



# Conservation advice for finders

## Using this guide

This guide is aimed at finders, and in particular metal-detectorists, who find and collect archaeological objects. It provides straightforward information on how to care for and record finds to ensure their long-term survival and to capture useful information about their discovery. This guide shares some conservation techniques that we hope will prove useful. However, it does not remove the need to consult with specialists, such as a Finds Liaison Officer (FLO), museum curator or professional conservator in cases where you are unsure of an object's historical significance or its condition presents difficulties, nor does it remove the need to offer all finds for recording with the Portable Antiquities Scheme (PAS).

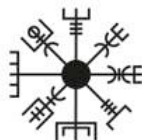
## Contents

On site: discovering finds	2
Caring for finds: assessment	7
Caring for finds: cleaning	13
Coating	16
Joining	16
Packaging and storing	18
Displaying and collecting	19
Further advice	19
Suppliers	20
Acknowledgements	20



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## On site: discovering finds

From the moment finds are removed from the soil, care is needed to ensure their long-term survival: an object which has lasted hundreds or thousands of years in the ground may only last a few years above ground, or even less, if not properly cared for. As soon as they are dug up, the environment around them changes. Exposure to the open air, creates increased levels of oxygen and air-borne moisture which means objects can change and become unstable. This can lead to corrosion and decay. Alternatively, objects which have been buried in damp or wet conditions may distort irreversibly after a short time in the air.

### Preparing to search

Read the *Code of Practice for Responsible Metal Detecting in England and Wales (2017)*, available on the Portable Antiquities Scheme (PAS) website or from a Finds Liaison Officer (FLO). It includes:

- Ensure permission is obtained from the landowner before detecting on-site.
- Before going out, it is a good idea to make a plan for recording and bagging up finds.
- A numbering system for keeping track of individual finds and where they were discovered is useful. Recording findspots as accurately as possible for all archaeological finds (to at least a single ten metre square- i.e. an eight-figure National Grid Reference), using a hand-held Global Positioning System (GPS) device whilst in the field or a 1:25000 scale map if this is not possible. Postcodes are not accurate enough.
- Bag finds individually, recording the National Grid Reference on the bag with a waterproof/indelible marker.
- Understand the law before setting out. The Treasure Act applies to various categories of metal objects and both the Act and guidance about how to follow it is available online, as are contact details for local FLOs.
- Anything from a wreck found in the sea must be reported to the Receiver of Wreck (ask a local museum or FLO for details).

- Assemble a kit of sealable plastic bags with small holes (polythene is best), waterproof pen, hand-held GPS or a mobile app for recording location, map of the area and camera. This ensures that finds can be cared for and documented from the moment of discovery.

### Recording a find on site

Having the right equipment and recording finds correctly ensures that the objects are cared for from the moment they are discovered. Keeping a record of the find spot location, the depth of the find and what kind of soil it was found in helps with this: taking a photo is a great way to easily record information about an object. The more data recorded about an object the more we can make connections between people, places and objects, enabling us to discover more about our shared history. Bear in mind that there may be associated objects nearby which may not be metallic.

### Bagging and labelling on site

- Bagging a find on site and labelling the bag (with waterproof pen) with a number and its location is a good way to ensure information about the find is not forgotten or misplaced.
- Putting a single object in each bag prevents mix ups or damage to finds.
  - As rule of thumb, wet objects need to stay wet until they can be assessed off-site, and damp metal objects can be allowed to dry out slowly.

Object:
Find spot location (e.g. field):
Soil conditions (e.g. waterlogged):
Depth of the find:
Grid Ref:
Parish:
Date of Find:
Farm/landowner:
Notes:

FLO's suggested finds label

Information about the Treasure Act and contact details for local Finds Liaison Officers can be found on the Portable Antiquities Scheme website: <https://finds.org.uk>



### Digging up a find

Once a possible object has been detected, care should be taken to ensure the object does not get damaged or broken when it is removed from the ground, and also to make sure that nothing else is buried with it. Detectors vary in the way they detect finds in the ground so the use of a pin-point probe to locate the object will help to avoid damage.

Metal objects can be discovered on many types of site, and at different depths. Archaeologists call an object's three dimensional location within the soil its context.

The context relates to an event represented in buried soils. This could be anything from a hole dug and filled with soil to an object being deposited into a bog or river. The relationship between an object and its context gives meaning to why and how it may have been buried.

Key questions when digging a find spot:

- How has the object come to be there?
- Is the find isolated or could it be part of a larger group of objects? Are there other items near the metal object, for example, pot, bone or stone?
- Are there any colour or texture changes in the soil indicating archaeological features that might be lost or damaged by digging?
- If the soil is very wet, are unusual materials present, such as wood, textile or leather?
- Is the find part of a human burial?
- Is the find likely to be Treasure?

