THE EXCAVATION, RECOVERY AND PROVISIONAL ANALYSIS OF A MEDIEVAL WRECK FROM MAGOR PILL, GWENT LEVELS

by Nigel Nayling

Introduction

This interim report summarises the provisional findings of a collaborative project which has only been possible through the support (often voluntary) of many involved in the SELRC as well as private companies. The success of the project to date is in good part due to the close contacts between individuals and archaeological bodies which the SELRC has fostered over the years, and highlights what can be achieved when common goals are shared.

The intertidal zone at Magor Pill off the Gwent Levels has been the subject of intermittent archaeological study over the last half century, yielding material from the Iron Age to the early modern period. Much of the material can be associated with silted palaeochannels, their location on the open foreshore reflecting later erosion of the land along their banks. Recent erosion of semi-mobile sand and gravel, which had previously obscured much of the area, encouraged the geoarchaeological study printed in last year's *Archaeology in the Severn Estuary* (Allen and Rippon 1995), which mapped this

Figure 35. Magor Pill Wreck: During excavation.

succession of palaeochannel deposits and considered transposed pottery in the areas an indicator of periods of human activity. This outline of the geomorphological picture in the area has provided a stratigraphic framework within which structures associated with the palaeochannel deposits may be investigated.

Project Background

As part of the exchange visit of Drs Schlichtherle and Dieckmann organised by Rick Turner in late August, 1994, the area was visited in the company of a number of SELRC members. The lower part of the foreshore was particularly 'clean' on the day and Derek Upton spotted previously unexposed timbers on the eastern edge of the palaeochannel some 500m from the sea wall. Brief examination suggested the presence of the stem or sternpost of a boat with attached oak planking. Subsequently, dendrochronological analysis of a tree-ring sample gave a *terminus post quem* of AD 1174 (Nayling 1994), suggesting construction in the thirteenth century. Observations of the visible remains suggested the vessel was clinker-built. In November 1994, the Glamorgan-Gwent Archaeological Trust (GGAT), with funds provided by Cadw (Welsh Historic Monuments), briefly surveyed the site by total station and covered the exposed remains with geotextile matting and steel mesh to reduce/prevent further erosion.

During the winter, discussions with Cadw and potential receiving museums led to the National Museum of Wales indicating its interest in acquiring the vessel and Cadw agreeing to fund a phased programme of fieldwork to investigate the remains and examine the feasibility of lifting the vessel. Limited excavation in May 1995 confirmed the survival of up to 8m of a clinker-built vessel which appeared to have been truncated and disturbed, possibly by fluvial action following its deposition. Complete excavation followed in July (Figures 35 and 36), requiring the stratigraphic excavation

Figure 36. Magor Pill Wreck: Excavation and cleaning nears completion.

of overlying palaeochannel sediments and gravel, the *in situ* recording of the vessel by photogrammetry, and the removal of the remains of a cargo of iron ore (front cover photo). Whilst the excavations were in progress, wide-ranging consultation with maritime archaeologists sought to identify a suitable method of recovering the remains. An approach for assistance made to Laing-GTM, the consortium constructing the Second Severn Bridge, elicited a positive response, and discussions led to a detailed design for a lifting cradle, to be placed underneath the vessel to allow it to be recovered as a single object (Figures 37 and 38) During the last week in August, a collaborative team comprising Laing-GTM staff and support ships and plant, Diane Dollery from the National Museum of Wales, and GGAT staff worked every available tide leading to the successful recovery of the boat and her transport to storage in dedicated facilities in Cardiff (Figure 39).

During the winter, further recording of the vessel was carried out whilst she was supported on her cradle in a custom-built holding tank, prior to controlled dismantling of the vessel into her constituent timbers. The majority of these have now been recorded in detail and sampled for tree-ring analysis and conservation assessment. Post-excavation analysis will continue in 1996, and the National Museum of Wales intends to conserve the vessel and place it on display either in its present galleries or in a possible annexe associated with the Cardiff Bay development.

Although there is further detailed recording to be completed, some initial observations on the construction and form of the wreck are now possible. These should be considered very much as interim results subject to revision following further assessment and analysis.

Figure 37. Magor Pill Wreck: Preparation of the lifting frame.

Figure 38. Magor Pill Wreck: The lifting frame taking the weight prior to removal of remaining underlying clay.

Figure 39. Magor Pill Wreck: The last sea voyage to Severn Beach for transfer to road haulage.

