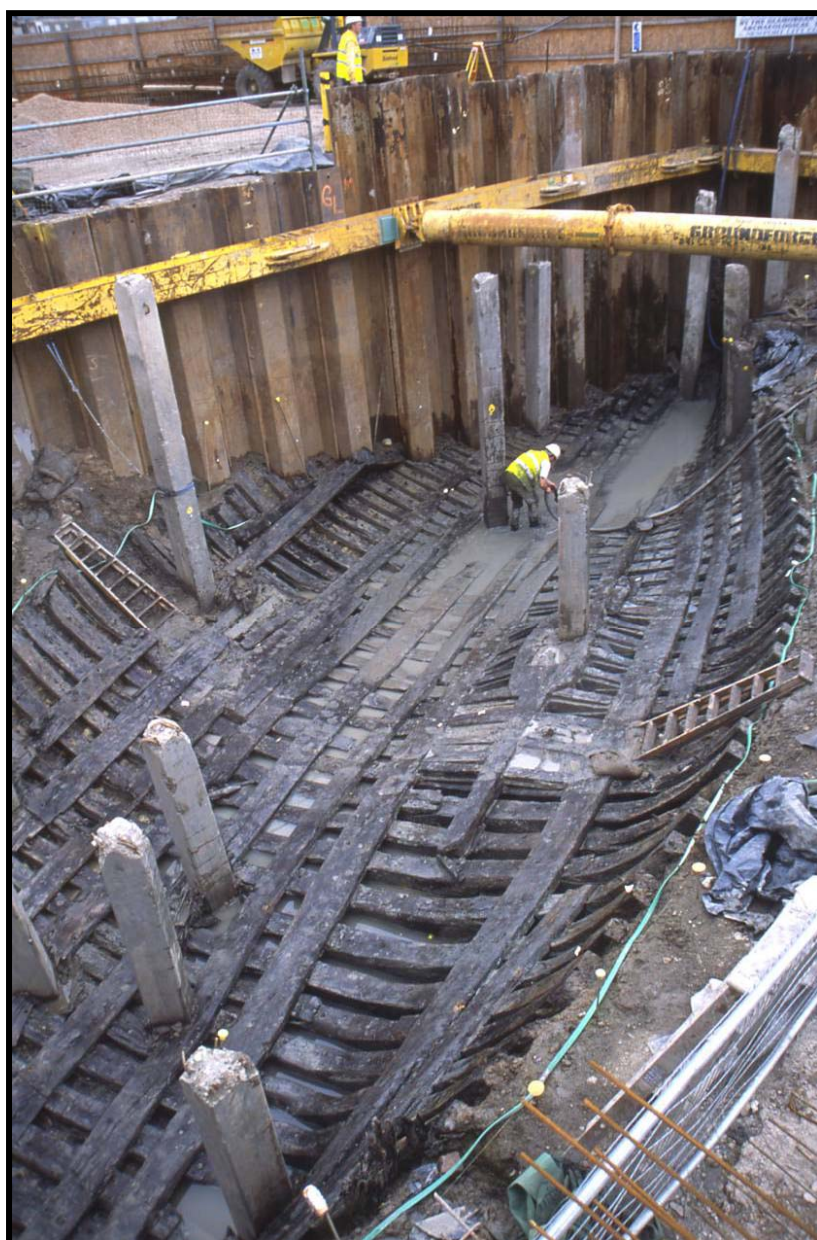


Newport Medieval Ship Project

Specialist Report:

TEXTILES, CORDAGE, BASKETRY and FIBRE



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By Penelope Walton Rogers, 28 August 2012
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The Newport Ship Project

Introduction

In 2002, during the construction of the Riverfront Theatre, on the banks of the River Usk in Newport, South Wales, an archaeological find of great significance was unearthed. In the summer of that year, while undertaking the excavations for the theatre's orchestra pit, the well-preserved remains of a 15th century clinker built merchant vessel were discovered.

The site, which was surrounded by a cofferdam, was being monitored by the Glamorgan Gwent Archaeological Trust at the time of discovery. The ship lay in what is locally known as a pill or small inlet, with its stern closest to the river and its bow facing into the inlet. The timbers were covered in thick alluvial mud, which created an ideal anaerobic environment for successful preservation. Seventeen strakes of planking remained on the port side and thirty-five on the starboard side of the ship. The vessel was approximately 30m in length.

A silver French coin was found purposely inserted into the keel of the vessel, dating the ship to after May 1447. Dendrochronological research has shown the hull planking to be from the Basque country and after 1449 in date.

After a much publicised 'Save Our Ship' campaign, it was decided that the ship would not be recorded and discarded but excavated with the aim to conserve. The riders, stringers, braces, mast step, frames and overlapping clinker planks and keel were dismantled one by one and lifted. Almost 2000 ship components as well as hundreds of artefacts were excavated.

This report examines and lists the textiles, cordage, basketry and fibre remains recovered during the Newport Medieval Ship excavation.

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REPORT

Fibre Products from the Newport Ship, Gwent:

(i) Cordage, (ii) Basketry, (iii) Textiles,

(iv) Threads from Leatherwork

On behalf of Toby Jones, Newport Medieval Ship Project

Penelope Walton Rogers

28 August 2012

Penelope Walton Rogers asserts her right to be identified as the author of this work

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Cordage

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Ropes of different types and sizes were essential to any kind of sailing vessel and ‘learning the ropes’ – their weight, breaking strain and usage - was fundamental to a seaman’s training (*Manual of Seamanship*, 1937; Stopford 1953; Ashley 1960; Gibson 1961; Popple 1969; Day 1970). Medieval cordage recovered from excavations, however, has proved to be even more diverse than might be expected from the literature. A Scandinavian goat-hair braided rope from Newcastle upon Tyne (Walton 1988, 79-80), palm-fibre examples from Southampton (Crowfoot 1975, 337) and coir (coconut fibre) cordage from London (Walton Rogers unpublished a) represent some of the exotic materials found in medieval ports, while flax stems, heather stems, hair-moss and tree bast have been identified in a range of other sites (Walton 1989, 393-7; Walton Rogers 2001). The different fibres are often associated with particular methods of construction, although the exact geography, chronology and function of the different types have yet to be determined. The Newport ship therefore provides a welcome body of fresh data.