### Types of context

#### Simple (ploughzone area of active cultivation)

Many objects are found in the topsoil or plough soil. Although the find is likely to have been disturbed from its original position, provided the location is recorded, valuable information can still be recovered. In particular, a distribution map might help identify or link a scattered coin hoard. Recording find spots may also uncover patterns of object deposition within the landscape. For example, research is underway using PAS finds data to understand the distribution of Bronze Age metalworking tools in comparison to known archaeological sites.

#### Complex sealed contexts

Sealed or undisturbed contexts are found below the topsoil: these layers hold valuable archaeological information. Finds- either single objects or groups- from sealed contexts are best understood through careful excavation which allows maximum information to be gathered, leading to better understanding of the discovery. It's best to stop digging and make the landowner aware that you are seeking expert help if you discover something below the ploughsoil, or a concentration of finds or unusual material, or wreck remains. Your local FLO may be able to help or provide useful contacts.



Roman patera and pots. The Kingston Deverill hoard during excavation. WILT-92B052



Blocklifted Burnham hoard of bronze axeheads. ESS-E2DD91

### Getting help: contacting your local FLO

The local FLO is available to advise upon all unexpected discoveries and complicated and significant finds. Asking for help ensures that maximum information about the find and how it was buried can be gained. Remember to show the FLO fragments and corrosion lumps as well as whole objects. The FLO may:

- Offer guidance about recording, storing and caring for finds, including composite and wet finds.
- Advise on the excavation of important finds. If archaeologists are called in to excavate materials they will work with the finder.
- Assist with reporting Treasure finds.
- Help with contacting a conservator or arranging an x-ray.
- Identify and record finds for inclusion on the Portable Antiquities Scheme database.
- If the FLO is not available to visit a find spot immediately, it's a good idea to consider covering the site and waiting to investigate until they are.

### Special environments

Very wet or dry environments preserve objects in special ways. When searching wet environments such as riverbanks, foreshores, bogs or beaches, the chances of finding rare ancient organic materials such as wood, leather or even textiles is much greater. Objects made of these materials can appear in good condition upon discovery, but if allowed to dry out they can shrink or fall apart. It's a good idea to seal these finds in a non-perforated plastic bag with a little water until they can be assessed fully by a specialist.



Sole of a Roman shoe, shrunken from drying out.  
WAW-0685E3

### Burials

How someone was buried and the objects they were buried with provide important clues to funerary practices and the status of the individual. Burials can be either inhumations, where the body itself is deposited, or cremations where the body has normally been burned and placed inside a vessel. For both types of burial, seek specialist advice by reporting to your local FLO.

Burials require specialist attention because:

- By law the discovery of human remains must be reported to the police, which can be done directly to your local police, but also ensure that the local FLO is informed.
- Burials often contain complex and fragile materials that require specialist training and equipment to remove or lift. It is important not to remove soil or clean objects on-site. Contents of cremation urns should be left intact.
- In special cases, a burial may contain traces of organic materials such as textile from clothing or wood from a coffin.
- Due to soil conditions the skeleton may have decayed and be difficult to see.
- Human remains require special ethical considerations which are different from objects.



Small Roman cremation vessel with contents intact. LANCUM-6199D0

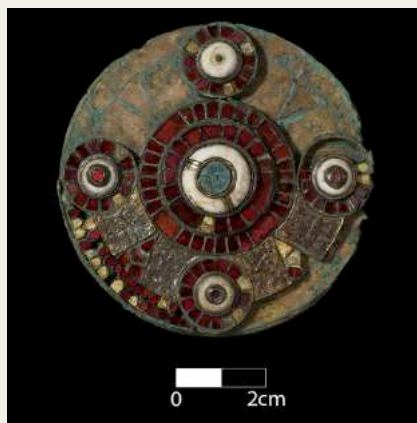
### Hanney brooch burial

In 2009, a detectorist unearthed a 7th-century Anglo-Saxon disc brooch inlaid with garnets and gold panels during a metal-detecting rally in West Hanney.

He also observed what he believed to be bone, and notified the organisers and relevant authorities. Over the next week, a team of archaeologists excavated what turned out to be the burial of a woman, estimated to be in her mid-twenties. The find and the subsequent excavation and survey yielded the first evidence for early Anglo-Saxon funerary activity in the area.



The Hanney skeleton during excavation.



The Hanney composite brooch. BERK-545C74

This is a great example of how metal-detectorists and archaeologists working together can enhance the archaeological knowledge of an area.

Although the copper alloy brooch didn't qualify as Treasure, the finder recognised the importance of the find to the local area and agreed to sell the brooch to The Oxfordshire Museum, so that it could be conserved and studied for the enjoyment of future generations.

### Coin hoards

A coin hoard is defined as Treasure if it includes two or more coins, so as long as they are at least 300 years old when found and contain more than 10% gold or silver. If the coins contain less than 10% gold or silver (such as gold or silver gilt coins) there must be at least ten in the hoard.

