

The Australian Historic Shipwreck Preservation Project – interim progress report

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Abstract

In early 2012 the Australian Historic Shipwreck Preservation Project (AHSP) was formally awarded a large Australian Research Council (ARC) Linkage Grant, enabling ten Partner Organisations to join with four Australian Universities in one of the largest multi-organisational maritime archaeology projects to be undertaken in Australia. The project involved a month-long excavation on the historic shipwreck Clarence (1850) in April/May 2012 and a complex reburial program in November 2012. Further in-situ preservation work is also being conducted on James Matthews (1841) in Western Australia to test experimental reburial approaches in an alternative marine environment. The work on Clarence is now in its research, analysis, monitoring and reporting phase, with artefact, sediment and chemical analyses being undertaken. This paper will provide an interim report on AHSP since its launch at the 1st Asia-Pacific Regional Conference on Underwater Cultural Heritage in Manila in 2011. It will provide analysis of some of the more significant artefacts and features revealed during excavation and approaches to long-term in-situ preservation and management of shipwreck sites.

Key words: *In-situ* preservation, *in-situ* management, historic shipwreck, artefacts, site management

Introduction

In early 2012 AHSP was formally awarded an ARC grant of \$500,000 AUD to investigate the excavation, recording and *in-situ* reburial of wooden shipwrecks. The historic shipwreck *Clarence* (1850) in Victoria's Port Phillip Bay was selected as the first case study to test the excavation and reburial methodology. The proposed research plan from the ARC application was presented at the 1st Asia-Pacific Regional Conference on Underwater Cultural Heritage held in Manila in November 2011 (Veth et al., 2011).

The project commenced in February 2012 with the appointment of a project manager to organise fieldwork logistics alongside the commercial dive operators, Melbourne based company - Professional Diving Services, and the host organisation, Heritage Victoria. It was decided to commence diving operations in mid-April 2012 to take advantage of autumn tides and weather. In less than two months, a diverse multi-national team of 65 professional and volunteer archaeologists, divers, conservation scientists, photographers, artefact specialists and marine ecologists converged on Portarlington, Victoria to commence the survey, excavation, artefact cataloguing and *in-situ* reburial of *Clarence*.

The excavation took place from a 12 m x 18 m jack up barge, which was towed by tugboat out to the site on the 12th of April, and placed alongside *Clarence*, off Edwards Point near the township of St Leonards. The barge was equipped with three shipping containers that held the artefact photography and x-ray systems, conservation and other general equipment and diving communication and safety equipment. Survey operations began on the 16th of April and continued for 29 days. During this time, diving, conservation and support teams were transported daily to the site using Heritage Victoria's 8 m commercial Kevlacat *Trim*, with both underwater and topside support teams changing over throughout the day.

Dive teams were tasked with placing sandbags along the exterior of the shipwrecked hull to provide structural support prior to reburial, completing a pre-disturbance marine ecology survey, obtaining sediment cores for baseline conservation data, excavating the

starboard side of the wreck from the stern towards the bow (from 0 – 9 m along the baseline), recording the artefacts and exposed timbers *in-situ*, documenting all recovered artefacts *ex-situ* and reburying them on site (or in the nearby underwater repository), placing sacrificial wooden and metal samples on site and in the repository and backfilling the excavation trench. This was all achieved in 181 hours of diving over 17 diving days. Non-diving personnel were tasked with topside and off site duties including data input, purchasing, organisation of equipment and housekeeping.

Clarence – Artefact and Site Features

The artefacts recovered during the 2012 excavation included 109 individual artefact pieces, consisting of 102 database entries. All recorded artefacts were subsequently reburied; organic artefacts were placed in an underwater repository less than 10 m from the stern of the shipwreck, and ferrous and non-ferrous objects were reburied in the excavated trench.