Over 40 separate fragments of cordage were recovered from the ship (Table C1-C2).

Identification of the raw material was carried out by Dr Allan R Hall, archaeobotanist at the University of York, and the construction was recorded at The Anglo-Saxon Laboratory, optical microscopy being used in both cases. The terms used to describe the construction of the material in this report are the standard ones employed in archaeology, where twist and ply are indicated by letters and numbers. Z and S are used for the direction of twist (when a cord is held vertically, the diagonal lie of the fibres corresponds with the middle strut of the letters Z or S). The smallest element is given first, followed by the number of strands and the direction of their ply, so that Z3S indicates three Z-spun yarns twisted together in the S-direction. In traditional manuals on sea-faring, the process of twisting is called ‘laying’; Z-twist is termed ‘right-handed’ and S-twist ‘left-handed’; the smallest element is a ‘yarn’ or ‘thread’; plied yarns are called a ‘strand’; a combination of strands is a ‘rope’; and a combination of ropes is a ‘cable’ (*Manual of Seamanship* 1937, 95-9; Ashley 1960, 23-4; Gibson 1961, 15-17).

On analysis, there proved to be two main groups, one made of grass stems which may relate to the dismantling of the ship, the other made of hemp and likely to represent the ship's rigging (Fig.C1).

Grass-stem cordage

The heavy-gauge cordage recorded during the excavation as Ropes A-E, W and Z (for MSG numbers, see Table C1), all proved to be made of grass stems, as were four detached fragments, MSG807, MSG855, MSG1298 and MSG1299. Dr Hall comments that 'the outer layers of the 'fibres' showed the characteristic pattern of grass epidermal cells, comprising 'long' and 'short' cells (Metcalf 1960), the latter sometimes in dissimilar pairs. The material was presumably from stems (culms), since the epidermis appeared to be continuous around the whole circumference of each 'fibre'. The identification of these samples beyond 'grass stems' remains uncertain at present.' (Hall, report in archive). Grass as a raw material for cordage does not appear to have been recorded previously in Britain, and a single example from 13th/14th-century Bergen was noted as an oddity in Norway (Schjølberg 1988, 99).

Most of the ropes of this type are around 40mm diameter, which approximates to 125 mm circumference, although Rope A is a little thinner than the rest. They have been made in three stages. For the first stage, bundles of grass stems were laid together in the S-direction, fresh bundles being added in as work progressed. Three of the yarns made by this means were then tightly twisted together in the opposite, Z-direction (helix angle 40°-50° from vertical), to give an S3Z strand, 15-18 mm diameter. The detached strands, MSG 807 and MSG1298, represent this basic element, but for the thicker ropes the strands were laid together, in threes for Rope A and in fours for Ropes B, C, D, E, W and Z, the final twist in every case being S (helix angle 25°-30°). This means that the rope is 'left-handed', which was less common than the right-handed technique in traditional rope-making (Ashley 1960, 23; Gibson 1961, 15-16).

The four-strand ropes of this construction are technically 'hawsers', which are defined as 'large plain-laid rope generally over 5 inches [125 mm] in circumference' and regarded as 'suitable for towing, warping and mooring' (Ashley 1960, 23). They lay under the starboard side of the ship, which had collapsed on to the river bed some time after it had berthed, and they ran lengthways, parallel to the keel. The exact position of the three-strand cordage, Rope A, was not recorded, but it was on the same alignment as the others and ran for at least 5 metres along the starboard side. A

single detached fragment of similar construction, MSG 849 (fibre not identified), was recovered from the midship port side. The hawsers were at first interpreted as having been used to manoeuvre the ship into position. However, there were heavy-duty nails or rivets in association with MSG 845 and MSG 1294 and, in view of the evidence for the shoring of the starboard side, it seems more likely that the hawsers represent an attempt to contain the framework of the ship while it was being repaired or dismantled.

Hemp cordage

The hemp cordage was much more variable in size and construction (Table C2). The fibre was identified as coming from the hemp plant, *Cannabis sativa* L., by Dr Hall, who noted ‘visible resin canals’ and, on MSG 1297, ‘some areas of the epidermis with large bosses surrounded by concentric cells’. Most of the raw material proved to be undressed plant stems, although for MSG 062 the fibre had been partially extracted from the stem, which will have made it more pliable than the rest.

Hemp eventually came to be regarded as the standard material for cordage used in rigging and netting. Already in the 13th century there was an established hemp rope-making centre at Bridport, Dorset (Friel 1995, 95-6), and the supply of hemp for ropes and canvas became a matter of concern for the crown in the 16th century (Beck 1886, 128) and for the Navy Board from the 17th century onwards (Pool 1966). Even so, the archaeological evidence for the medieval period indicates that at this stage hemp was only one of several fibres made into cordage. If the Newport ship was rigged in Spain or Portugal, however, it is worth noting that the Basque ship, *San Juan*, which sank in Red Bay, Labrador, in the 16th century, had cordage made of hemp (Bradley 2007). The Spanish towns of Calatayud and Calahorra were identified as a likely source, and a trade in rope from Brittany, Bordeaux and Flanders was also mentioned (*ibid.*, 20).

