Kleanthis' ethos is to use the authentic materials employed by contemporary workmen and artists, which makes him the perfect person to make the Kyrenia ship's anchor reconstruction. He is using traditional tools and materials—for example, oak compass timber from the Trodoos Mountains, Cypriot copper from local mines, and regional lead for the construction of the anchor stock.

PhD Studies in Maritime Archaeology

James Hunter III submitted his PhD dissertation in May 2012 with the title: *Throwaway Navies: Naval Transition, Abandonment Process, and the Archaeology of Australia's Torpedo Boat Defences 1884–1924*. Then, the Department of Archaeology welcomed two new PhD students this semester, Maddy Fowler and Gay Lacsina, who both commenced maritime-related PhD research topics.

Maddy Fowler's PhD study aims "to understand issues related to Indigenous and European cross-cultural interaction, specifically adaptation and change of maritime technologies. This research fits into a field of archaeology commonly referred to in literature as contact period archaeology, the archaeology of culture contact and the recent Indigenous past. It will primarily address the question: how do issues of the incorporation and/or modification of European boat building traditions and techniques relate to issues of Indigenous Australian cultural continuity or the application of traditional knowledge? This research will focus on a material culture analysis of European style vessels (marine and riverine) to examine Indigenous use of European boat building traditions. The study area will be confined to mission associated watercraft. This research is significant because archaeological evidence will provide a different data set to the previous historical and ethnographic records on the topic and will produce comparative results." (PhD Proposal summary, Maddy Fowler. Supervisors: Jennifer McKinnon and Amy Roberts).

Gay Lacsina commenced a PhD study on the traditional watercraft of island Southeast Asia by re-examining their archaeological remains in Philippine sites.

One of the Butuan Balangay boats on display in the Philippines National Museum.

In the 1970s, the so-called Butuan boats were discovered in Butuan City, southern Philippines. A total of nine round bottom boats were found buried beneath flood deposits along what is believed to have been the banks of a river. Three of the boats were excavated and radiocarbon dated. The results of the dating, 320 CE, 1215 CE and 1250 CE, respectively, revealed the oldest (notwithstanding some skepticism regarding the 320 CE date), and best preserved archaeological evidence of Philippine watercraft. The vessels average 15m in length and 3m in beam, and exhibit the building techniques described in a 17th-century account by Spanish priest Francisco Alcina.

Other sites with evidence of similar boatbuilding technology are the San Isidro and the Gujangan wrecks. In 1996, in the waters of San Isidro, Zambales province in the northwest Philippines, a vessel approximately 15m long carrying Ming Dynasty Chinese ceramics (*ca* 16th century CE) was discovered. It was postulated that the wreck at San Isidro acted as a lighter for larger vessels that were unable to moor closer to shore. Though much of the hull was obscured by cargo and concretions, small wooden pins were observed. The San Isidro hull remains indicate that it may have been clinker-built, unusual for Philippine vessels. This, however, needs to be verified by further field research.

The heavily looted Gujangan wreck was found in the waters off Gujangan Island, Sulu province, southern Philippines. The wreck, dated to the 15th–16th century CE based on its ceramic cargo, was inspected by archaeologists in 1998, who noted bored lugs indicative of lashed-lug construction. They are remarkably similar to the Butuan boat planks.

The San Isidro keel and planks were recovered for documentation, but were returned to the site due to the difficulty of wood conservation. The Gujangan hull was left in situ, though some plank fragments were recovered for sampling. Neither of the sites have been re-examined since the initial investigations. Meanwhile, at least six Butuan Boats remain unexcavated.

Specific research goals include the radiocarbon dating of the unexcavated Butuan boats, the precise recording and documentation of the unexcavated Butuan boats and the hulls of the San Isidro and Gujangan wrecks, and a thorough comparative study of the archaeological remains. (PhD Proposal summary, Ligaya S.P. Lacsina. Supervisors: Jennifer McKinnon and Wendy van Duivenvoorde).

Conferences, Public Lectures, and More

While Wendy was in Cyprus, Jennifer McKinnon travelled to Saipan to present a key note lecture "Beyond the water's edge: investigating underwater wrecks from the Battle of Saipan" at the 1st Marianas History Conference from June 14–16, 2012.

She returned home with the exciting news that she has been promoted to Senior Lecturer in Maritime Archaeology. Congratulations on a much deserved promotion!

