013 on trip 1242 in zone 37/38. WA_5059 was discovered on the same trip.

WA_5060 is heavily corroded and covered in marine concretion however it is still recognisably a small part of an engine. A gear wheel is visible towards the base of the item as seen in the image above. It is potentially a carburettor though this identification cannot be confirmed due to degradation and marine corrosion on the find.

This find is potentially from a mechanised vehicle – either a vessel, aircraft or motor vehicle. It is being considered at this stage as a chance find lost from a vessel or from a highly dispersed site as no further associated remains were noted by staff on board.





WA_5061 and WA_5062: Metal Finds



These two finds were discovered by archaeologists working on board the *Marieke* to protect archaeological material during dredging of the Thames Estuary. They were found on the 18th September 2013 on trip 1243 in zone 37/38.

They are potentially associated and were found amongst the same cargo, so are reported together here. Find WA_5061 is a curved metal external gear wheel. The find is broken but the remaining section is in fair condition with three rows of gear teeth still defined, though showing some signs of erosion. The internal surface shows two broken faces which potentially would have held spokes.

WA_5062 is a piece of steel frame with seven evenly spaced uniform holes designed for rivets or bolts. The regularity of these confirm that this is a machine made item providing a likely twentieth century date for this find. This find measures 74cm long and its shape, whilst broadly sub-rectangular in profile, is obscured by damage.

Identifying them conclusively is problematic. Both pieces have suffered damage before, during or after entering the water though it is clear they would have been part of a larger piece of machinery, likely to be a vehicle, vessel or aircraft. The absence of further associated material amongst the same cargo suggests that these are isolated finds or that they originate from a highly dispersed site.

The further lack of diagnostic features makes identification of these finds unlikely at this stage. These finds will be reinterpreted at a later date if more material is recovered from zones 37/38 of a similar nature.



WA_5062: Metal Frame Fragment



This item was discovered by archaeologists working on board the *Mareike* to protect archaeological material found during dredging of the estuary. It was found on the 18th September 2013 on trip 1243 in zones 37-38.

Discolouration seen on this find suggests that it is made of iron and its shape and form suggest that it is part of a frame. The holes seen above are evenly distributed and are likely to be fixing points for bolts or rivets, potentially bolts given the absence of damage that may be caused by the insertion of rivets. The uniform spacing and size of the holes on the find and its general appearance suggest that it was machine manufactured which indicates (along with the general good condition of the find) that it is of twentieth century date.

Beyond this interpretation is difficult. It is likely to be part of a frame and given its context it may have come from an aircraft or a vessel though this cannot be confirmed on current evidence. Its relatively modern date and partial nature suggests that it has limited potential to inform us about the archaeology of the Thames Estuary.



WA_5064: Stanchion



This item was discovered by archaeologists working on board the *Breughel* to protect archaeological material found during dredging of the estuary. It was found on the 19th September 2013 on trip 1246 in zones 37-38.

This is a short spiked stanchion, possibly a jack stay stanchion. It is difficult to give an accurate date for this object, but staff specialists at Wessex Archaeology believe it to be post-medieval or modern in provenance. Jack stay stanchions were in use from the beginning of the 19th century. This stanchion may have been utilised on a vessel as an upright bar or a supporting post for chains and ropes, fed via the eye-hole seen on the right. If it is a jack stay stanchion it would have held a wire (the jack stay) onto the yardarm of a sailing vessel to which the sails would have been attached. The spiked end would have been driven into timber which suggests it may have come from a wooden or composite vessel.

Although this artefact may be derived from a shipwreck, it appears to be an isolated find. It may well have become detached from a vessel and lost accidentally. High levels of commercial and leisure activity in the Thames Estuary has resulted in considerable amounts of debris on the seabed. Despite this, further finds in the area could aid interpretation and should be reported through the Protocol.



WA_5065: Timber



This item was discovered by archaeologists working on board the *Marieke* to protect archaeological material found during dredging of the Thames Estuary. It was found on the 19th September 2013 on trip 1246 in zones 37 and 38.

This find measures approximately 42x16cm and has a broadly triangular profile, though this has been altered by damage to the timber sustained post-deposition. Two steps are cut into the side of the timber, visible on the lower part of the find as shown above, potentially representing a three-planed or 'z' scarf joint where two timbers would have been joined. One intact treenail was noted with a diameter of 2.5cm. This relatively thin find is interpreted as a small plank.