The primary element in all the Newport examples is a Z-spun yarn, 1-3mm in diameter, mostly tightly twisted (helix 50°-60°) into S-twist strands, 15-18mm diameter. The number of yarns in a strand varied, and could not always be counted, but 15, 28 and 30 yarns were recorded in strands of increasing thickness. The particularly hard twist of most of the examples recorded here, termed ‘firm lay’ or ‘short lay’, gives a solid rope which retains its shape well and is relatively impervious to water (Ashley 1960, 23; Gibson 1961, 17). The strands were twisted in the Z-direction (helix mostly 40°-50°) into a 3-ply rope (ZmultiS3Z). This is a right-laid rope, the most common type to be used in traditional rigging. The tight construction causes the primary Z-spun

elements to lie parallel to the line of the rope, which must aid the smooth running of the ropes through blocks. The small number with a less tight final twist, 'plain-laid', such as MSG 088 and MSG 834, would be more flexible and suitable for knotting and plaiting.

Most of the hemp cordage appears to have been flattened during burial, but diameters were estimated as between 12 and 30 mm, which represents circumferences of 38-95 mm (1.5-3.7 inches). One, MSG 1297, with a diameter of approximately 20 mm and the tight twist described above, came from a wooden pulley block, although there was otherwise no indication of the function of the different hemp ropes within the vessel. They can, however, be compared with the rigging of the *San Juan*, where ratlines of 8mm, lanyards of 24 mm and shrouds of 30-35 mm diameter, were all twisted ZmultiS3Z, as here (Bradley 2007, 20-22: Bradley uses the term 'hawser-laid' for all this material). The much thicker anchor cables and stays associated with the *San Juan* were absent from the Newport ship.

Textiles

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Nine separate finds of textiles, incorporating over twenty fragments, were recovered from the ship, along with some loose yarns which are likely to have originated in the same pieces (Table T1). These textiles are all soundly made from well-spun yarn, but they are relatively heavy fabrics, patterned in natural fleece colours, rather than dyed yarn, and they lack the dense soft-finishing often seen in tailors' offcuts of the period. As such, they are most likely to represent the remains of working clothes, probably of the sort worn by mariners. In the final phase of their use, however, they appear to have been cut up and used for practical purposes around the ship.

Raw materials

Examination by transmitted-light microscopy showed that the fibres had suffered a certain degree of physical and chemical damage, but enough of the cuticular scale pattern had survived to indicate that most were sheep's wool (Appleyard 1978, 26-7, 107-117). Fine, medium and coarse fibres, including hairs (fibres with a medulla or central air-channel) were present in most samples, while kemp (particularly wide fibres with latticed medullas) could be observed in some, such as MSG 091. These features indicate mountain or hill sheep, or the hardy breeds that can survive in the difficult conditions of the Atlantic islands. The eighth sample, MSG100, included some particularly fine fibres and it is possible that this represents goat fibre.

Pigmentation can be identified by microscopy from the presence and density of granules in the fibre, and the original fleece colour can be reconstructed from the number of these pigmented fibres in the sample. MSG 100 was poorly preserved, but pigmentation appeared to be dense throughout and the cloth was probably originally dark brown or black. The main body of MSG 057 included a small percentage of brown fibres which would have given it an oatmeal colour, while the stripes were made from dark brown or black wool. In MSG 66 and MSG 067, the ground colour was similar to that of MSG 057, but the stripe was probably a mottled brown-grey. Non-striped fabric MSG 096 was again oatmeal colour, and MSG 076 a mottled brown. MSG084 was represented by a very small fragment and the sample examined only contained non-pigmented (white) fibres. MSG 074 was a larger piece made of non-pigmented wool, but some felted fibres attached to it included both moderately pigmented (brown) fibres and blue-dyed ones. In MSG065, the textile visibly had dark stripes on a pale background, but the wool in both sets of yarn was the same, a non-pigmented wool with the

occasional brown fibre. It seems likely that in this instance the dark yarn was dyed, although this was not tested analytically.

In medieval England, the term 'russet' was used for textiles made of natural fleece colours, whether they were grey, black, brown or roan and they were regarded as the proper clothing for country people and artisans (Strutt 1842, ii, 105 et seq.). Archaeological evidence has demonstrated that dyed cloth was more common in towns (Walton Rogers 1992) and pigmented wools in less populous areas (Walton Rogers 1999, 195-7). Amongst mariners there were probably grades of clothing that reflected the pocket of the wearer. One 16th-century Basque seaman buried at Red Bay, Labrador, for example, wore garments made entirely of different shades of wool, although some of his contemporaries also wore dyed cloth (Walton 1987; Dubuc 1988).

Weave structure and pattern

MSG 066 and MSG 067 are almost certainly pieces of the same cloth, but the other textiles can be differentiated by technical features: this means that there are at least of eight different fabrics present (Table T1). All the textiles have been woven in simple structures, either tabby (plain weave) or 2/2 twill (Fig.T1-T3), which are the two most frequently identified weaves in 15th-century collections from European sites outside Scandinavia (Walton Rogers 1999, 195; Cardon 1999, 454). In common with many fabrics of this period, they have been made with singles yarn, which can be Z-spun or S-spun (Z and S indicate whether the yarn has been twisted clockwise or anticlockwise). Selvages (side borders of the cloth) are present in MSG 066 and MSG 067 (Fig.T3), which indicates that the Z-spun system is the warp. One selvedge has been strengthened with paired warp threads, but the other is simple, without any strengthening.

Thread-counts (number of threads per cm) range from 5-6 x 5 (MSG065: Fig.T2) to 12 x 8 (MSG067: Fig.T3). Most pieces have the appearance of having been fulled - the weave is close and the fabric slightly felted – although MSG 057 is not felted and has the kind of firm, diagonally ridged appearance seen in cavalry twill. The lowest thread-counts may indicate blanket-quality fabrics, but the remainder lie within the middle and lower end of wool clothing fabrics, as identified in waste from tailors' workshops (Walton 1981, 194-7; Crowfoot et al 1992, 26-55) and the mid 16th-century clothing recovered from the *Mary Rose* (Forster et al 2005, 29-30).