— Wendy van Duivenvoorde

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Victoria

***Clarence* Excavation and Rapid Recording, April/May 2012**

In 2011, the Australian Research Council (ARC) awarded a 10 Partner Organisation Linkage Grant for the *Australian Historic Shipwreck Preservation Project* (AHSPP), aka, 'The *Clarence* Project', with the grant coming on line in February 2012. The project is investigating the excavation, rapid recording, reburial and in situ preservation of threatened shipwrecks and their associated artefacts.

The project will run for three years and involves fieldwork with Investigators from the University of Western Australia (UWA), the Australian National University (ANU), Monash University and the Western Australian Museum (WAM), supported by Research Associates and practitioners from State, Territory and Commonwealth Partner Organisations and the Australasian Institute for Maritime Archaeology. Practitioners, students and volunteers (many of whom are AIMA members) are key participants in the project, which has involved over 75 people to date—both directly and indirectly.

Clarence was a small schooner (54x18ft), and is one of just a handful of early Australian-built wooden coastal traders to have been intensively recorded by maritime archaeologists. It was built in 1841 by William Lowe at his Deptford shipyard on the Williams River at Clarence Town (NSW); Lowe also constructed the first Australian-built paddle steamer.

Wrecked while anchored in the Coles Channel in Port Phillip in 1850, the site is located less than 3km from St Leonards boat ramp, and only 1km off shore from closest landfall (Point Edwards) on the Bellarine Peninsula. The site is subject to tidal currents from Port Phillip Heads ranging from 0.4 up to 1.75 knots. Slack water at the site was usually once per day during fieldwork, and lasted anywhere from 5 to 30 minutes.

The site lies in 5m of water within a 100m radius protected zone. The zone is primarily aimed at preventing access by anglers, whose activities—namely anchor damage—on and around the site have caused its degradation over the years.

Heritage Victoria (HV), in its previous incarnation as the Victoria Archaeological Survey, has undertaken several seasons of fieldwork on the site since the mid-1980s, including survey, sediment profiling and excavation. Since then, HV has continued to monitor the site and undertake compliance activities. As manager of the shipwreck site and its protected zone, HV is providing considerable staff and logistical support to the project, including use of its boat (*Trim*) during lead-up reconnaissance trips and the major fieldwork period (now concluded), follow-up fieldwork and monitoring (which is ongoing). Heritage Victoria is also hosting Cass Philippou's position as Project Manager at its Conservation and Research Centre in Abbotsford.

JUPB1 being towed out to the site early on the morning of 12 April 2012. (Photo by Cass Philippou)

Early in April 2012, the excavation team converged on Melbourne for the first and primary field season on *Clarence*. The fieldwork commenced on 13 April and ran through 12 May 2012.

The multi-disciplinary rotating team (with a maximum of 30 at any one time) were housed in group accommodations at Portarlington, and diving operations took place from *JUPB1*, a jack-up barge located directly adjacent the site. The barge was towed to the site by tug from Port Melbourne, and the platform itself, once 'jacked up' on its spuds (legs), sat about 3m above the waterline. Three shipping containers on the barge housed the conservation and recording facilities and the diving control room.

Divers, conservation and artefact recording teams travelled out to site and *JUPB1* each day aboard *Trim*, with replacement teams being collected from the nearby St Leonard's boat ramp. Two buddy pairs were usually in the water working on a range of tasks simultaneously, while dive tenders assisted with the diving supervision topside. Meanwhile, recovered artefacts were rapidly assessed for their individual significance and conservation requirements, catalogued, recorded, photographed and/or x-rayed, then wrapped in geotextile and placed in holding containers until their return to the site.

The majority of the participants arrived on 16 April, with people rotating throughout April and May. Over the course of the month, 68 researchers, students and volunteers from around Australia, as well as international participants from New Zealand, the United States, Thailand, Indonesia, the Philippines and Cambodia, contributed to the field program. This work comprised archaeological and biological survey, scientific sampling (sediment cores and wood samples), excavation, artefact recording and site and artefact reburial. The diving component was compliant with Australian Standards for commercial diving using surface supplied air (SSBA)

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Divers Brad Duncan and Mike Nash preparing for their dive. (Photo by Cass Philippou)

and tethered SCUBA systems with hard-wired surface communications. The first week of the project also saw a group of 11 divers undertaking commercial diver training from the jack-up barge, including a number of practitioners.

The core team consisted of Lead Chief Investigator Professor Peter Veth, Partner Investigators Vicki Richards and Ian MacLeod, Heritage Victoria's Manager Maritime Heritage Peter Harvey, Diving Supervisor James Parkinson, Chief Investigator Dr Mark Staniforth, Research Associates Debra Shefi, Andrew Viduka and Mike Nash, researchers Dr Jennifer Rodrigues and Amer Khan, and Project Manager Cassandra Philippou.