Intact hoards can be discovered as a group of coins, possibly still inside their original ceramic vessels, boxes or bags. It can often be difficult to excavate intact hoards to ensure all possible archaeological information is captured, so it's best to get a specialist to block-lift them. Contact your local FLO for advice.

Scattered coin hoards are those which have been disturbed and dispersed, often by plough action. Well-recorded, accurate locations for individual coin finds can help reconstruct the history of the hoard and link the individual finds together.

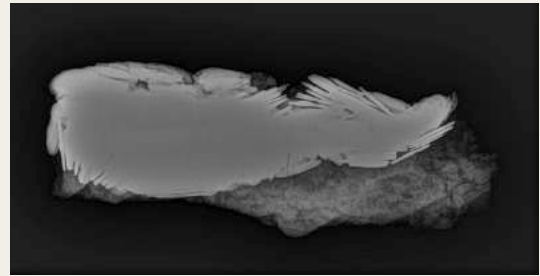
For example, three Iron Age gold coins were found on arable land in Warwickshire in 2011. A hoard of eleven Iron Age gold coins had been discovered at the same site in 1994 by a different metal-detectorist. Well-recorded, accurate locations by both finders enabled both sets of coins to be connected, despite the timegap between their discoveries.



Two coin fragments, one found in 1994, the other 2011, re-joined after discovery. WAW-58E251

### Leominster coin hoard

Block-lifting the Leominster hoard of Roman copper alloy coins allowed the examination of rare evidence for 3rd-century AD textiles (below).



The X-ray of the block-lifted hoard shows that the coins were probably placed into two bags, one large, one small, before burial. HESH-91B963

### The Bitterley Hoard

Discovered in Shropshire in 2011, the hoard consists of 137 high value silver coins and one gold coin from the English Civil War period.

When the finder first exposed the coins and realised they were still buried intact in a ceramic vessel, he called in his local FLO, who excavated around the vessel and block-lifted it.



Exposing the coins and the civil war cup.



The wrapped block-lift ready for removal.

This allowed the hoard to be micro-excavated in the laboratory by conservators and subjected to detailed analysis. The investigation revealed that the coins were placed in a leather purse before

being buried in the pot. The purse was so well-preserved that indentations in the leather made by the coins were still visible.

Coin hoards from the Civil War are relatively common, with several known from each county in England: the existence of so many hoards shows the upheaval and underlying worry of the general population at the time. The Bitterley hoard was buried relatively quickly in a prepared container, suggesting just such concerns.



Dark brown leather visible amongst the coins.



The hoard was acquired by Ludlow Museum. HESH-28FFB5

## Caring for finds: assessment

### What is it made from?

The first step in caring for a find is to identify which type of metals and materials it's made from. No metal objects are 100% pure: all archaeological metal finds are composed of a mixture of metals, with traces or high levels of other metals mixed with the primary metal. Many metal objects also have coatings such as gilding or may have inlays of other materials. But in general conservation terms, identifying the primary metal is important.

### What condition is the object in?

Every metal and material reacts differently to decay and corrosion, and observing the object carefully helps with the decision of how best to care for it. This section provides information to help with identifying materials and their condition.

**Gold** does not corrode and often appears yellow and in good condition, although it can be damaged or have loose inlays. Sometimes the surface might look orange, brown or maybe even green, if copper and silver from inside the object have come to the surface over time. This coloured surface should not be cleaned away as it can provide information about the composition of the gold or how the object was made. Gold objects should be placed in a storage box to keep them safe since they might be Treasure, and reported to a local FLO within 14 days.



Iron Age gold stater with good condition original surface. SWYOR-883578

**Silver** can appear bright and shiny, but is often tarnished with a black surface or covered in corrosion (lumpy, purple-grey colour) from exposure to the soil. Silver is often soft when new, but excavated silver can be very brittle and cracks easily, especially if the object is thin, so careful handling is needed.

Silver coins can appear in many colours but this is not in itself an indication of weakness in the metal. Silver objects should be placed in a storage box to keep them safe since they might be Treasure, and reported to a local FLO within 14 days.



Post-medieval silver annular brooch in good condition. HAMP-974996



Silver mount with heavily tarnished surface from burial conditions. CAM-4E3706



Medieval silver coin in good condition. SWYOR-081FD4



Silver Henry III halfpenny: despite the red colour, the coin is in good condition. NLM-3C0E82

**Copper alloy** objects are generally green or sometimes red in appearance, and, if found in special burial conditions (such as waterlogged), they can also appear black. All copper alloy objects should be kept dry. 'Bronze disease' is a particularly damaging form of corrosion, which can be identified by a powdery pale green product (like icing sugar) on the surface of the object. Bronze disease can be halted by dry storage, but progresses quickly when moisture is present. If it spreads, the find may need chemical stabilisation. A conservator can check and treat the object as necessary. All copper alloy corrosion is toxic.