Provisional description of the boat

The vessel as found comprises the incomplete forward section of a clinker-built vessel, some 7m in length and up to 3.7m wide, which appears to have undergone selective salvage and subsequent collapse and erosion (Figure 40 and front cover photo.). Unless otherwise stated, all the timbers are oak (*Quercus* spp.). A rabbeted keel was incomplete and survived from forward of midships to its forward end where it was attached to an incomplete stempost by a modified through-splayed scarf secured with iron nails. The rabbet on the keel was carried forward onto the stempost to receive the hull planking. Six clinkered strakes of radially split planks survived on the starboard side whilst on the port side up to ten strakes survived. Five floor timbers and fragmentary remains of side-frames were secured with wooden treenails. Ceiling planking survived in a restricted area where an overlying remnant of a cargo of iron ore, placed on a laid hurdle, had prevented its removal by either salvage or erosion.

The stratigraphic context of the vessel has only been investigated in the restricted area where excavation was necessary for recovery of the remains. She appeared to rest in the bed of a palaeochannel, with the base of the keel at *c.*2.1m below Ordnance Datum and the stempost surviving to a height of 1.2m below Ordnance Datum, with the erosive interface of the palaeochannel defined by a spread of fine grade ore washed out from the wreck. The channel had partially truncated earlier palaeochannel fills characterised by the inclusion of peat clasts in a matrix of relatively stone-free, buff-grey, silty clay, and had in turn been truncated by a later channel which had passed obliquely across the wreck, eroding it prior to deposition of infill rich in organics (particularly leaves).

Structural elements are described in approximate construction sequence and, in order to allow comparison with broadly contemporary boat finds, are considered in terms of attributes used to characterise the substantial set of boat timbers excavated in medieval Dublin (McGrail 1993). Any detailed description of the surviving elements of the vessel require the use of some specialised vocabulary. Some of the terms used in the description are explained in a glossary at the end of this article.

Keel

The keel, with an incomplete length of 4.56m, was hewn from either a whole oak log or a boxed-heart baulk of timber. The upper surface is worked to a convex cross-section and rabbets were cut along both sides with moderately sharp deadrise angles of *c.*45-55 degrees to receive the garboard strakes. At the approximate midships position, its overall depth (214mm) and width (215mm) are more substantial than might normally be anticipated in a vessel of this size (cf. McGrail 1993, p35). The moulded (126mm) and sided (158mm) dimensions of that part of the cross-section protruding below the garboards, give a ratio of 0.8 which is comparable with keels from Dublin and Scandinavia (cf. McGrail 1993, tables 5 and 6). At the forward end, the keel was attached to the incomplete stempost with a modified vertical through-splayed vertical scarf (angle 240 degrees) secured with iron nails. Approximately 0.4m behind the scarf, a subrectangular hole had been augered and cut through the keel below the rabbets, and subsequently sealed with an oak plug. A number of functions are possible for this feature although the absence of any defects in the timber itself discourage its interpretation as an attempt to remedy a natural area of weakness. The sternmost surviving portion of the keel is damaged