Other researchers from the 10 Partner Organisations and numerous local, interstate and international students and volunteers attended for periods ranging from one to three weeks of the field program.

The team was fortunate to be dealt excellent weather and sea conditions for the first week, allowing them to carry out a pre-disturbance survey and record baseline data. Divers installed fixed survey points for use throughout the excavation, stabilised the wreck's hull and filled and deposited 1,250 UV stabilised polywoven sandbags near the site for reburial works. Core samples for geo-archaeological and chemical analysis were taken both on and off site.

The research design specified that only the starboard half of *Clarence* would be excavated during the project. Not only would this be representative of the archaeological potential across the wider site, but, importantly, the starboard side was documented to be at risk. It is estimated from surveys carried out in the mid-1980s and more recent site inspections that from 30–75 cm of sediment and archaeological deposits have been lost due to site disturbance and scouring. There was clear evidence of serious and ongoing anchor damage, most easily seen by the loss of profile of the port side frames and reduced levels at the stern.

View to stern of the excavation trench, starboard side of *Clarence*. (Photo by Deb Shefi)

Excavation of the starboard side commenced at the stern on 21 April. Sediment was removed from the site using a water dredge operated from *JUPB1* and controlled by divers below. Sediment traps were created at both bow and stern to contain as much of the spoil as was possible in the current.

Mid-Autumn was selected for the fieldwork for its stable weather patterns in this region. Unfortunately, the team suffered unseasonable bouts of poor weather despite this predictive approach. Even with the challenge of difficult transfers from the vessel to *JUB1*, the team only lost a total of 10 non-diving days out of the 27 field days allocated. Excellent use was made of the 17 diving days, with 167 individual dives completed totaling over 181 hours of bottom time logged. James Parkinson of Professional Diving Services (PDS) reported that this was an exceptional outcome for such a field season on tethered scuba and SSBA.

The team excavated a starboard section of *Clarence* that extended from the stern some 11m along datums towards the bow, ending just aft of a large mast-step and leaving approximately 5m forward of this unexcavated. Although this remaining area was excavated in the 1980s, the substantial lower clay unit beneath the comparatively unconsolidated marine sediments (now known to be pipe clay or kaolinite ballast) was left in situ. The decision to cease excavation at this point was in recognition of days lost due to inclement weather and the re-scoping of reburial and conservation tasks. The excavation also took longer than predicted, given the plasticity, weight and additional labour required to remove this very significant clay unit. The volume of deposit excavated, area of timbers exposed and size of the

James Parkinson exiting the water. (Photo C Philippou)

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artefact assemblage recovered was ideal for the recording and reburial trial. Only the interior of the wreck was excavated, and all exposed timbers and artefacts were measured in situ using hand held tapes attached to a network of datum points. Excavated trenches were drawn to scale using a 1x1m grid square. The measurement data and sketches were later transferred into the Site Recorder4 GIS program by SA state maritime archaeologist Amer Khan. Artefacts, primarily timber barrel staves and lids and fragments of leather, were exposed from the first day of excavation. All artefacts were measured and photographed in situ prior to removal and transfer to the surface. On deck, conservation scientists and artefact specialists undertook rapid significance and conservation assessments, detailed imaging by photography and x-ray, morphometric measurements and cataloguing. Artefacts were then prepared for reburial with their individual identifiers, wrapped in geotextile and eventually returned to the seabed.

One hundred and two artefacts were recorded in the project artefact database, with 109 pieces in total. The majority of the artefacts were parts of four timber barrels that were laying end to end lengthways on the hull. These tierce-sized casks had multiple components (staves, hoop fragments, lids and bases), as well as dunnage (packing material), accounting for the large number of individual artefacts recorded. Other artefacts included leather fragments, cordage and glass. All of these artefacts were returned to the seabed, with small samples of leather and rope retained for conservation analysis.

During excavation a surprising element to the site was encountered: a substantial layer of fine clay, most likely kaolin pipe clay, overlaying the bottom hull timbers of the wreck. This clay was soon identified as an artefact, and research has indicated that pipe clay out of Newcastle (NSW) was used as ballast on some ships. This also was common practice in the UK at the time, but *Clarence* is the first wreck in Australian waters to yield a substantial and well-preserved clay ballast. Detailed analyses are now being carried out by Tony Barham and students at the ANU to geochemically fingerprint point of origin and to fully understand conservation processes on the buried timbers.