The most plausible origin for worked wood found offshore is from a vessel, potentially one wrecked and lying on the seabed. The timber reported here is likely to have originated on a vessel though it cannot be confirmed whether the rest of the ship is lying within the shipping channel of the estuary, or whether it has entered the water in some other way. Given the absence of further timbers within the same load it may be that this is a loss from a vessel, rather than with one, or that this timber has come from a dispersed site.





WA_5066: Tarred Cordage



This find was discovered by archaeologists working on board the *Marieke* to protect archaeological material during dredging of the Thames Estuary. It was found on the 19th September 2013 on trip 1246 in zone 37/38.

Tarring rope was common practice before the introduction of synthetic fibres and the widespread use of steel wire. Hemp rope, which was commonly used in rigging, is susceptible to degradation when exposed to weather and marine conditions. To prevent the loss of structural stability the rope would be coated in tar. This provides strength and, by waterproofing the fibres, protection from the elements. This example demonstrates how effective the technique was as this find has survived on the seabed due to its tarred nature.

This item was found on the same trip as a worked timber (WA_5065) and is potentially connected with it (due to proximity of discovery and their maritime nature) though this cannot be confirmed. No further vessel remains were recorded in the same load so these finds are thought to represent chance losses or highly dispersed sites.

Dating is difficult for this find – pine tars have been in use in Scandinavia for at least 600 years. This example plausibly dates to the later post-medieval or modern period, before hemp and tar marine rope construction was superseded and steam and other forms of propulsion supplanted sails, reducing the need for rope on board.





WA_5067: Machine Belt



This find was discovered by archaeologists working on board the *Marieke* to protect archaeological material during dredging of the Thames Estuary. It was found on the 19th September 2013 on trip 1246 in zone 37/38.

Belts like this one are used in power transmission for many applications now and throughout the last century. This example is a flat belt and, provided that it was not much longer when manufactured, was likely to have been used for short-distance power transmission. The woven outer layer seen on the find creates friction and aids the life span of the belt by providing additional thickness. It has not been possible to determine beyond this what use this find may have fulfilled.

This type of belt can be made as an endless loop but is more commonly joined by stitching, glue or steel fastenings. In-hand examination reveals no join in this belt so it may have been manufactured as an endless loop or the splice has been lost in the broken section of the artefact.

The find is likely to be relatively modern, dating from the twentieth century, but is reported here as it has the potential to be connected with an as yet unrecognised site of archaeological importance such as a ship or aircraft crash site. Whilst the potential remains, there is no evidence that would suggest this is currently the case and this is currently assumed to be an isolated find or from a highly dispersed site.



WA_5070: Timber



This item was discovered by archaeologists working on board the *TSHD Charlemagne* to protect archaeological material found during dredging of the estuary. It was found on the 13th November 2013 on trip 177 in zone 38.

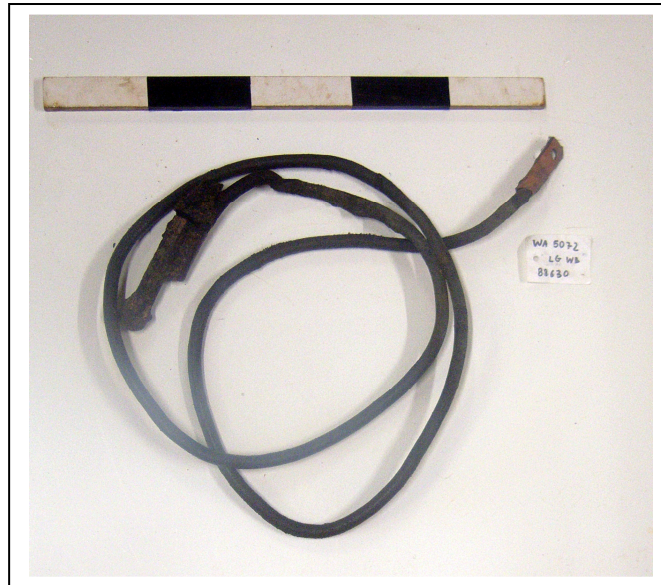
This timber measures approximately 83x20x11cm and is interpreted as a plank. It has been bored by shipworm (*Teredo navalis*) and has suffered damage post-deposition. One surface has been worked though this is also affected by abrasion. No treenails were observed on this timber.