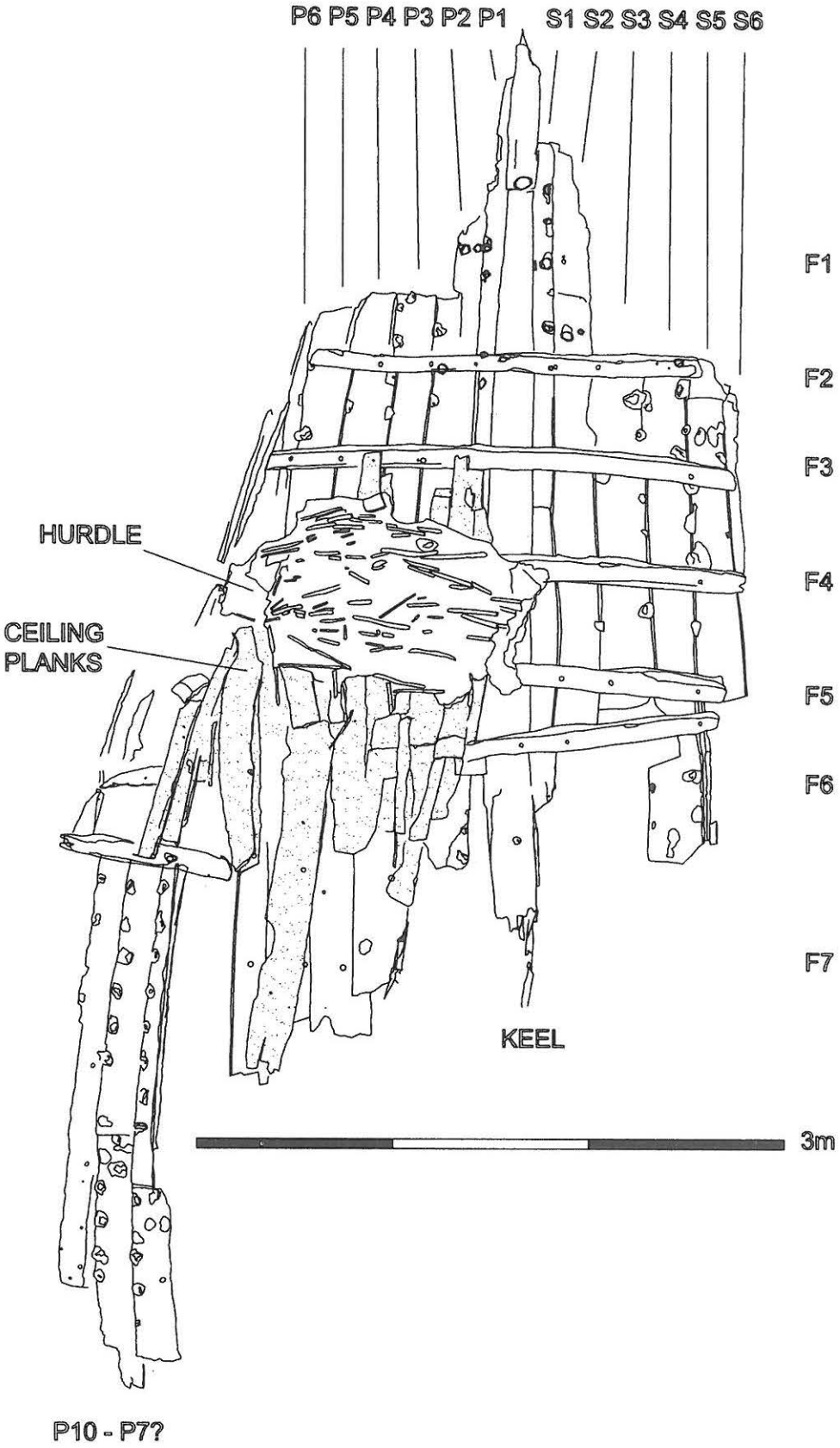

Figure 40. Magor Pill Wreck: Composite plan after removal of ore cargo.

and incomplete, although there is some thickening here suggestive of a slight rocker. As yet it is unclear whether this damage is the result of the vessel having broken her back when she foundered, the result of salvage attempts (see below) or the result of post-depositional erosion by later palaeochannel action.

Stempost

The wedge-form stempost is incomplete at only 525mm in length, 275mm of which forms the linking scarf to the keel. Shallow rebates for the garboards only, including their forward ends, continue the rabbets from the keel. Although there is no significant curvature in the surviving portion, the scantling reduces from astern (475mm moulded, 300mm sided) to forward (420mm, 210mm).

Planking

The garboard strake planks, S1 and P1, three of which survived on each side, were 180-220mm wide and approximately 20mm thick, hewn from radially converted timbers. They had been worked on their outboard faces to continue the curved cross-section of the keel giving something of a 'wineglass' transverse section to the vessel. The inboard faces were hewn to an angled cross-section to allow the strakes to fit closely in the keel rabbet and define the angle between the faying surfaces of the garboard strakes and the floor timbers. The planks which make up the garboard strakes were secured in the keel rabbet and stempost with round-headed nails (26mm diameter head) driven through the planks from outboard into the keel at intervals of 120-200mm. Planks along the same strake are scarfed to one another with feathered ends secured with round-headed nails (normally two per scarf) turned over roves on the inboard face ('through-splayed on edge, face-nailed', McGrail and Denford 1982, 35).