In Situ Preservation

Artefact Reburial

An off-site artefact repository was installed in the seabed circa 10m southwest of the stern to contain the

John Osmond and Joe Brothers assist Ian MacLeod with cleaning barrel staves. (Photo Jen Rodrigues)

organic artefacts. The repository (or depot) was created by cutting a 3m diameter rainwater tank in half and using a water dredge (after probing different sites with a lance) to settle it into the sediment to a depth of approximate 120cm below surface level.

Wrapped and tagged organic artefacts were placed in the bottom of the repository and backfill from the excavation was re-deposited over them to create an anaerobic environment. Clean washed sediments were then used to top up the repository and a layer of 95% UV shade cloth was placed over the tank and pinned to the seabed with sandbags. The repository will be capped by heavy duty PVC sheeting and contoured concrete weights during a final reburial program in November. There is more than 50cm of sediment above the highest artefact cache.

Inorganic artefacts, primarily ferrous concretions, were wrapped, tagged and returned to the excavated trench for reburial adjacent to the keelson.

Site reburial

Shade cloth was installed over the excavated trench to act as a sediment trap and backfill from the excavation was pumped by water dredge into the trench. Due to the (expected) loss of some sediment from the spoil containment bund located at the bow, additional washed sediment from sandbags was added into the excavated trench to provide a minimum of 50cm back-fill over the hull timbers and reburied artefacts. The profile of sediments over the excavation at the end of backfilling was noticeably higher than at the start of works.

The reburial process was an intensive and logistical exercise, with divers contending with intractable clay, large lengths of shade cloth in low visibility and strong currents. The decision was made to undertake preliminary reburial to ensure that all exposed elements were buried by an adequate sediment load and covered with shade cloth. At the end of May a return team of Heritage Victoria staff, PDS divers and volunteers, under the guidance of Principal Investigator Vicki Richards, returned to the site for two days to complete the reburial and to obtain baseline core samples from the control sites and the reburied sections, including the depot. Further sandbags were positioned to support the frames and in preparation for final coverage by PVC, geotextile and concrete bags in November.

Sacrificial Samples

A number of timber and metal sacrificial samples were prepared by Vicki Richards with the assistance of volunteers. Three types of timber tokens (Baltic Pine, Sydney Bluegum

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Vicki Richards preparing sacrificial samples. (Photo by Jen Rodrigues)

and Blackbutt) and a variety of ferrous alloy tokens were attached to plastic plates and buried on the site for future analysis. The shade cloth and eventually the PVC cover will have access ports to allow the sacrificial samples to be recovered every year for the life of the project. Analysis of the reburied samples will provide invaluable information regarding the success of the applied in situ preservation strategy, without recourse to sampling the actual wreck or the reburied artefacts.

Sacrificial timber samples. (Photo by Jen Rodrigues)

Core and artefact sampling

Conservation scientists, James Parkinson and Peter Veth took 15 core samples from locations near the bow, midships and stern, directly from the clay unit as well as control locations off site, for detailed geochemical, physico-chemical and grain-size analyses. Samples were also taken of timber, leather and rope artefacts. Twelve marine cores were taken for geoarchaeological analysis to be carried out by Tony Barham and Masters of Archaeological Science students from the ANU. These cores will also be used to compare with the results of cores they have taken at nearby terrestrial locations. Replicate cores were taken for all samples and analysis of the cores is in process.

Future work

The conservation science component of the reburial project, while always imagined to be significant, looms as a critical longitudinal task. While all aspects of the overall archaeological research design were sequentially addressed, it became clear that some tasks including artefact documentation, imaging (including x-ray), preparation for reburial and the reburial itself could not be characterised as especially 'rapid'. Equally the discovery of a significant stratigraphic unit/artefact—the pipe clay ballast—served as a caution that contingencies must be allowed for when intervening on an at-risk wrecksite. Re-scoping of tasks and the research design itself is part of any excavation, but an especially critical one in a reburial exercise.

A final period of intensive fieldwork is planned for November 2012 when a discrete team will return to the site for 10 days to complete the final installation of the in situ reburial stabilisation, protection and monitoring materials. Additional sandbags will be delivered to the site to support upstanding hull timbers before shadecloth is deployed to cover the entire wreck. Once these are in place large PVC tarpaulins will be placed over the entire site to completely cover the wreck as a mound. The tarpaulins will be anchored in place with contoured concrete blocks (set in situ), with the intention of preventing boat anchors from snagging on the shadecloth and dragging it from the site.