Stripes were identified in three textiles, in each case dark stripes on a paler background. In MSG 065 there are single dark yarns at irregular intervals across the weave, which probably will have given the cloth an overall flecked appearance, but in MSG 057 and MSG 067 the bands of colour were six threads wide, which will have been seen as bold narrow stripes. It is not impossible that some felted

blue/brown fibres in association with MSG 074 also represent the remains of an area of colour patterning.

This form of striping is different from that found in the fabric traded under the name of ‘ray’, a Flemish speciality which had multi-coloured weft bands in a different weave structure from the rest of the cloth (Crowfoot et al 1992, 52-68; Walton Rogers 2002, 2882-3). The simpler stripes seen here could have been made by any weaver, anywhere in Europe: the larger collections of medieval textiles often include one or two examples of the type. As far as the evidence from ships is concerned, no striped textiles appear to have been recorded among the Tudor wool clothing from the *Mary Rose* (Forster et al 2005, 20-31), nor do any appear in smaller collections such as those from the Armada ship, *Trinidad Valencera* (Walton unpublished), the wool twills used to caulk some of the late 15th- and 16th-century ships found in Oslo harbour (Walton Rogers unpublished b), or a single wool textile, a Z x S tabby, recovered from the *San Juan* (Davis 2007, 231-2). A 2/1 twill with a complex plaid pattern recovered from a 14th-century wreck from Skjernøysund in the Skagerrak offers one comparative example (Walton Rogers unpublished c), but the closest parallels for the Newport striped textiles are to be found in two *chemisettes* (hip-length sleeved tops with no front opening) worn by the seaman (‘individual 2’) buried in russets at Red Bay (Walton 1987; Dubuc 1988). Both *chemisettes* were made from a cloth with thin brown stripes in one direction and wider brown bands in the other. Significantly, Elise Dubuc, in her study of the clothing from this site, provides a series of pictures of seamen taken from European manuscripts, in which the costume of a Spanish mariner in 1529 appears to have thin stripes in both the top and the trousers (Dubuc 1988, 146-7).

Primary and secondary uses

Most of these fragments have irregularly cut edges on at least two sides. Two, MSG 096 and MSG 100, have small square perforations surrounded by iron staining, which suggests that they were at some stage pinned flat between timbers: MSG 096 was recorded at F42-43 and MSG 100 at F37. MSG 066 was a twisted strip encrusted with iron corrosion, most probably used to plug a gap next to the garboard strake at F10. Textiles used in this way often prove to have been tarred, but no tar could be detected analytically in MSG 100, the only sample tested. The textiles smell strongly of chemicals and it is possible that residual tar has been removed during conservation.

There is also evidence for their use before they were cut up. A cluster of eight yarns emerging from one of two small adjacent perforations in the fabric of MSG 057 are likely to represent the anchoring threads for a button or toggle and several textiles show evidence for wear. In some instances this is visible as a patchy felting on one face, but on MSG 057 damage on the crowns of the weave-crossings, visible at x10 magnification, and the formation of fibrils and brush-like frayed ends of fibres, seen at x400-x640 magnification, clearly indicate extensive abrasive wear (Cooke and Lomas

1990, 220-2) on one face. This has been noted previously in garments worn by working people such as miners (*ibid.*). From these observations, it has been concluded that the textiles represent old clothing, or possibly a blanket in one case, cut up for use in the vessel.

Basketry and related material

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Items worked in basketry technique are relatively common in excavations of shipwrecks and quaysides: at least twenty-one separate baskets were recovered from the *Mary Rose*, for example (Hurcombe and Lemieux 2005). To some extent, their survival is due to the waterlogged conditions at these sites, which help to preserve organic materials, but their number probably also reflects the particular need for lightweight containers on board ship. Once removed from a wet environment, however, basketwork deteriorates rapidly and requires urgent specialist conservation (Karsten et al 2012, 25). This was not available during the excavation of the Newport ship and the following text has therefore been based on site photographs and such remains as have survived ten years in storage. Much of this material appears to originate, not in containers, but in the ‘pump baskets’, used to filter out debris in the bilge-water. The other remains are of less certain function, and will be discussed individually below. As previously described (*Cordage*), the plant species have been identified by Dr Allan R Hall. The basketry terminology has been taken from craft manuals (Okey 1912; Wright 1977) and archaeological guides (Adovasio 1977; Wendrich 1991).

The pump baskets

A complete pump basket, approximately 200-250 mm diameter (internally) and 200-220 mm deep, was recorded at the mid-ship mast step (Fig.B1). The photographs show a sturdily built cylinder, with slightly tapering sides, which sits on wooden planking (the inboard face of the hull). The surviving fragments, MSG 547 and MSG1308, indicate that it was worked in simple ‘randing’ (a single rod or ‘weaver’ worked in and out of the uprights or ‘stakes’), with willow (*Salix*) for both the stakes and the weavers. The distance between the uprights is calculated to have been approximately 35 mm. Bark was preserved in patches, and it is likely that the willow was originally used ‘unstripped’, and that the process of pumping water has left it partially stripped. The stakes are mostly 3-4 mm diameter, but the weavers are more variable, from 1.5 to 4 mm thick: this accounts for the irregular appearance of the basketwork in the photograph.

Further fragmentary remains collected from the area of the stern pump, MSG 565 (Fig.B2), MSG 1260 and MSG 1263-9, are likely to represent another pump basket, although this must have had a different construction from the first. Preliminary records made at the assessment stage indicated that the stakes were wooden laths of alder (*Alnus*) and the weavers were willow (*Salix*). These now survive as fragmentary laths, up to 50 mm wide and 12 mm thick, and unstripped (or partially stripped) rods 4-6 mm thick. The curvature of some of the rods suggests that they were used in a twined technique ('pairing' or 'fitching') for at least part of the work, and that there was more space between the uprights than in the mid-ship pump basket. The presence of several rods which have been bent at an oblique angle (Fig.B2) implies that this was a square or rectangular basket.