The range of materials found consisted of timber thought to be dunnage, a large number of cask components (staves and headpieces), concretions (including a concreted bolt), lead hull-sheathing, fragile pieces of leather, rope related to rigging, clear and olive-green glass pieces, a ceramic fragment, and an animal bone which appeared to be burnt. A leather bag or satchel was also identified *in situ*, however, this artefact was not raised. To date, analysis of the excavated artefacts continues and here a few selected items will be profiled. A more comprehensive report on the artefacts will be submitted later in 2014.

Tierce casks

The wooden cask components represented the majority of artefacts raised. The sizes of the staves and headpieces fit closest to the category of tierce casks. A tierce is an old measure of capacity equivalent to one third of a pipe, 42 wine gallons, half a puncheon or approximately 158 to 160 litres. The imperial tierce was 35 imperial gallons (~159 L) — the US tierce was 42 US gallons (~160 L). English stave lengths for tierce



Fig. 1: Branding mark on cask. (AHSP).

casks were usually given at 31.5 inches (~800 mm) (Kilby, 1971: 52). The complete lengths for the *Clarence* staves averaged between 876 mm and 890 mm for the interior and 911 mm to 930 mm for the exterior. These measurements identify the excavated staves as slightly larger tierce casks than those traditionally described by the English. This variation in size could be because some tierce casks were made to store dry goods, in which case, they could be more rudimentarily manufactured as opposed to wet casks, which required a higher level of skill and precision for storing liquids and preventing leakages.

The casks from *Clarence* have similar features found on casks from other shipwreck sites. These include branding marks, incised lines and circles (made by a scribe tool) for ease of reassembly (Fig. 1) and branded names (either complete or partial due to deterioration or breakage) on headpieces for identification purposes or indication of their contents. Hoop marks are also visible on the exterior of some staves where they are assumed to have been hammered in. Some limited evidence of concreted iron hoops has also been found.

The branding names on the headpieces recovered from *Clarence*, however, suggest that either these casks contained ale or they are reused components. The average diameter of headpieces raised was 55 cm (21.7 inches), which closely coincides with tierce cask head diameters of 20.5 inches (52.1 cm) (Kilby, 1971: 52). The slight difference is understandable



Fig. 2: Headpiece inscribed with "J & R TENNENT". (AHSPF).

considering that the *Clarence* casks are slightly larger than the standard English dimensions of tierce casks. The pitch (widest mid section) of the cask would be approximately 25¼ inches (64.1 cm) in diameter.

The headpieces are attached to each other via wooden dowels along the joining flat edges or straight flush joints. Dowels and dowel holes were visible along the joining

edges. The outer circumference is bevelled in order to fit into the bite or croze groove of the staves upon assembly of the cask. The tool marks and striations observed suggest that the staves and headpieces were machine made rather than handmade, which was more common in earlier centuries. In England, for example, the first patent for a coopering machine was taken out by Plasket and Brown in 1811 (Kilby, 1971: 65). At this time, however, most of these machines were crude and inefficient and were mainly used for cutting headpieces. Certainly by the 1870s, a number of cooperages were making tierces and cheap dry casks by machinery (Kilby, 1971: 65).

Some sets of headpieces, consisting of the cant and middle pieces, are branded on the topside with the words, either partial or complete, “J & R TENNENT” (Fig. 2). To date, at least one identity of J. & R. TENNENT has been traced to Wellpark Brewery in Glasgow, Scotland, which was in operation in the 1840s. If some of the casks originated from an overseas brewery, it is possible that the casks and similar contents were continuing to be transported elsewhere or the casks or some components were being reused, as was



Fig. 3: Headpieces inscribed with “SAMUEL” and “BURTON”. (AHSP).

common practice.

Another name branded on other cask heads, again, either partial or complete, is “SAMUEL” and “BURTON” (Fig. 3). Preliminary research identifies a Brewer named

Samuel Allsopp as well as The Burton Brewery Company, both based at Burton upon Trent in Staffordshire, England. Samuel Allsopp entered business in 1807 and during the 1840s, Allsopp's brewery had an overwhelming superior reputation for their pale ale (Perkins, 2012). Contemporarily, the Burton Brewery Company, founded in 1842, was one of the largest brewers in Burton upon Trent in the nineteenth century and supplied ships in the early 1850s with ale. However, it still may have been too late to be contemporary with casks that were later transported via *Clarence*.