The most plausible origin for worked wood found offshore is from a vessel, potentially one wrecked and lying on the seabed. The timber reported here is likely to have originated on a vessel though it cannot be confirmed whether the rest of the ship is lying within the shipping channel of the estuary, or whether it has entered the water in some other way. Given the absence of further timbers within the same load it may be that this is a loss from a vessel, rather than with one, or that this timber has come from a dispersed site.





WA_5072: Cable



This find was discovered by archaeologists working on board the *THSD Charlemagne* to protect archaeological material during dredging of the Thames Estuary. It was found on the 14th November 2013 on trip 179 in Zone 38.

This cable has copper terminals. Visible clearly on the top right of the photograph above, this type of lug is used to connect equipment with battery or generator power and is commonly used in harsh weather environments, such as would be found on a vessel offshore.

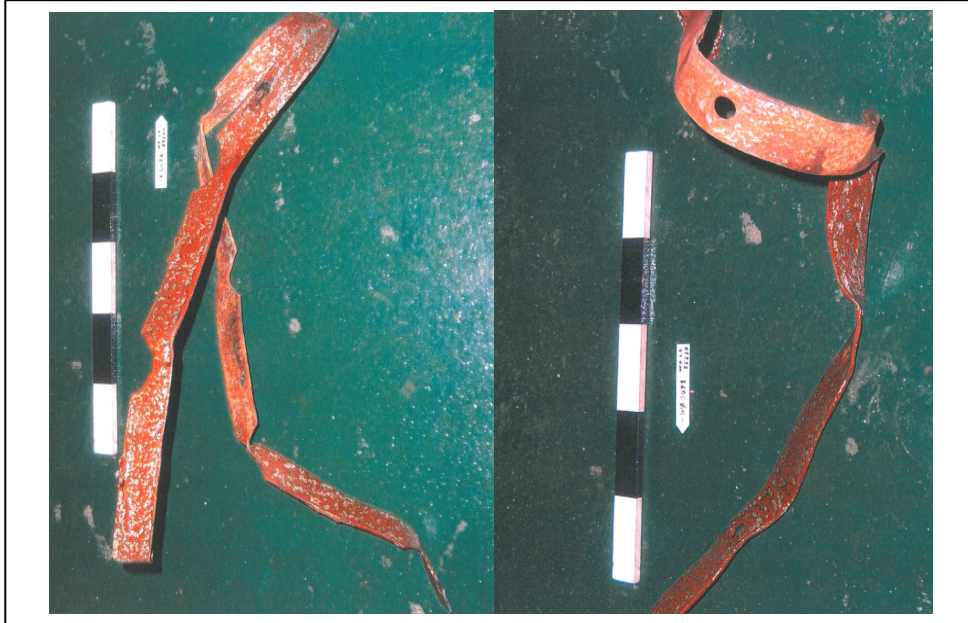
This find appears to display a thin rubber casing along the length of the cable and has marine growth including barnacles adhering to it, suggesting a prolonged period in submergence. No markings, manufacturer's stamps or labels were evident on the find when it was studied at Wessex Archaeology's offices.

The find is likely to be relatively modern, dating from the twentieth century, but is reported here as it has the potential to be connected with an as yet unrecognised site of archaeological importance such as a ship or aircraft crash site. Whilst the potential remains, there is no evidence that would suggest this is currently the case and this is assumed to be an isolated find or from a highly dispersed site.





WA_5073 and WA_5074: Steel Strips



These two pieces of bent steel were discovered on the *TSHD Charlemagne* in November 2013, having been retrieved during trip 185 in zone 38.

The two finds are interpreted as being connected given the similarity of their construction and appearance. They are certainly post-medieval in date but more likely were manufactured and used during the twentieth century.