Subsequent planking was overlapped and attached by nails driven from outboard through an inboard rove and then clenched. Organic residue in the keel rabbet and between overlapped planks contains possible animal hair and moss which may represent the remnants of caulking (A. Caseldine pers comm). The starboard strakes, beyond the first, garboard strake (S1), comprised two feathered planks and associated fragments at S2, a single plank at S3, a single plank at S4, two feathered planks at S5 and a single plank at S6. The arrangement of planking on the port side is less clear due to collapse and displacement, especially of planking beyond the position of floor timbers. Single planks survived at P2 and P3, two feathered planks at P4, at least two feathered planks at P5, and at least one feathered plank at P6. Planks beyond P6 have collapsed in antiquity, and their placement within the code scheme will have to await completion of detailed timber recording. It is clear, however, that four strakes beyond P6 survived in a collapsed state with partially attached side-frames. Spot dating of dendrochronological samples from the hull planking indicate a construction date of AD 1233-1278 (Nayling 1995).

All the planks examined to date are radially split oak, generally 250-300mm wide and 15-30mm thick. The overlaps between planks from adjacent strakes, usually 40-50mm wide, are often marked with distinct scores, interpreted as intentional marks used to define the extent of overlap. Bevels cut along the overlaps ensured a close fit between planks and defined the profile of the vessel. Planks along the same strake were scarfed in the same manner as the garboard strakes, and fastened to one another with round-headed nails driven from outboard and clenched over roves at spacings of 150-200mm.

Frame groups

The presence of certain features

provide evidence for nine frame groups: floor timbers/side-frames; treenail holes in planking, with diameters of 20-30mm; and intentional marks defining the faying surface of the frames on the hull planking . Four floor timbers (F2-F5) were still in position, whilst the floor at F6 was displaced, especially on the starboard side. Floor timbers were joggled to match the underlying planks and attached with treenails to the hull planking but not the keel. No timbers survived at F1: only treenail holes through P2 and S2 indicate the former location of framing timbers. Floor timbers survived at F2-F6 and a fragment of floor timber survived at F8. Side-frames or fragments, apparently on the same line as the floors, survived at F4-F7. The floor timber at F6 exhibits two redundant auger holes on the upper surface and a slight waist which suggests a seating for a mast-step or keelson. The floor timbers appear to have been hewn from curving timbers, the boatbuilder having exploited branching timbers ('natural crucks') for optimum strength. Although most of the floor timbers have notched limber holes on their underside to allow free movement of water in the bilges, no limber holes are present at F2 and F3 as the timbers here were not in continuous contact with the keel and hull planks. These timbers offer the greatest promise, in terms of dendrochronological analysis, of providing high resolution dating for the vessel's construction.

The product of the moulded and sided dimensions of the floors (giving an indication of their bulk) and the enclosed angle along their transverse section (indicating the flatness of the vessel profile) are summarised in Table 5. These are in keeping with a large boat/small ship with a flattish 'wineglass' transverse cross-section. Side-frames, often incomplete and displaced, survived along the port side at frame groups F4-F7 inclusive. These appear to have been seated over the port end of the floor timbers and extended the framing to P10. As with the floor timbers, these had been joggled to meet the clinkered hull planking and secured with treenails, driven through both hull planks and side-frames, and secured with oak wedges.

Ceiling planks

Approximately twenty ceiling planks survived, nailed to the underlying floor timbers. These were best preserved where covered by the hurdle and ore (see below). On the uppermost surviving elements of the port side, the ceiling planking appears to comprise reused oak planks. Two of these have been dated by dendrochronology giving felling ranges of 1197-1242 AD and 1214-1248 AD (Nayling 1995a). The rather early felling ranges, in comparison with the felling ranges from the dated hull planks, suggest reuse as does the strong computer correlation between one sample and the Dublin medieval chronology which points to

Table 5: Floor timber attributes

Floor timber	Enclosed angle degrees	Product (M.S)
F2	152°	135
F3	150°	165
F4	159°	155
F5	159°	154
F6	161°	133 at 'waist', 147 at S1

reuse of ship timbers from potentially diverse geographic locations. The majority of the ceiling planks comprised radially split beech (*Fagus sylvatica*). The presence of poorly preserved remnants of iron nails on the upper face of floor timbers suggest that originally the ceiling planking was more extensive. It is likely that the ceiling planks, which acted as protection for the hull planks and floors from damage and wear, were periodically replaced. Should absolute dating of the beech planks prove possible, indications of the duration of the vessel's working life could be forthcoming.

Hurdle and ore

A hurdle comprising at least four sails and 48 rods of immature roundwood was covered by an irregular mound of iron ore identified by Professor John Allen. This varied from large blocks through smaller lumps and granules to fine powder reminiscent of reddle, presumably part of the vessel's last cargo. A total of 46 kg of block ore and 122kg of granular/powder ore were recovered. This is interpreted as part of the vessel's last cargo.