MSG 564 appears to be the poorly preserved remains of a third basket, although in this instance the rods, which include elements that are thick (6-7 mm diameter) and thin (1-2 mm diameter), are not willow. Dr Hall commented that they are 'perhaps *Prunus* and might be gean or wild cherry, *P.avium*'. *Prunus* is not one of the traditional materials used in British basketry (Wright 1977, 20-2), but the wild cherry is to be found in woodlands in Britain and in other parts of temperate Europe.

Handle

A curving length of bound wood, MSG 858, almost certainly represents a handle for a basket or bucket. It was an unstratified find, not necessarily connected with the use of the ship. It is now in three fragments, but originally it was at least 160 mm long and over 35 mm thick. The core was identified by Dr Hall as split wood, probably oak (*Quercus*) or sweet chestnut (*Castanea*), and the binding rod as willow (*Salix*). The willow was mostly split lengthways and was 4-7mm wide. This represents one of several standard methods for constructing a handle in basket-working (Wright 1977, 79-80; Crampton 1984, 63-70) and similar examples were recorded on baskets recovered from the *Mary Rose* (Hurcombe and Lemieux 2005, 404-6).

Bundle of flattened plant stems

One particularly puzzling find, MSG 857, appears to represent small bundles of flattened plant stems, each tied together with a plaited cord (Fig.B3). They all lay on the same alignment and covered the area of a rounded square, 320 x 300mm. The stems are regular in shape, most being

300mm long, 6-8 mm wide and 0.5-1.0 mm thick, and they appear to have been flattened before they were bound. The binding cord has deteriorated, but the stems themselves remain robust and flexible: a single stem can be coiled around the finger without any risk of damage. The stems proved to be particularly difficult to identify, as Dr Hall reports.

‘This material consists of flattened hollow herbaceous plant stems – they are clearly tubular when examined after sectioning, though their internal structure is very difficult to discern as a result of flattening (a somewhat similar appearance was effected by squashing an already strongly-flattened stem fragment from a herbarium specimen of hemlock, *Conium maculatum* L.). The stems are rather finely ridged and in places patches of moderately well-preserved epidermis are present; in these, large scattered stomata are visible and the ground tissue comprises somewhat brick-like cells with rather rounded angles. Dark brown tubular structures which are presumably secretory (resin, latex or mucilage) ducts are present in some parts, locally heavily concentrated (in one patch forming an almost continuous sheet across an eroded surface). At intervals there are nodes where branches or leaves were attached. These are characterised by a ring of openings (for the exit of vascular strands).

‘This last feature argues strongly that the stems are from member of the Apiaceae (Umbelliferae, carrot family) in which the sheathing leaves, characteristic of many members of the family, leave a ring of vascular traces. Plants in this family also often have secretory cavities containing oil, resin or mucilage. Another family of dicotyledons with latex ducts is Asteraceae (Compositae; in members of the Liguliflorae) but these seem less likely to exhibit a whorl of holes at the nodes. Stems of teasel (*Dipsacus*) are hollow, and their sheathing (connate) leaves might produce a whorl of holes on decay of the leaves but they do not have secretory ducts. The nature of the epidermal cells rules out any monocotyledonous plant from the grass or sedge families.’

The purpose of these small bundles of flat stems is unknown, although it is obvious that they are strong and flexible and survive well in wet conditions. It is possible that they represent the raw material for mariners’ plaited work, such as the sailors’ hats that were traditionally made by plaiting flat strands of straw or leaf, or the plaited and woven mats of different materials used in doorways and on deck (Ashley 1960, 488, 554). Plaited straw bands stitched together, and the remains of a twill-woven mat made of split reed, were recovered from the *San Juan* in Red Bay (Davis 2005, 232-4).

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Threads from leatherwork

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Samples were extracted from stitch holes in the seams of the leatherwork during conservation and were passed to The Anglo-Saxon Laboratory for identification. Examination by microscopy revealed most of these to be decayed collagen from the leather, but four samples, from MSG 055, MSG 083, MSG 085 and MSG 087, incorporated processed plant fibres and have been interpreted as the remains of sewing threads. The sample from MSG 055 included fine S-spun yarns, 0.7 mm diameter, which may have been originally plied, but the structure of the thread in the other three was no longer intact. The fibres could all be identified as partially processed flax or hemp, from the presence of a central lumen, nodes and cross-markings, which were especially clear when viewed with a polarised light microscope. A sample of MSG 083 was examined by Dr Allan Hall and was tentatively identified as hemp (*Cannabis sativa* L.).

There was a long transition from animal to plant fibres during the course of the late medieval period, but flax (or hemp) was established as the preferred material for stitching leather in Britain by the end of the 14th century (Walton Rogers 2003). Most of the British threads have proved to be Z-spun and, where the fibre can be identified it is flax. The S-spin and tentative identification as hemp in the Newport examples may reflect a different origin for the leatherwork.

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Figure Captions

Cordage

Fig.C1: Examples of the two main types of cordage recovered from the Newport ship, grass hawser MSG1293 (left) and hemp rope MSG 061 (right). © The Anglo-Saxon Laboratory.

Basketry

Fig.B1: The midships pump basket *in situ*. © Newport Museum.

Fig.B2: Fragmentary remains of basketry MSG565, including alder laths (stakes) and willow rods (weavers). © The Anglo-Saxon Laboratory.

Fig.B3: Fragments of flattened plant stems and crossways plait used to bind the stem bundles, extracted from MSG 857 (pre-conservation). © The Anglo-Saxon Laboratory.

Textiles

Fig.T1: The two weave structures of the textiles.

Fig.T2: Striped wool textile woven in tabby, MSG 065. © The Anglo-Saxon Laboratory.

Fig.T3: Striped wool textile woven in 2/2 twill, with selvedge, MSG 067. © The Anglo-Saxon Laboratory.



Cordage

Fig.C1: Examples of the two main types of cordage recovered from the Newport ship, grass hawser MSG1293 (left) and hemp rope MSG 061 (right). © The Anglo-Saxon Laboratory.