Coin with bright blue/ pale green bronze disease. KENT-7741AA



Copper alloy buckle, typical green appearance. LVPL-F3C586



Copper alloy strap end, red corrosion. NLM-73F4F8



Copper alloy seal matrix, stable but darkened surface. LANCUM-37898D

**Iron** can often appear as brown lumps. It corrodes easily, and to prevent this it needs to be kept very dry. Active corrosion is indicated by bright orange powdery patches or little droplets of 'weeping' iron, as well as cracking on the surface or detached flakes. Orange iron-stains on packing materials indicates an urgent need for dry storage.

Although lumps of rust are not always visually appealing, they can contain interesting archaeological finds. An x-ray is usually required to correctly identify the object within the corrosion. For example, a heavily corroded iron bar from agricultural equipment can look very similar to a section of a sword.



Medieval iron barrel padlock with corrosion obscuring the surface. LIN-600BED



Iron key revealed inside lump of rust by x-ray.





Iron horse shoe with bright orange active corrosion. SUR-E4EDF7

**Lead** appears grey and is very heavy. It can become brittle during burial and have white corrosion products on the surface. Lead is a poison which can be absorbed through the skin or ingested, and the corrosion products are toxic. Always wear gloves when handling lead finds and don't brush off the white powder, as this puts toxic particles into the air.



Post-medieval lead toy cockerel with powdery surface. IOW-175723



Lead cloth seal with cracking and powdery corrosion products. SOM-170440

**Pewter** A tin-based alloy similar in appearance to lead, it can appear silvery grey or have white or grey corrosion products. The surface can laminate and be brittle, and the object can be more fragile than it looks. It is a soft metal that often deforms in the burial environment or becomes flattened. Trying to bend it back into shape is likely to cause damage.



Post-medieval cast pewter spoon. ESS-370A06



Post-medieval pewter toy cup with corroded grey surface. WILT-4296F5

**Surface coatings** Metal objects may have had another metal applied to the surface for decorative effect, for example they may have been tinned, silvered or gilded. These thin coatings can be very fragile.



Roman gilded and tinned copper alloy brooch. HAMP-F37C06

**Inlays** occur frequently on metal objects. These can be enamel, glass, bone or ivory or sometimes other metals. These inlays can be fragile and often have different conservation needs to the metal itself so need to be treated with extra care.



Copper alloy and enamel cloisonné disc brooch of early medieval date. YORYM-972146



Roman copper alloy zoomorphic plate brooch with enamel designs and stable copper alloy surface. SF-57E8F9

**Composite objects** Sometimes objects are discovered with both metal and non-metal components, for example a knife with a bone or ivory handle. These objects can be very difficult to identify and care for, especially if they have come from a waterlogged environment. The organic component, for example, might appear robust, but could be prone to shrinking or breaking as it dries out. As a general rule, it's best to keep these finds wet and seek advice from the local FLO about how to deal with these objects.



Iron folding knife with bone handle. LON-24FCB5



Iron knife tang with preserved bone handle sections. LON-CE5DB2

**Mineralised organics** Both copper alloy and iron can preserve organics well by mineralising them through contact with the metal corrosion products. For example, a copper alloy button or brooch might preserve textile from garments on the back of it. Similarly, an iron axehead might preserve parts of its wooden shaft as it corrodes. It is also possible that associated items such as packing materials or flowers and seeds which have been placed with the object are preserved in this way.

Mineralised organics are often very fragile. If you discover any take photos as soon as possible to record them (in case they change shape or break apart). It is best to keep all organics to ensure the maximum archaeological information is preserved.



Copper alloy object with textile. SUR-62A09C



Mineralised textile on Viking iron sword blade.



Copper alloy strap end with fragile leather adhering. NLM-38382B

**Leather** can be very deformed and weak from the burial environment and the original object may be unidentifiable. Waterlogged leather will appear very dark, almost black. As a general rule, it's best to keep these finds wet and get help identifying them from your local FLO, as they may require a conservator to treat it; if waterlogged leather dries out without treatment it can crumble and shrink. Once dry, any damage cannot be reversed.



Medieval leather purse. NMGW-5DBD53



Waterlogged medieval shoe sole, less robust physically than it looks. LON-800485

**Bone/Antler/Ivory** can vary in colour depending on the environment they are found in, varying from an original pale colour to very dark and cracked. They can also take on the colour of nearby metal corrosion: this is particularly common for objects found with copper alloys.

These materials can be dried slowly if found in damp conditions. Some objects may need special support to ensure they do not break apart, such as combs, which are made from multiple parts which become fragile over time.