Salvage

The forward ends of strakes P3 outwards and S2 outwards had been chopped away between F1 and F2. Eroded toolmarks indicate the use of an axe. Possibly a complex stempost had been salvaged. Less definite indications of salvage include empty treenail holes on the upper face of the floor timber at F6, which had been displaced, particularly at its starboard end, suggesting disturbance during an attempt to recover a keelson or mast step. Together, these features suggest selective removal of structural elements which were accessible and had required considerable effort to manufacture. Such a process of selective salvage is reminiscent of the boatbuilder's timber cache found at Poole harbour, where salvaged timbers appear to have been kept to act as templates (Watkins 1994).

Context

Following the vessel's 'deposition', and partial salvage, finer grades of the iron ore, interdigitated with fine gravel and silty clays, accumulated both in the river bed and also within the void between the ceiling and hull planking. This phase is interpreted as a period during which the vessel lay exposed in the bed of the watercourse, with fluvial action leading to the spread of finer parts of the cargo of ore into accumulating sediment. A deep and widespread deposit of gravel then accumulated over the boat, being thinner towards the west (bow end) where it interdigitated with a succession of silty clays. The coarseness of this gravel deposit implies high energy water movements which would not normally be associated with purely riverine flow rates. It may be that the wreck had foundered at or near the mouth of the contemporary river, where storm surges in the Severn proper could result in deposition of banks of sand and gravel at the mouth of this tributary.

At some subsequent date, the river had cut a new course, running obliquely over the vessel, presumably eroding out those parts of the hull which have not survived *in situ*.

Discussion

Analysis of the vessel and its context are incomplete at this stage, and the results presented here can only be considered provisional. Nonetheless, it is clear that the boat remains reflect the use of large boats/small ships built in the Norse tradition in the thirteenth century in the Severn Estuary. The variety of woodland products utilised in its construction indicates a keen awareness on the part of the boatbuilder of their varying properties with slow grown oak being split down

and subsequently finished for hull planking, natural oak crucks being selected for the floors and a variety of relatively low grade timber (reused oak planks and split beech) being used for ceiling planks. Further analysis will concentrate on more detailed characterisation and dating of these structural elements followed by attempts at theoretical reconstruction of the original vessel form and modelling of its cargo-carrying potential and sailing performance. The ultimate test of the validity of theoretical reconstruction would be contruction of a 1:1 'replica'. Media interest in the latter could feasibly be translated into funding for such an exercise.

Its construction date in the thirteenth century fits well with documentary and archaeological evidence suggesting the presence of a landing place at Magor Pill known as Abergwaitha, recorded as having been lost to the sea in the fourteenth century (cf Courtney 1987; Wood 1914). It is hoped that limited additional fieldwork will help to bracket the date of land loss at Magor Pill, through dating of the remains of putt and putcher lines which survive in the intertidal zone north of the palaeochannel. Significant set back of the sea wall during the thirteenth or fourteenth century would be in keeping with landscape development seen elsewhere in the Gwent Levels (Rippon 1995b). The attempts at salvage suggest that the vessel, probably located near the confluence with the Severn, was partially exposed at low tide. The height of salvaged elements therefore reflects contemporary sea-level and adds to the data-set on relatively recent sea-level change. In addition to placing the vessel in its contemporary landscape, its place within the local economy needs consideration of evidence for patterns of trade in the Severn Estuary in the late thirteenth and early fourteenth centuries. Attempts at provenancing the cargo of ore, and the timber used in its construction, may assist in defining the vessel's operating area.

Glossary

A plethora of specialist terms are used in nautical archaeology. Two recent publications (Marsden 1994 and McGrail 1993) provide useful glossaries from which the following have been paraphrased.

Deadrise angle: the vertical angle between the horizontal and the line of the keel or hull planking.

Faying surface: the overlapping surfaces of two timbers which fit closely together.

Garboard: the strake next to the keel.

Joggle: notch cut in a timber so that it will fit closely against another.

Land: the overlap between adjacent strakes.

Moulded dimension: the dimension of a timber measured at right angles to shell of the vessel.

Rove: a washer-like piece of metal, forced over the point of a nail before it is turned over or clenched.

Scarf: the bevelling of the ends of two timbers in such a way that when fastened together they form one timber in appearance.

Sided dimension: the dimension of a timber measured parallel to the shell of the vessel.

Strake: a single plank or series of planks which stretch from one end of the vessel to the other.

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