CONSERVATION

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Guidelines for dealing with material from sites where organic remains have been preserved by metal corrosion products

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ABSTRACTS

Includes classification of types of materials and types of deposits involved. Lists points to be taken into consideration on site and in the laboratory. Gives examples of information obtained from specialist examination of organic materials so preserved.

KEYWORDS

Excavation: examination: organic materials: metals

THIS REPORT IS Level III

GUIDELINES FOR DEALING WITH MATERIAL FROM SITES WHERE ORGANIC REMAINS HAVE BEEN PRESERVED BY METAL CORROSION PRODUCTS.

Over a number of years, work in the Ancient Monuments Laboratory on the examination and conservation of metal objects, particularly those from graves , has resulted in the isolation of many fragments of organic material preserved by metal corrosion products.[1] From these remains specialists have been able to identify some of the materials used, and also report on technological details in cases where these are preserved.[2] Guidelines have now been developed from this work to ensure that the maximum amount of evidence can be obtained from organic materials preserved in this way.

Many organic materials in close contact with metals in the ground can be preserved by corrosion products. The first task is to decide whether any such preserved material has relevance to the object or its context. The conservator may need to discuss this point with the excavator, and possibly with the appropriate specialist.

A distinction can be made between organic material in its 'natural' state and that which has been fashioned into an artefact. Deposits may be natural, accidental or deliberate. A rough classification of the types of evidence has been produced, dividing the organic material into three major groups with subdivisions relating to the kind of deposit.

1. NATURAL MATERIALS

a) Random deposits of vegetation in which metal objects become buried. This can be demonstrated by a group of iron currency bars which were thought to have been bound with leather, but on closer examination the smooth patches with a suggestion of a grain pattern were found to be leaves.

b) Natural occurences of organic material may become incorporated in a deliberate deposit. Pupa cases of insects which fed upon the body may be preserved on metal objects in a grave, and at least one example of the adult insect has been found.

c) Natural organic material may be deliberately buried. The preservation of grass on the surface of metal grave goods has suggested that in some cases the burial was covered by this. Human skin may also be preserved by close contact with metal objects.

2. ORGANIC ARTEFACTS IN ASSOCIATION WITH METALS

a) Traces of an organic object such as a textile may be preserved on a metal object which was accidentally buried in contact with it.

b) A metal object may have been wrapped in a textile or contained in a box, and remains of these items may be preserved.

c) Traces of organic artefacts may also be preserved by chance association in an intentional deposit like a burial with metal grave goods. Fragments of the coffin may appear on any metal object within the grave, as may evidence for a cloak or blanket covering the body, and any garments present. Larger organic objects such as shields may leave traces on metal objects not directly associated with them.

3. COMPOSITE ORGANIC AND METAL ARTEFACTS

a) Organic objects with metal fittings like shields and boxes may leave traces on the metal parts. Coffins and leather belts are also included in this group.

b) Some metal objects have organic parts, examples being the handles of knives and the hilts of swords.

c) Organic artefacts may also be closely associated with metal obects, although not part of them, scabbards for swords being an example.

It is the responsibility of both the archaeologist and the conservator to ensure that this evidence is available for specialist examination. No cleaning of the metal objects should be carried out on site, and great care should be taken when the material is worked on in the laboratory. Much evidence can be obtained from deposits such as graves where metal objects are buried in close contact with organic artefacts, and essential information for the detailed study of organic traces is contained in grave plans. Co-operation between excavator, conservator and specialist

is necessary so that the potential information may be recognised and relevant records kept.

ON SITE

As mentioned above grave plans can prove essential in dealing with complex groups of material, and additional details such as which way up in the ground an object was lying, and if it was on top of another object, may shed light on organic traces.

The organic material is often in a delicate condition, and care should be taken to protect it by leaving a coating of soil over the surface and careful packing. Conventional lifting methods using polyurethane foam or plaster of paris can be used to lift large groups of objects, but at times the confined space of a grave and the proximity of other objects and the skeleton can make this impossible. Objects can be lifted in a small block of surrounding soil, using bandage as support, but no consolidants should be used as these can make later cleaning and identification difficult.