Basketry

Fig.B1: The midships pump basket *in situ*. © Newport Museum.



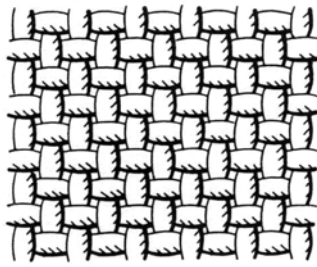
Basketry

Fig.B2: Fragmentary remains of basketry MSG565, including alder laths (stakes) and willow rods (weavers). © The Anglo-Saxon Laboratory.

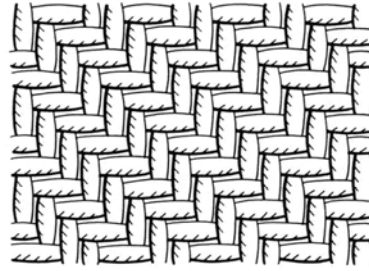


Basketry

Fig.B3: Fragments of flattened plant stems and crossways plait used to bind the stem bundles, extracted from MSG 857 (pre-conservation). © The Anglo-Saxon Laboratory.



tabby



2/2 twill

Textiles

Fig.T1: The two weave structures of the textiles.



Textiles

Fig.T2: Striped wool textile woven in tabby, MSG 065. © The Anglo-Saxon Laboratory.



Textiles

Fig.T3: Striped wool textile woven in 2/2 twill, with selvedge, MSG 067. © The Anglo-Saxon Laboratory.

Table T1: Textiles from the Newport Ship

MSG No.	Dimensions* in mm	Fibre	Construction	Thread-count/ Spin	Finish/ Wear	Notes
MSG057	300 x 145, 105 x 55, & 60 x 55	wool, non-pigm & non-pigm	2/2 twill, striped	12-13/Z x 7/S	none	Two bands of dark colour, in Z-system, along one cut edge: 3(+) dark, 6 light, 6 dark, rest light. Occasional reverses in twill diagonal, over two threads each, probably weaving mistakes. See text for details of use.
MSG 065 & MSG 1285	8 fragments 175 x 75 etc	wool, mostly non-pigm	tabby, striped	5-6/S x 5/S	slightly matted	Single dark yarns (D) at irregular intervals (Fig.T2): 1D/6/1D/c.25/1D/4/1D/10/1D/c20/1D. Remains of cut strip 75 mm wide.
MSG 066	3 fragments 190 x 25 etc	wool, non-pigm	2/2 twill	10-12/Z x 7-8/S	wear on one face	Two selvages on separate fragments, (i) has 7 pairs Z-spun and (ii) has plain twill construction with no paired threads. Other edges irregularly cut.
MSG 067	150 x 145	wool: non-pigm, but pigmented in stripe	2/2 twill striped	12/Z x 8/S	slight wear on one face	Selvage worked on 7 pairs Z-spun. Single stripe 6 dark threads. Edges other than selvage cut.
MSG 074	3 fragments 52 x 45	wool, non-pigm	2/2 twill	9-10/Z x 9/Z	slight wear one face	No cut edges. Some felted wool on fibres in association, probably spun. yarns, dyed blue with woad or indigo.

MSG 076	35 x 22 & 24 x 12	wool, including pigmented fibres	2/2 twill	9/Z x 7/Z	probable wear on both faces	Both fragments have one cut edge.
MSG 084	--	wool, non-pigm	tabby	8/Z x 6/Z	--	Poorly preserved remains in phial of water. Associated with leather.
MSG 091	52 long	wool, most non-pigm	yarn	Z, 1.0-1.2mm diam	--	Single regularly spun yarn.
MSG 095	30 & 22 long	wool, most non-pigm	yarns	Z, 2.0-2.5mm diam.	--	Two spun yarns.
MSG 096	95 x 30	wool, most non-pigm	tabby	8/Z x 8/S	fulled	wear or 2 square holes, 5 x 4mm, with iron staining.
MSG 100	100 x 65	?goat ?dense pigm	tabby	7/S x 7/S	slightly felted	Solid, stiff textile. 2 square holes, 2.5 x 2.5mm.

* Dimensions: where there are more than two fragments, only the largest fragment has been listed.
Abbreviations: pigm = pigmented; diam = diameter.

Table C1: grass-stem cordage from the Newport Ship.

Note that the recorded lengths come from the fragments that were lifted and do not necessarily represent the *in-situ* length of the rope.

<i>Number</i>	<i>Length(m)</i>	<i>Thickness(mm)</i>	<i>Construction</i>	<i>Notes</i>
ROPE A				
MSG 1293	0.21	43 x 21	S3Z3S (helix Z 50°, final S 30°)	2.0m from bow.
MSG 1294	0.22	40 x 20	S3Z3S, as 1293	4.0 m from bow. Nail head in association.
MSG 1295	0.25	40-50 x 20	S3Z3S, as 1293	5.0m from bow.
MSG 1296	six lengths c.40 diam.		Probably as 1293	Arrow pointing to prow runs parallel to rope. Wet, covered in mud & mould when examined.
ROPE B				
MSG 850	0.95	40-50 diam.	S3Z4S	Below ship, <181>
ROPE C				
MSG 845	1.10 m	40 diam.	S3Z4S	Below ship <182>. Arrow pointing to prow runs parallel to rope. Iron domed rivet head, 65mm diameter in middle of rope.
ROPE D				
MSG 842(a)	0.30	55 diam.	S3Z?4S (helix Z 45°, S?)	Below ship, <184> .
MSG 842(b)	0.15	40 diam.	SZS, detail unclear	Below ship, <184>. Continuation Of <177> and <178>
MSG 851	0.72	40 diam.	S3Z4S (helix Z 40° final S 20°)	2.0m from bow. Below ship. <178> split from <177> for lifting.
MSG 856	1.40	40 diam.	S3Z4S (helix Z 50° final S30°)	Below ship, <177>. Arrow Pointing to prow parallel to rope. Prow end best preserved.
ROPE E				
MSG 846	1.40	40-45 diam.	S3Z4S (helix Z 50°-60°, S 25°)	Below ship, <176>
ROPE W				
MSG 848	0.48	45 diam.	SZS, detail unclear	Below ship, <172> 'co-ords DWG124'
ROPE Z				
MSG 853	1.68 in total	35-40 diam.	S?Z?S, detail unclear	Below ship. <175>. One length, 1.04m, folded in two with loop at fold; also a pair, parallel, 0.32 m. Fe domed nail/rivet, head 60mm diameter.
OTHER				
MSG 807	0.16	18 diam	S3Z (helix Z 40°)	'rope base from bow, starboard'