Further research into the connection between the *Clarence* casks and the above-mentioned brewing companies is warranted. Although a few leads for the branded names on the cask's heads have been obtained, the possibility that some components or entire casks had been re-used has not yet been ruled out.

Leather Bag or Satchel

A leather bag or satchel was also found on the site partially buried under a semi-circular timber artefact. Based on discussions amongst divers who excavated the area and upon close examination of underwater images, this leather bag, left *in situ* (Fig. 4), is thought to be a bosun's bag. The size and thickness of the satchel suggest it may have been used to carry tools (i.e. if one was repairing masts or rigging), as it could be slung over the shoulder via a strap on the side. Interestingly, an image in Kilby (1971: 164) on coopers and their craft shows a nineteenth-century travelling cooper carrying a possible leather bag or basket over the shoulder containing tools.



Fig. 4: Leather bag or satchel left *in-situ*. (AHSPF).

Clarence – Management

Monitoring and Management

In June 2012, shortly after the completion of the April/May *Clarence* excavation, a small team of researchers and volunteers returned to the site to finish backfilling the trench and artefact reburial depot to a minimum of 50 cm sediment coverage, as outlined in the research methodology. Final fieldwork took place in November when the site was covered with shade cloth and PVC tarpaulins to encourage anaerobic conditions and protect the site from anthropogenic and natural impacts (Fig. 5). Sediment core samples were collected for physico-chemical analysis and a marine biological survey was completed.

In both March and September 2013, visual inspections were conducted and the site appears to have stabilised. A small team returned to the site in November 2013 to extract sediment core samples and sacrificial wood and metal samples.

Management of the site has not ceased with the reburial of *Clarence*.

Long-term monitoring, including visual site inspections and a program of regular compliance patrols, has been established. These site visits are conducted during periods of calm weather and on weekends and public holidays, when recreational boating activities peak. Individuals found within the 100 m protected zone surrounding the site are issued with either official warnings or infringement notices. Regular patrols by Heritage Victoria at *Clarence* have resulted in a



Fig. 5: PVC tarpaulins on *Clarence* (J. Carpenter).

high level of compliance by recreational anglers, with boats clustering around the boundaries of the site but complying with the exclusion zone itself.

Although increased enforcement activities seem the likely driver for the improvement in compliance, consideration should also be given to the fact that stabilisation works on the site have substantially altered the seabed terrain and associated biology. Biological surveys indicate the variation in species on-site has not been greatly impacted, but this could have reduced the numbers of desirable fish catch, possibly also helping to explain the decreased fishing activity over the site.

Digital Outreach

In addition to on-site visitation and management of *Clarence*, AHSPS has focused on disseminating information beyond the academic and scientific communities to the wider public. This includes providing Project Updates for meetings of the Commonwealth *Historic Shipwreck Act* delegates, the AIMA quarterly newsletter and the AHSPS website

(www.ahspp.org.au). Public lectures and professional papers have also been presented nationally and internationally with a major paper on the project published in the 2013 AIMA Bulletin (Veth et al., 2013).

Moreover, in lieu of tangible displays, AHSPS relies upon digital media for dissemination of information. This includes

the project website and two public-focussed outreach projects. The first project is a triptych display banner that tells the story of the AHSPS *Clarence* case study using



Fig. 6: Shade cloth cover over the top of the cofferdam surrounding James Matthews (J. Carpenter).

simple text and images. The pop-up banners are easily transportable and throughout 2013 and 2014 will be used as a travelling exhibition to Partner Organisations and collaborating institutions around Australia. They are also available for further use at presentations and conferences.