IN THE LABORATORY

Great care must be taken when cleaning metal objects if there is a chance of organic material being preserved. This should always be carried out under magnification, the ideal equipment being a low power binocular microscope with a variable magnification.

All objects from a grave group should be examined and it should be remembered that shield bosses, grips and rivets form part of one object, as do box fittings and spearheads and ferrules, and these should not be treated as groups of objects.

If several objects are lifted in a block it is essential for the conservator to record the relative positions when dismantling it, tying in with any plans supplied by the excavator. This is a continuation of the excavation and appropriate records should be made in the laboratory as in the field.

When describing the preservation of the organic material care should be taken in the choice of terms so that no confusion arises. The surviving

material can be divided into two main groups, that preserved on copper alloy (and possibly lead), and that preserved on iron objects.

In the first case the bacteriostatic effect of the corrosion products inhibits decay of the organic material, The material is still organic and may be subject to shrinkage and warping. It may be stained by the corrosion products, but in some cases the colour has been preserved.

In the second group the iron corrosion products coat the organic material which can remain inside this coating in varying stages of degradation, in some cases becoming a 'replacement' where the organic material has totally decayed leaving a cast of its surface or structure in the corrosion products. This latter distinction cannot generally be made without the use of high power magnification, so until such examination has been undertaken it will be best to describe the material as 'mineral preserved' on copper alloy or iron, and perhaps abandon the term replaced which is not strictly true in many cases.[3]

'Replacement' does not appear to result from preservation in contact with copper alloy, but confusion might arise where iron pins and springs are present on copper alloy brooches and the preferential corrosion of iron preserves the organic rather than the copper corrosion.

Until a positive identification has been made it is safest to describe the material as 'organic' as certain materials can cause confusion which will be discussed below. Where possible it is desirable for the specialist to see the material in position on the object, and to take their own samples when necessary. If samples have to be taken by the coservator the position of them must be clearly recorded on a drawing or a photograph. Consolidants should not be used before specialist examination has been carried out, as details can be obscured, photography can be difficult, as will identification using a scanning electron microecope.

Stabilisation methods for the metals can also be restricted if organic material is present which needs to be preserved. The residual organic remains on iron objects can be adversely affected by some treatments for

iron. Even if the surface of the organic material appears to be unaffected damage may be done to the structure. Any coatings such as waxes or laquers will obscure detail and make later examination difficult.

The organic material on copper alloy objects can be affected by immersion in liquids causing shrinkage on drying, and any crystallization of benzotriazole can destroy the structure completely. Unlike iron where the organic material has become part of the surface of the object and cannot be removed in one piece, it is sometimes possible to detach the organic material from copper alloy objects without its destruction.

Ideally specialist examination should be carried out at an early stage in the conservation process, before any stabilisation methods are used. If this is impossible consideration should be given to keeping the metal objects in a sealed dry environment, until the organic material can be studied.

SPECIALIST EXAMINATION

Once the organic material has been isolated specialist examination can provide information on the materials used in many organic artefacts. Much work has already been done on the identification of wood and fibres used in textile. However some materials may be misleading at first sight. This can be shown in the case of handles on knives where some examples were initially thought to be wood, but on closer examination were found to be horn which resembles wood in its degraded state under a low magnification. Other materials used for handles and hilts include bone, antler and ivory, and these should not be discounted.[4]

Another material which can cause confusion is crushed and degraded textile which can appear to show fibre bundles similiar to leather. Leather can be identified under a low magnification if the surface showing the grain pattern is still present, but further work has to be done on the degraded examples.[5]

A further step in specialist examination is the description of any constructional details still present. A considerable amount of work has

been done on the preservation of the construction of textiles with descriptions of the weave, spin direction of the threads, the count and in some cases details of remaining selvedges and stitching details being recorded.[6] Another field where useful information can be obtained is woodworking, where construction of boxes has been worked out from grain directions of the wood preserved on metal fittings.[7]

The construction of shields may be worked out from traces of wood preserved on shield bosses, handgrips and rivets, while traces of organic material on swords may show evidence for scabbards made of wood, possibly bound with leather and lined with sheepskin.

The study of all these organic remains can provide a useful addition to the archaeological record, and the importance of making them available for examination should be taken into account at all stages of excavation and conservation.

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