Roman bone comb with delicate bone teeth, darkened by burial soils. NARC-242E72



Prehistoric red deer antler mattock. LON-2DB52B



Roman bone gaming piece. LIN-885587

**Glass** can be difficult to identify because the original surface is often degraded, opaque and cracked. The colour of glass can also change over time as the colorants decay. It is often very fragile and should be supported in a box and kept damp until advice from either a conservator or local FLO can be sought. If found in waterlogged conditions, it will require a conservator to treat it; if it dries out without treatment it can crumble into pieces.



Medieval glass linen smoother with delicate corroded surface. LANCUM-FF279C



Medieval window glass. SF-1FF9C6

**Ceramics** are a common find at many locations, and it's useful to collect them and record where they are found. It's best not to wash whole vessels or those found with hoards or burials because of the possible presence of residues indicating previous contents.



Iron Age ceramic fragment. WMID-D54FF2



Roman ceramic spindle whorl. SUSS-AE7287

### Pewsey Hoard

This hoard of eight Roman vessels, including a cauldron, two bowls, a vessel and four scale pans was discovered in October 2014. The bronze vessels had been removed from the ground by the metal-detectorists; but, crucially, they had not attempted to clean the bowls and the delicate remains of the packing material were preserved in place within them.



Bowls stacked inside the cauldron with organic remains visible. WILT-0F898C

Ideally such discoveries should be left in situ to allow full archaeological study of the find and its context. But the finders did record the depths of the plough soil and of each object as they removed them.

Because the finds were not cleaned, a great deal of information about the hoard has been gained. Flowers and seeds preserved in the soils within the objects show the hoard was packed during mid-late summer using vegetation from local grasslands for protection. The abundance of organic material meant that radiocarbon dating of the packing material was also possible. It indicated that the hoard was most likely buried in the late Roman or early Anglo-Saxon period (AD 380-550).



Flowerheads preserved within the soil.

## Caring for finds: cleaning

### Does the object need cleaning?

After removal from the soil, corrosion can form quickly or slowly, depending on the metal alloy the object is made from, the conditions where it was buried, and how much oxygen and water (from the air) it is subjected to. Deciding whether to clean an object to remove soil or corrosion is an important decision, one that depends on what the desired outcome is for the find.

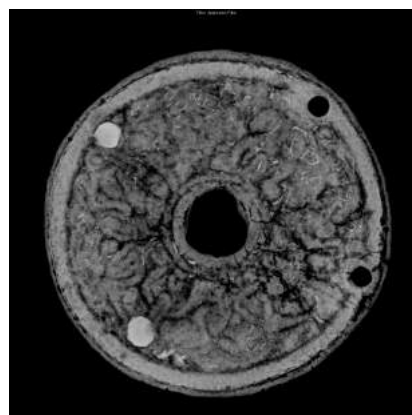
Before cleaning or washing, it is best to report all finds to the local FLO. This enables a better understanding of the object, and ensures it can be recorded before any changes are made to the find which might result in information being lost. Possible Treasure finds should be reported uncleaned: inappropriate cleaning may reduce the commercial as well as historical value of the find, as indicated in the Treasure Act Code of Practice.

Before cleaning an object it's useful to bear a few questions in mind, to assist with choosing the right treatment:

- Is the aim to remove soil or metal corrosion?
- Is there archaeological material such as preserved organics that might be lost by cleaning?
- Will cleaning the object reveal new metal that might corrode further?
- Is the object too fragile to survive cleaning? Will it be damaged?
- Do I have the skills to clean the object or does it need a conservator?

### X-radiography

X-radiography can reveal hidden designs or construction details, and can help to understand the shape, size and condition of an object before any cleaning takes place. This is especially true of iron objects that don't look like an object at all but a ball of rust. Not all FLOs will have access to an x-ray machine, but x-rays are available at a cost from archaeological units across the UK.



Early medieval mount and x-ray showing detail. LEIC-03DD2C

### Treasure and the national museums

At the British Museum and National Museum Wales, conservators work with the PAS to ensure that deposited Treasure items will not deteriorate in storage during the Treasure valuation process. Block-lifted finds are excavated and recorded to preserve archaeological contextual details. Some items, notably coins, are cleaned or x-rayed so they can be fully identified.

The Watlington hoard being excavated at the British Museum.



### Need to find a conservator?

The Conservation Register has listings of professional conservators across the UK. It can be found via the Institute of Conservation website: <https://icon.org.uk/>

### Simple mechanical cleaning

The purpose of cleaning an object is usually to reveal the original surface detail. But in the burial environment many layers of corrosion products may have formed over time and it can be very difficult, or even impossible, to find the original surface beneath them and clean it. The thickness and type of corrosion products will have an effect on the results of any cleaning process.

Protective clothing such as disposable gloves and dust masks are essential kit, especially when cleaning objects containing lead and copper alloys.

**Removing soil** Cotton buds, water, acetone and cocktail sticks can be used to gently remove soils from the surface of an object. Do not wash under a running tap or scrub with a toothbrush, as these activities can damage the surface. Tap water contains additives like chlorine, and distilled water is better if available. Gently remove soils with the smallest amount of solvent (distilled water or acetone) possible.