				Folded in two. <187>
MSG 855	0.23	40 diam.	S-cabled	<186> Heavily concreted
MSG 1298	0.11	c.30 diam.	S3Z x 3	Below ship, <179>. 3 strands each 15 mm diam
MSG 1299	0.20	35 diam.	S3Z4S (helix Z40°-50° final S30°)	<174>
Poorly preserved, fibre not identified				
MSG 849	0.83	40	S3Z3S	Port midship. E25.48. Three ropes parallel (two above, one below) 75-80 mm across.
MSG 854	0.36	20 diam.	?Z3S	<302> E17.59

Table C2: hemp cordage from the Newport ship

<i>Number</i>	<i>Length(m)</i>	<i>Thickness(mm)</i>	<i>Construction</i>	<i>Notes</i>
MSG 059 (i)	--	18	Zmulti S	C.F30-40 Starboard. Two sections of matted cordage, incorporating bundles of Z-spun yarn, c.2 mm diameter, loosely S-twisted together..
MSG 059(ii)	0.18 & 0.13	39 x 21	Z28S3Z (helix S60° and final Z35°-40°)	C.F30-40 Starboard.
MSG 061	0.15 & 0.15	29 x 18	ZmultiS3Z (helix S50°-60°, final Z 40°).	F48. Starboard.
MSG 062	mostly imprint	c.20	unclear	Starboard side of mast step. Hemp is part-processed
MSG 075	0.05	20x 3	bundle of Zs, each 1-1.5 mm diam.	cF45-50, starboard side near 'reed matting'. Possibly frayed rope. undressed hemp
MSG 079	Several, longest 0.09	28 x 12	Z multiS3Z (helix S60°, final Z40°)	NE bow.
MSG 088	0.06	19 x 12	?ZmultiS3Z (helix final Z 20°-30°)	COW1561 (orig wood no.519)
<i>MSG 809-811 represented poorly preserved remains found together</i>				
MSG 809	0.05	16 x 11	Z30S (helix Z 30-40, S50)	Associated with timber 1132.
MSG 810	-	-	As MSG 809	Associated with timber 1132.
MSG 811	knot	2-3	Z only (helix 40°-50°)	Fragment, 40 x 30 x 8 mm: a knot of Z-spun yarns.
MSG 828	0.06	27 x 11	ZmultiS3Z (helix S 60°, final Z 45°)	
MSG 833	0.11	22 x 13	ZmultiS3Z (helix S45°, final Z 50°)	
MSG 834	0.15	20	ZmultiS3Z (helix S50°, Z35°)	F5-F6Post
MSG 835	0.09	28 x 16	ZmultiS3Z (helix final Z 40°)	
MSG 1297	0.08	26 x 15	Z15S3Z (helix final Z 40°-50°)	Rope from wooden pulley block (MSG 548, Cow 3036) hemp: dressed or undressed
MSG 1301	--	--	Z?S?Z	Elliptical pad, 105 x 35 x 14 mm, of compacted material ,

including matted cordage

MSG 1302	0.04	16 x 3	ZmultiS (helix S 40°).
	0.03	13 x 5	

MSG 1304	0.07	18 x 7	ZmultiS3Z (helix S final Z 50°)
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Poorly preserved, fibre not identified

MSG 854	0.36	20 diam.	S-ply	<302> E17.59
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For Archive Only
Catalogue of textiles from the Newport Ship

*This represents the detail behind Table T1
Table T1 is intended for publication, this catalogue is not.*

MSG057 (467 Lab 1170)

TEXTILE

Three fragments of the same textile, a striped wool 2/2 twill, 12-13/Z/0.9 x 7/S/1.0-1.5 per cm; no soft-finishing. There are three interruptions in the weave in which the twill diagonal is reversed for the space of two Z-spun yarns: the interruptions are irregularly spaced and may be unintentional. There are two narrow bands of darker colour in the Z-spun system running along one cut edge: >3 dark, 6Z light, 6 dark, rest light. The textile is harsh to the touch and the twill diagonal is prominent, giving the fabric a ridged/grooved effect.

Microscopy of the fibres revealed the typical scale-pattern, pigmentation and diameter range of wool. There were fine, medium and coarse fibres, mostly non-pigmented (white), but a small number of moderately pigmented fibres probably gave the main body of the fabric originally an oatmeal look. The dark bands, however, were made from densely pigmented fibres with only the occasional non-pigmented fibre, which would have been dark brown or 'natural black' to the naked eye.

The main fragment has a cut edge along the longest side. One face has seen extensive rubbing wear, reflected in the broken fibres on the crowns of the weave-crossings (Fig.00). The coloured bands are barely visible on this face. On one of the smaller fragments there is a tuft of approximately eight Z-spun yarns emerging from a perforation in the fabric and there is an empty perforation immediately next to it: these suggest a fastening for a button or toggle.

Fragments 300 x 145mm, 105 x 55mm and 60 x 55 mm.