Site monitoring, involving the recovery and testing of timber and metal sacrificial samples, and further sediment cores will be undertaken periodically until 2014 to measure the impact of the excavation and the rate at which the site returns to anaerobic conditions This site monitoring will occur at sample points on the wreck itself and also at the reburial repository located to the stern of the wreck (containing the organic material from the site). This monitoring will ultimately form the quantitative evaluation of the success of the in situ reburial strategy for historic shipwrecks that are at risk in southern waters.

For more information about the project, or to see the daily blogs and images from the excavation, visit the project website at www.ahspp.org.au.

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— Cassandra Philippou & Peter Veth
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J5 Submarine Anode Protection Project

A 2011 AIMA Scholarship Project
Getunder Dive Club

The aim of this project was to carry out investigative and conservation work on the *J5* submarine site off Port Phillip Heads, Victoria. It is hoped that the site can be preserved as part of Victoria's maritime history by reducing corrosion of the submarine's pressure hull and frames. The project involved carrying out a general site survey, mapping and corrosion potential survey work to provide information on the site and its current state of deterioration. The data obtained was then used to establish a plan for anode placements within the hull structure, which was carried out through November 2011.

Historic photograph of *J5* submarine. (La Trobe Picture Collection, State Library of Victoria)

Introduction

The J Class submarines saw service in the British Navy during World War 1 and, at the time of their construction in 1916, were the largest submarines ever built. In all, seven were constructed and were the "state of the art" vessels of their day. At the end of the war, negotiations were made to donate six of the vessels to the Royal Australian Navy (one sub, *J6*, was sunk accidentally in 1918 by an allied submarine). In 1919, the six submarines, escorted by a support vessel, made the long and arduous voyage to Australia.

The J Class submarines actually had a rather short active life in the RAN, as mechanical problems following their years of active service, together with funding cutbacks, led the Navy to retire the vessels in 1921. By 1922, the decision was finally made to scrap the vessels; all but one (*J7*) was sold.

The Navy stripped four of the submarines before scuttling them in an area outside Port Phillip Bay known as the Ships' Graveyard. *J1*, *J2* and *J5* were scuttled in 1926, while *J4* was scuttled a year later. *J3* had been beached in shallow water at Swan Island, Queenscliff, in 1923 to supply electric power, while the last vessel, *J7*, was eventually scrapped as well in 1930 and sunk at Sandringham to serve as a breakwater for the yacht club.

The submarines scuttled in the Ships' Graveyard laid undisturbed until scuba divers rediscovered them in relatively recent times. *J2* was the first discovered, in 1974, followed by *J5* and then *J4* in 1982, and *J1* in 1984. Of these four subs, the hulls of *J4* and *J2* are broken, and *J1* is in an advanced state of decay.

At the time of planning this project, *J5* was regarded as being the most intact, largely because she was scuttled with most of her bulkheads still in place, which have added to her current structural integrity. As such, it became the focus of this preservation study. Unfortunately, the resting place of *J5*, in 36m of water, is one of the deeper of the four sites, making the underwater tasks reasonably challenging.

The project was conceived by members of the Getunder Dive Club following a 2008 presentation on anodic protection of underwater wreck sites by Dr Ian McLeod or the Western Australian Museum. Project methodology was coordinated in consultation with Heritage Victoria, who also were responsible for granting relevant permits for the project work. All of the underwater work was carried out by members of Getunder Dive Club using members' boats and equipment. An underwater multimeter was supplied by Mal Venturoni from Professional Diving Services.

The wreck site is approximately 2 nautical miles seaward from the entrance to Port Phillip Bay. Access to the site requires traversing through Port Phillip Heads and the narrow stretch of water known as "The Rip", due to the strong and turbulent tidal currents that run through the entrance. The entrance can be dangerous in poor weather conditions, especially for small craft, and the wreck site is subject to ocean swells, necessitating careful planning.

Project Implementation

Site map

The first phase of the project was to prepare a pre-disturbance survey of the *J5* wreck site. Teams of divers made a number of dives, which resulted in a sketch map showing relative positions, dimensions and general layout of the site. A baseline was established along the hull and fixed datum points placed at strategic locations, such as at the bow. Position and orientation of all datum points and lines, as well as key features, were determined with GPS coordinates, depth measurements and compass bearings. Plastic labelling discs

Divers examining the submarine's conning tower. (Photos by)

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