**Removing corrosion** Manual cleaning is the best way to remove thick corrosion layers, using fine hand-tools with the aid of a low-power microscope if available. Use sharpened wooden or plastic points such as cocktail sticks and artists' brushes to remove loosened soil. Practising first with scrap objects is a good idea, as skill and experience is needed to produce good results. Barrelling, wire brushes or other harsh methods will damage the object and shouldn't be used.

### Complex cleaning treatments

For complex finds and objects of significance (both Treasure and non-Treasure) it's best to seek help. Consult your local FLO for advice.

### Hallaton helmet

The Hallaton hoard from Leicestershire included fragments of one very rare Roman cavalry helmet. Because it was block-lifted on-site, it was possible for highly-skilled conservators at the British Museum to clean and reassemble the many iron and leather fragments. If it had been cleaned and investigated on-site, information about this impressive object would have been lost.

The reconstructed helmet at Harborough Museum.

### Chemical cleaning: what not to use

**Home remedies** A variety of home remedy chemical cleaners for metal objects are often suggested online and elsewhere, but although they may deliver a desired appearance initially, most risk causing deterioration and damage to the object in the long term.

Chemical reactions cannot easily be controlled and some chemicals may remain on or within the object, continuing to act upon it and causing damage after cleaning has finished. This is a particular risk for archaeological metal finds which are often fragile and porous.

Even lemon juice- or vinegar-based cleaners are harsh chemicals with a variety of additives and are not recommended as a cleaner for archaeological objects because they can cause damage to metal surfaces.



Over-cleaned bronze axehead with no original surface left.

The 'quick fix' effect of many traditional remedies and commercial products may create a bright and shiny 'as new' appearance, but this is often not appropriate for archaeological finds. A slower, more cautious approach with regular progress checks delivers a more desirable outcome, and presents less risk of damage to the object.



### Commercial cleaning and polishing products

Avoid products which use a chemical or abrasive action to polish metal. Any chemicals which can strip metal corrosion products from a surface are also capable of attacking the metal itself. When using any cleaning products, less is more.



Coin with surface damaged by over-cleaning.

**Ammonia** Also known as ammonium hydroxide, ammonia causes irreversible damage to many materials, but is found in many products that are incorrectly suggested for object cleaning. In some cases, ammonia may leave the surface with an undesirable pink hue. Surfaces cleaned with ammonia tend to tarnish rapidly and quickly lose their brightness. The risks associated with the use of ammonia far outweigh the potential benefits.

### Chemical cleaning: what to use

Two chemicals can be suggested for cleaning, although these should never be used on composite objects or those with inlays. Either citric acid or ethylene diamine tetra-acetic acid (EDTA) can be mixed with distilled water to make a 3% solution which works well on copper alloy corrosion products and removes green staining. Keeping the

solution dilute is very important, as a stronger solution is likely to cause damage. Both chemicals will also attack original metal if left unsupervised. Slow controlled cleaning with regular checking is always the best option.

- Apply the solution with a cotton bud to soften the corrosion products. This technique can be used in conjunction with mechanical cleaning: press gently on the object surface (don't wipe) to avoid catching or pulling on raised areas.
- Soak the object for a maximum of five minutes at intervals. The solution changes colour as corrosion is removed.
- Wash excess acid away by placing the object gently in a container of distilled water, changing the water several times to ensure all acid is removed. If the chemical stays on the object long-term then it will cause damage. Dry the object slowly to remove all water.
- Follow health and safety guidelines when using and storing chemicals, as they can harm humans as well as objects. Wear appropriate protective clothing, ventilate workspaces and think of others around you who might be affected by chemicals.

### Barrelling, electrolysis and ultrasonic cleaners

These techniques should not be used. They use very aggressive techniques and can damage the surface of an object or completely destroy it. The cleaning action is uncontrolled and it's not possible to monitor the process while it's happening.

### Straightening hammered coins

Coins can be bent by agricultural activity, but in some cases they were bent deliberately, and this forms an intrinsic part of the history of the object. Before thinking about straightening or reshaping bent coins, it is worth considering their history and metallurgy. Historically, people have reshaped coins for many reasons, including as love or pilgrim tokens, giving them new identity and purpose beyond their original function. This makes the coin interesting and unique.

Straightening coins carries risks to the object and is not advisable. Coins that appear silver often have copper added, and are of varying purity. Both silver and copper are likely to have become brittle during burial and the act of reshaping can lead to cracking or the coin snapping into two. Hammered coins found together may be Treasure and should be reported in their excavated state.



A hammered coin as discovered. LVPL-9A4846



Damage caused by straightening. IOW-B9B2D1

## Coating

Coatings are commonly used to protect and enhance the surface of an object. They can protect the object from the environment and stop corrosion. However, a surface coating is often not really necessary if objects are handled and stored correctly, so before applying a coating, get your local FLO to record the find. Then it's worth asking:

- Does the object need protecting?
- Can it be stored in a 'dry box' instead?