MSG065 (-)

Eight fragments of a striped wool textile woven in tabby, 5-6/S/1.2-1.5 x 5/S/1.5 per cm; slightly matted, probably as a result of fulling. Stripes are made up of single dark yarns spaced at irregular intervals: 1dark/6/1dark/c.25/1 dark/4/1dark/10/1dark/c.20/1dark. Microscopy of fibres showed the features of wool, mostly non-pigmented, with the occasional fibre which was moderately pigmented in all yarns, light and dark.

The two largest pieces fit together to make a strip with parallel cut edges 75 mm wide.

Largest fragments 175 x 75 mm and 50 x 45mm.

Note that MSG 1285 is a sample of S-spun yarns separated from the textile during conservation.

MSG066 (467/120, F10.1 garboard strake)

A twisted strip of wool textile woven in 2/2 twill, with smaller fragments the same: wa10-12/Z/0.9 x 7-8/S/0.8-1.5 per cm; slightly matted on one face, possibly from wear. A selvedge along one side of the main fragment has been worked on five pairs of Z-spun warp threads, followed by a single and then another pair (probably originally seven pairs); a second selvedge on one of the small fragments has a simple twill construction without any paired threads.

Microscopy of the fibres showed them to be encrusted with iron corrosion products, but such features as were visible indicated non-pigmented sheep's wool.

Mostly irregularly cut edges, except for selvedges.

190 x 25 mm, 50 x 15 mm, 70 x 15 mm and 30 x 15 mm.

MSG067 (467/128 <112> Lab.1166)

One fragment of a striped wool textile woven in plain 2/2 twill, wa/12/Z/0.8-0.9 x we/8/S/1.0-1.2 per cm; no soft-finishing. A selvedge along one side has been worked on 7 pairs of Z-spun warp yarns; it maintains the twill weave structure in some places and in others the order of the threads has become jumbled. Parallel to the selvedge along the opposite (cut) edge, there is a single stripe of 6 dark threads.

Microscopy of the fibres showed them to be similar to those of MSG 057, except that the stripe was made from wool which was non-pigmented, moderately pigmented and densely pigmented, indicating a mottled brown-grey wool.

The fragment had been cut on one side and possibly torn on the other two. There is evidence for rubbing wear on one face only, although it is not as pronounced as it is on MSG 057.

Fragment 150 x 145mm.

MSG074 (467/128 Lab.1164)

(a) Three fragments of wool textile woven in plain 2/2 twill, 9-10/Z/0.9 x 9/Z/0.9; slightly felted on one face, possibly from wear. The wool is non-pigmented. No cut edges or seams. 52 x 45 mm, 40 x 40 mm and 32 x 18 mm.

(b) Some felted wool fibres, covering approximately 25 x 18 mm. The wool includes fibres which are stained dark, a few blue-dyed and a few moderately pigmented (brown). The dye proved to be either indigo or woad, the detectable component being indigotin.

MSG076 (467/128 Lab.1168)

Two fragments of wool textile woven in plain 2/2 twill, 9/Z/1.0 x 7/Z/1.2; slightly felted in places, probably from wear. The wool is a mix of non-pigmented, moderately pigmented and densely pigmented fibres, probably originally a mottled brown. Both fragments have one cut edge, but no indication of a seam.

Fragments 35 x 22 mm and 24 x 12 mm.

MSG084 (467 (128) Lab.1198)

A glass phial of water containing short disaggregated fibres, labelled 'textile from leather' includes a single fragment, 6 x 3mm, of decayed textile woven in tabby, approximately 8/Z/1.0 x 6/Z/1.0 threads per cm. The fibres are poorly preserved, but the range of diameters, 15-68 microns, the absence of pigmentation and the small areas of preserved scale pattern – irregular waved mosaic with smooth near margins – indicate white sheep's wool.

MSG091 (467/120 Lab.1167)

A single, regularly spun yarn, Z-spun, 52 mm long, 1.0-1.2 mm diameter. The fibre is wool and includes kemp (ribbon-like fibres 100-150 microns wide with a latticed medulla), as well as fine and medium fibres. This indicates a primitive fleece, probably from a hill or mountain breed. There are some fibres with light-moderate pigmentation present, but most are non-pigmented.

MSG095 (467/128 Lab.1191)

Two loosely Z-spun yarns, (a) 30 mm long, 2.0-2.5 mm diameter, (b) 22 mm long, 2.0 mm diameter. The fibre is wool, mostly non-pigmented but there is an occasional fibre with light-moderate pigmentation.

MSG096 (457/120 F42-43 <159> Lab.1248)

One fragment of wool textile woven in tabby, 8/Z/09.-1.0 x 8/S/1.0-1.2; slightly felted, from wear or fulling. The wool is mostly non-pigmented with the occasional moderately pigmented (brown) fibre. The fragment appears to have torn edges. There are two square holes, c.5 x 4 mm, both surrounded by iron staining with a rounded shape.

Fragment 95 x 30 mm.

MSG100 (467/130 F37)

One irregularly shaped fragment of textile woven in tabby, 7/S/0.8-1.0 x 7/S/0.8-1.0 per cm; slightly felted on one face. The textile has a mottled black appearance, which may be the product of pigmentation in the fibres, although it was difficult to establish this due to poor preservation of the fibres. It is possible that the fibre derives from goat [*sample taken for proteomics: results expected October 2012*] rather than sheep, as there are several fibres around 14-16 microns diameter. The textile has a sold feel and it was thought it might have been impregnated with some strengthening or waterproofing agent,

although no tar emerged when a thread was immersed in chloroform. It is possible that two square holes, 2.5 x 2.5 mm and 6 mm apart, represent where nails or rivets have been used.

Fragment 100 x 65mm.

MSG176 1639 <1907>

A small number of loose animal fibres were identified in the matrix of silt and plant matter attached to the coin. They were 17-50 microns in diameter with streaky pigmentation, but the scale pattern was unclear and the species could not be identified.

MSG1285

Labelled: 'From MSG067 textile untreated thread sample'

A small number of S-spun yarns, comparable with those in MSG067.

Penelope Walton Rogers

28 September 2012