Identifying them is problematic. They are described as having been made of steel and have suffered damage before, during, or after they entered the water. They are likely part of a larger item, further evidence of which was not retrieved. Six evenly spaced fixing holes for rivets or bolts with a diameter of 17mm are seen in the piece on the right. The find on the left displays seven evenly spaced curved recesses or semi-circular notches which would have aided its function in some way, potentially allowing it to accommodate regularly spaced pipes or similar. Wessex Archaeology's Bob Davis suggested that they may have been joining or sealing pieces and that their lightweight nature potentially suggests them fulfilling a relatively lightweight use.

The further lack of diagnostic features makes identification of these finds unlikely at this stage. These finds will be reinterpreted at a later date if more material is recovered from zone 38 of a similar nature.





WA_5075: Echinoid Fossil



This fossilised sea urchin was found by archaeologists working on board the *TSHD Charlemagne* in November 2013. It was discovered during work in zone 38.

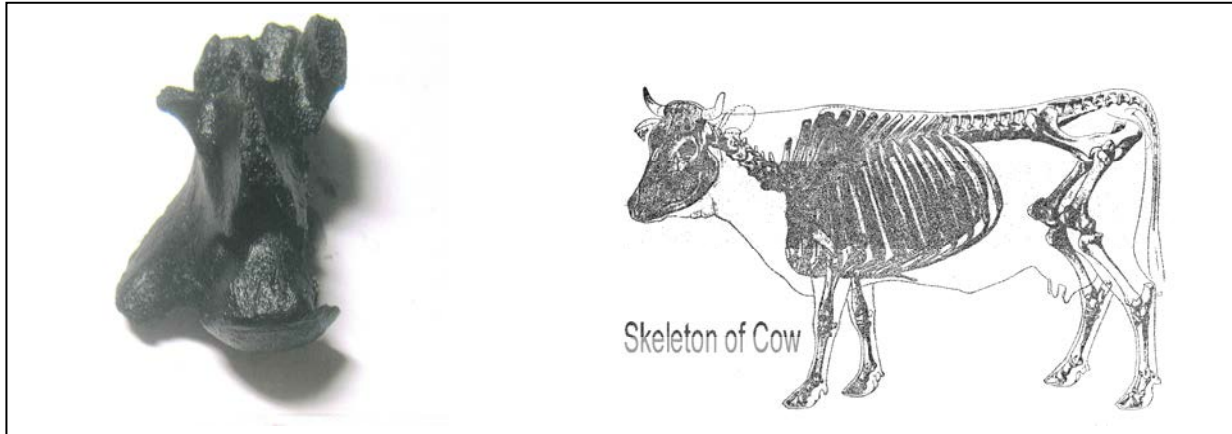
This is a fossilised echinoid or sea urchin which derives from Upper Cretaceous Chalk (c. 100 to 65 million years old). Fossils are not necessarily archaeological as their formation predates the evolution of man (archaeology being the study of the human past). However, as today, fossils have been collected and used in the past for decoration, ornamentation and ritual or superstitious practices. Where a fossil can be shown to have been used by people (such as in the example of a Bronze Age grave encircled by echinoid fossils, shown above right) they are considered to be artefacts.

There are references to echinoid fossils being known as “snake eggs” in the Iron Age period. During the medieval and post medieval period they were known as “fairy loaves” and kept in people’s larders. In later periods they were highly sought after by sailors as a cure for seasickness.

There is no evidence on the artefact itself that indicates its use by people (such as holes drilled for hanging, carving on the surface or paint or similar on the find). It is not known if this object arrived naturally in the Thames Estuary, whether it was part of a site assemblage, or whether it was lost by a sailor who had taken it on board a vessel.



WA_5077: Cattle Vertebra



This item was discovered by archaeologists working on board the *TSHD Charlemagne* to protect archaeological material found during dredging of the estuary. It was retrieved from the water on the 25th November 2013 on trip 192 in zone 38.

Images of the find were shown to Lorrain Higbee, Wessex Archaeology's zooarchaeologist. She identified the bone shown above as a cattle caudal vertebra.

Vertebrae form the spinal column which protects the spinal cord and provides attachment for the muscles and ligaments that support the body and allow movement. They fall into five categories – cervical (those in the neck), thoracic (the chest), lumbar (lower back), sacral (attaching to the pelvis) and caudal which form the tail of animals. In humans, the caudal vertebrae form the coccyx which is also known as the tail bone.