### Coating: what not to use

**Oils and waxes** such as olive oil, microcrystalline wax or other commercial waxes are a popular coating for archaeological materials. However, they don't provide long term protection for metal, and often actually damage the object.

Oils and waxes decay and so are not stable. Once inside an object it is almost impossible to remove them which means it's problematic to prevent them causing corrosion as they decay and attack the metal. Historically, museums did use these materials to coat objects, but now that the long-term corrosion effect is understood, re-treatment of objects with more appropriate and removable coatings has become standard.

**Off-the-shelf varnishes and products** do not adequately protect objects from damage or corrosion in the long-term. These coatings also do not protect objects if they have bronze disease.



Coins coated in oil, making them dark and smelly.



Late Bronze Age sword, broken before deposition.  
LIN-7850F7

## Joining

It is not always advisable or necessary to re-join an object. Breakages can be an important part of the story of the object, and it is often possible to understand an object without making a join. If a join is desirable, but the repair is beyond your knowledge or skills, it's best to consult a conservator. Always get your FLO to record finds before they are joined.

**Glues** Never use epoxies or superglue, these will harm the object.



Anglo-Saxon tweezers with inappropriate paper support glued to object.

### Coating and joining: what to use

Paraloid B72™ is commonly used by conservators as both a coating and an adhesive, because it has good long-term aging properties and can be easily removed if needed.

Paraloid B72™ can be purchased as pellets to be mixed with acetone, or as a pre-mixed solution which can be diluted with acetone for coating. It can also be purchased in a tube for use as an adhesive. See below for Paraloid B72™ stockists.





## Using Paraloid B72™ to coat and join objects

### Coating:

1. Remove soils from the object with hand tools softer than the metal itself, such as bamboo sticks, wooden or plastic modelling tools.
2. Make sure the object is completely dry: wait 24 hours after cleaning to ensure that all water has evaporated.
3. Apply a 3% Paraloid B72™ mix (3 grams of Paraloid B72™ with 100ml acetone) to the surface of the object with a small artists' brush, 2-3 coats.



### Joining:

1. Use a magnifying glass or microscope.
2. Clean the edges of the object with a solvent such as acetone. Not water.



3. Paint a very thin layer of Paraloid B72™ (15% solution if using pellets, or direct from tube) along both break edges and allow to dry.



4.

Once dry paint a small amount of Paraloid B72™ onto one break edge and join the pieces together.

5. Test the edge of the joint with the end of your fingernail. If you can feel a slight ridge the join is not aligned- carefully move the pieces until you no longer feel a ridge.

6. To hold the join together while the Paraloid B72™ dries, use small pieces of masking tape or place into a small sand tray (with cling film as a barrier) to support the object.

7. Excess Paraloid B72™ that has seeped out of the joint can be removed with a cotton swab dampened with acetone. Too much acetone will undo the joint.



## Packaging and storing

### Protecting finds

Excavated finds have specific long-term storage requirements to ensure their survival. Objects may be fragile, thin or brittle and be easily broken, or they might be heavy or be complicated shapes. Support and padding may be needed to keep objects secure and prevent them moving around and being damaged during storage and transport.

Excavated finds may have lost much of their metal content to corrosion during burial. As mentioned previously, different metals corrode in different ways: gold hardly corrodes at all, whilst iron corrodes quickly and copper alloy will corrode easily when the environment is too wet.

### Storage environment

Corrosion requires oxygen and moisture to progress. Excluding either or both means metals will survive for a much longer time. It is simple to create a dry environment for finds, starting on site.

- Make sure the plastic finds bag has holes to prevent condensation. Dry out finds gently at home, avoiding radiators and ovens, as sudden temperature changes can damage objects.
- Pack the dry find in a perforated bag with padding to protect it from knocks, and store the bags in an airtight container, with silica gel and an indicator strip if available (see Dry Box below).
- Acid-free paper envelopes are good for storing coins as they do not abrade the surface over time as plastic pockets can do.

**Composite objects** need special consideration. Objects made of more than one metal or which include other materials like glass, enamel, wood, bone, ivory, horn, leather, or textiles should be boxed but without silica gel or other drying materials. It is necessary to check on these objects on a frequent basis, if the box gets too dry then it's likely the non-metal parts will begin to crack.

### Bags, boxes, padding, markers and labels

A range of object-friendly packing materials are recommended:

- Plastic (polyethylene or polypropylene) boxes. (e.g. Stewart or Lock and Lock brand).
- Permanent solvent-free black markers for labelling.
- Mini-grip bags with write-on strips and a polyethylene foam insert (e.g. Jiffy® foam) are good for most objects.
- Acid-free tissue paper or polyethylene foam (e.g. Plastazote®) is recommended for padding.