The second outreach project was a curated digital database entitled 'Preserving the Colonial Trader *Clarence* (1850)' (the *Clarence* Anthology), which is publically accessible through library database subscriptions to BiblioBoard. This contains both web-based access and applications for mobile devices and Apple iPad and android tablets (<http://www.biblioboard.com/libraries.html>).

The *Clarence* Anthology was the first Australian project created for BiblioBoard and also the company's first archaeological and shipwreck database. The concept was to curate a collection of images, documents and multi-media items (including video and audio via web streaming) into an 'anthology' as part of BiblioBoard's new 'Artifact of History' module. The module is made up of a wide range of historical sources that are focused on historical artefacts and archaeological discoveries.

The *Clarence* Anthology consists of more than 270 files, primarily underwater site and artefact photographs, topside images and underwater and topside video. It also includes presentations, previous site research, historical research, media interviews and an edited oral history interview with a descendant of the captain of *Clarence*. This digital resource thus allows for enriched, well-curated content to be accessible to a broader, technologically-progressive audience and also facilitates access to associated grey literature.

The *Clarence* Anthology is currently being utilised as a test case for future online curation of archaeological projects. As such, this method of community outreach may be recognized as an appropriate platform for future presentation of archaeological sites, in particular *in-situ* preservation projects where artefacts are returned to the seabed with no plan for future conservation and long-term museum curation.

James Matthews

Since the inception of AHSP it was duly noted that to be a truly national research project, other sites around Australia should be included in the longitudinal *in-situ* preservation study for comparative analysis. Following the reburial success of *Clarence* in November 2012, and due to prudent project management, it became clear that the AHSP could expand to a second case study. Partner Investigator Vicki Richards and colleagues at the Western Australian Museum (WAM) subsequently recommended the reburial of *James Matthews* (1841) in Cockburn Sound, Western Australia using a preferred cofferdam solution. Under the aegis of the AHSP, WAM began organising this innovative reburial project in April 2013.

Background

James Matthews, originally known as *Voltigeur*, was a French-built wooden brig (approximately 24 m length x 6 m breadth x 3 m depth). In 1836 the vessel was sold to a Brazilian slave dealer and registered as *Don Francisco* under the Portuguese flag. For the following year, the vessel operated in the illegal slave trade between Africa and the West Indies until its capture by the British in 1837.

Contemporarily, in 1836, British Parliament passed a Bill establishing an end to slavery. At this time, ships were seized and destroyed, often resulting in the vessel being dismantled and sold for scrap or burnt to the waterline and sunk (Henderson, 1977). This was obviously not the case with *Don Francisco*, which was sold and re-registered as the trading vessel *James Matthews* (Henderson, 1980).

In July 1841 the ship sailed for the Swan River colony in Fremantle, Western Australia, but shortly after its arrival a violent storm struck the port and the vessel sank. Local divers came across the site in 1973, 12 km south of Fremantle, approximately 100 m off shore in 2-3 m of water (Henderson, 1977).

Four seasons of excavation were carried out by WAM between 1974 and 1977. All loose artefacts were recovered and stabilised by standard conservation treatments appropriate for each material type and the excavation trenches were backfilled with the original overburden. The site remained buried for many years and was still relatively stable in the 1990s. However, in early 2000 it was observed that the edges of the

wooden vessel and timbers at the stern and bow were exposed and severely degraded by marine borers and the extent of exposure was increasing every year. Therefore, devising an appropriate *in-situ* management plan to mitigate continuing deterioration was of paramount importance.