Animal bone recovered from the sea could have been deposited in several ways. They may have been lost or thrown from a vessel, washed from the land or may have originated during the last Ice Age when some areas that are today underwater were dry land. This example is likely to be an isolated find which possibly represents the provisioning of crew on board a vessel.





WA_5079: Lead Projectiles



These two artefacts were discovered by archaeologists working on board the *TSHD Charlemagne* in November 2013. They were retrieved during trip 194 in zone 38.

Images of these finds were shown to Jonathan Ferguson, Curator of Firearms for the Royal Armouries Museum in Leeds. He identified them as shot intended for use with Royal Naval aiming guns or aiming rifles. These weren't intended to cause harm themselves but rather to check the targeting of a weapon before the firing of a larger shot or projectile. If shot like those pictured above reached the target, a larger projectile would be fired on the same alignment.

This type of projectile, Jonathan tells us, is often confused with the ammo used in a 1" Nordenfelt deck gun, which has the same case. However, the examples shown above do not have the copper alloy covering given to Nordenfelt ammunition, which has allowed their interpretation here. This type of ammunition was in use from 1893 until the end of the Second World War and these examples are likely to have been deposited in the estuary after firing at a target, either during conflict or during training.





WA_5080: Scupper



This find was discovered by archaeologists working on board the *Marieke* to monitor dredging of the Thames Estuary for archaeological material. It was found on 28th November 2013 on trip 196 in zone 38.

This find is potentially a scupper from a vessel. It is exceptionally heavy suggesting that it is made from lead or has lead in its construction. This type of item is fitted to vessels to allow rainwater or seawater falling onto the deck to drain into the sea or ocean. The characteristic shape of the find, as shown above, channels water using gravity. This find is potentially of post-medieval or modern (post 1800) date.

As no further material was reported within the same load, it may be that this is a loss from a vessel, rather than with one, or that this find has come from a dispersed site. It is not currently thought to represent a site of further archaeological significance.



WA_5089 and WA_5090: Animal Bones



These two bones were discovered on the *Marieke* in December 2013, having been retrieved during trip 1320 in zones 31-34.

Images of the bones were shown to Lorrain Higbee, Wessex Archaeology's zooarchaeologist. She identified the long bone shown above as a horse tibia (one of two bones forming the lower part of the hind limb) and the other bone as a lumbar (lower back) vertebra from cattle. The vertebra appears in the image above to have been butchered (indicated by the clean cut on the right) which suggests that the meat attached to this bone was used to provide sustenance, most likely to a crew on board vessel. Horses are not commonly used as a food source and the longer bone may have been washed from a terrestrial context or may relate to a time during the last Ice Age when parts of the estuary were dry land. Early humans were known to hunt horses which have been present in the British Isles since the Middle Pleistocene (c. 780,000 - 126,000 years ago).





WA_5092: Medieval Pot Base



This find was retrieved during an epibenthic trawl survey (reference number 15) in the Thames Estuary in spring 2014. The trawl was 500m long and the co-ordinates for the start and end are: Lat 50° 29' 374N Long 0° 54' 727E (start) Lat 51° 29' 375N Long 0° 55' 168E (end). The artefact was delivered to Wessex Archaeology for analysis.

Lorraine Mephram, Senior Project Manager (Post-Excavation), studied the vessel and believes it to be medieval. This type of ceramic vessel is termed a jar and could have had multiple functions, although aspects in the form of this one suggest that it may have been a cooking pot. It has unusually straight sides and a convex base and is constructed from a nondiagnostic sandy fabric, prohibiting much further analysis.

The marine life adhering to it tells us something about its post-depositional circumstances. It has very few barnacles which the finder, Richard Newell, tells us would colonise a surface like this one fairly rapidly. When found it had two clusters of whelk eggs and some hydroid growth. All of this suggests that the vessel had been largely buried in marine sediments but was exposed on the surface of the seabed up to a year before its discovery.

In terms of date, this vessel is likely to have been manufactured between the 13th and 15th centuries. The fabric of this vessel prohibits analysis of where it was made.

Its discovery offshore would suggest that it has been lost from or with a boat or ship. The evidence that the pot has been recently exposed leaves the potential that other finds, or potentially a wreck, may lie buried or may have been exposed at the same location and further survey of the trawled area (denoted by co-ordinates above) is recommended.