Materials to avoid:

- Cotton wool as it can catch on corrosion and be difficult to remove safely.
- Foam rubber can give off sulphur and tarnish silver. Textiles such as velvet and felt can do the same.
- Organic packing and boxes such as wood, cardboard, or newspaper can cause corrosion, especially for lead finds, and should be avoided.
- Metal boxes don't provide a properly-sealed environment for finds.

### How to make a Dry Box

To create a dry box, choose an airtight clear polyethylene or polypropylene box with packets of silica gel. Silica gel absorbs water vapour to keep metal objects dry.

Further instructions for how to make a dry box can be found on the PAS website:

<https://finds.org.uk/documents/file/drybox-leaflet.pdf>



## Displaying and collecting

### Showing finds

For objects that are likely to be taken in and out of storage, a thin coating of Paraloid B72™ will protect them from the environment and from handling. However it may be a good idea to consult a conservator before doing this. When handling large or fragile finds, it's a good idea to lay out a smooth cloth or padded surface for the object to sit on.

### Framing and mounting

There are many frames and mounts available of varying quality and materials. To choose the right frame or mount for an object, check:

- The material the box-frame is made from should be of 'archival quality' or tarnishing and even corrosion may result.
- Choose the right frame or mount for an individual object. Correct support is important so the object doesn't move over time.
- Albums can be a good solution for coins, but some are made from plastics which can corrode coins. Acid-free envelopes will not rub off surface detail.
- Only paper or card which is acid-free should be used.
- Plastazote® foam is a good supporting material which can be cut to fit objects and coins.
- Textiles made from cotton (calico) and linen are best, preferably undyed and unbleached, so they don't off-gas chemicals which can cause corrosion.
- Wood can off-gas and cause corrosion. Lead is particularly susceptible to this.
- Avoid Blu Tack™, modelling clays or adhesive tapes.
- If pins are used to secure objects, ensure that they are coated so the two metals do not touch as this can cause corrosion. Coating the pins with Paraloid B72™ or adding a fine polyethylene tubing is a good solution.

## Further advice

### Further reading

**Code of Practice for Responsible Metal Detecting in England and Wales** 2017. Available at: <https://finds.org.uk/getinvolved/guides/codeofpractice>

**First Aid for Finds** by D. Watkinson and V. Neal. Rescue and United Kingdom Institute for Conservation Archaeology Section, 3rd Edition, 1997. Currently out of print but a pdf can be obtained by emailing [chair@rescue-archaeology.org.uk](mailto:chair@rescue-archaeology.org.uk) and ordering a copy.

**The Elements of Archaeological Conservation** by J.M Cronyn. Routledge, 1990.

Technical guidance for the conservation and study of a variety of archaeological materials, published by Historic England available at: <https://historicengland.org.uk/advice/technical-advice/archaeological-science/>

### Websites

Control of Substances Hazardous to Health (COSHH): <http://www.hse.gov.uk/coshh/index.htm>

Federation of Independent Detectorists: [www.fid.newbury.net](http://www.fid.newbury.net)

Institute of Conservation (including links to the Conservation Register): <https://icon.org.uk>

Material Safety Data Sheets (MSDS): these are supplied when chemicals are purchased, but also available at: <http://www.ilpi.com/msds/faq/parta.html#where>

National Council for Metal Detecting: [www.ncmd.co.uk](http://www.ncmd.co.uk)

Portable Antiquities Scheme: [www.finds.org.uk](http://www.finds.org.uk)

## Suppliers

### Handtools

Alec Tiranti <http://tiranti.co.uk/>

### High-grade plastic boxes

Azpack Limited <http://www.azpack.co.uk>

**Plastazote, Paraloid B72™, acid-free card, paper**  
Conservation by design

<http://www.conserva-tion-by-design.com>

### Good-quality cases

Just in Case Co <https://just-in-case.biz/>

### Chemicals

R&D Laboratories Ltd <https://mistralni.co.uk/>

### Storage and display materials

Safe Albums <http://www.safealbums.co.uk/Zen/>

### Stationery, polyethylene bags, markers

Viking Direct <http://www.viking-direct.co.uk/>

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Other images: p.8 lower right (lr), 16 lr, 17, 18 Drakon Heritage and Conservation; p.10 lr Ardnamurchan Transitions Project; p.13 lr, p.16 lower left Trustees of the British Museum.

The Portable Antiquities Scheme is run by the British Museum and National Museum Wales to encourage the recording of archaeological objects found by members of the public in England and Wales. Every year many thousands of archaeological objects are discovered, many of these by metal-detector users, but also by people whilst out walking, gardening or going about their daily work. Finds recorded with the Scheme help advance knowledge of the history and archaeology of England and Wales.



**Portable  
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[www.finds.org.uk](http://www.finds.org.uk)



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