Experimental Remediation Strategies and Monitoring

Over the next ten years, a number of surveys and experiments were expedited to assess the most significant physical, chemical and biological deterioration processes impacting the site and determine an appropriate long-term *in-situ* preservation strategy to stabilise *James Matthews*. This included trialling different *in-situ* preservation strategies on-site, for example: sand bags; sediment trapping experiments using artificial seagrass, shade cloth mats and a cofferdam consisting of four environmentally-inert, interlocking medium density polyethylene ‘crash barrier’ units filled with surrounding sediment. More importantly, a long-term monitoring programme was also introduced that consisted of measuring sediment and seabed response and any changes in the sediment micro-environment via microbiological and physico-chemical analyses. Based on these results, the crash barrier cofferdam technique appeared to be the best solution for the *in-situ* preservation of *James Matthews* (Richards et al., 2009; Richards, 2012).

However, due to the significant cost of this mitigation strategy (~\$25,000 AUD for 40 crash barriers, geotextile and polymeric sandbags) and the local economic environment, the cofferdam solution could not be funded through WAM’s budget. Therefore, in 2010, the more exposed sections of the site were covered with shade cloth, which was economically more viable but resulted in undesirable toe scouring around the edges of the mats. The site continued to be monitored at regular intervals over the next two years (Richards, 2012).

The AHSPP and the Cofferdam Solution

Preparations for the reburial of *James Matthews* commenced in April 2013, with fieldwork occurring from 18-22 November 2013. A total of 22 people, including the AHSPP Chief Investigator and Acting Project Manager, WAM staff from the Materials

Conservation and Maritime Archaeology Departments, practitioners from other Partner Organisations and volunteers, were involved during an intensive five-day fieldwork period. During this time, 36 road crash barriers were deployed on-site in a semi-elliptical arrangement, anchored in place with a minimum of 120 kg of blue metal per barrier and 20 m³ of clean, washed proprietary sand dumped within the confines of the cofferdam via a manufactured sand barge, which provided a sterile sand layer of approximately 5-15 cm over the entire site. A more comprehensive account of the fieldwork logistics and deployment procedures are outlined in Richards et al. (2014) published in this volume.

The amount of sand required to fill the cofferdam to an optimum level of 0.8 m is approximately 165 m³, which was impossible to achieve in the five-day fieldwork interval. With a considerable reduction in personnel after the fieldwork had concluded, it was decided to cover the top of the cofferdam with 70% UV stabilised shade cloth (Fig. 6). The suspended shade cloth aims to a) preclude the ingress of dead seagrass and other organic material and b) encourage deposition of fine sand particles suspended in the water column, through the shade cloth and onto the site. In early 2014, the cofferdam will continue to be filled to the required depth (0.8 m) by dredging local surrounding sediment onto the site ensuring that minimal organic matter is incorporated within the backfilled sediment.

On-site monitoring of sediment characteristics and analysis of sacrificial samples will then proceed, replicating the monitoring strategy used on the *Clarence* site. This should allow for meaningful comparative analyses of these reburial interventions in different contexts. The efficacy of different reburial and stabilisation techniques can thus be systematically tested providing an evaluation of optimal protocols for the *in-situ* preservation and management of historic shipwrecks determined to be 'at risk' in both Australian and other waters.

Conclusion

The primary aim of the Australian Historic Shipwreck Preservation Project is the development of an optimal *in-situ* preservation protocol for historic shipwrecks at risk. Longitudinal recording, reburial and ongoing monitoring at both *Clarence* and *James*

Matthews, occurring in different geomorphic and energetic contexts, will provide an invaluable comparative study towards this end, and will continue throughout 2014. As outlined in this paper, data collection, analysis and interpretation are continuing. The results from the archaeological, conservation, sedimentary and biological studies will be published in a major excavation and fieldwork report due for completion in 2015. Analyses of the artefacts, geochemistry of the sediments, pre- and post-disturbance biological surveys, and condition of the sacrificial tabs, will also be published over the next several years.

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Biography

Debra Shefi is a Research Assistant Professor in the Department of Archaeology at the University of Western Australia and is the Acting Project Manager for the Australian Historic Shipwreck Preservation Project (AHSP). She joined AHSP after obtaining her PhD from Flinders University, where her thesis investigated the relationship between the in-situ preservation of underwater cultural heritage in law and practice.