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Speech by Sue Holliday at the opening of the XIth AIMA Conference:Shipwrecks and Community, held at the National Maritime Museum, Darling Harbour, 12 November 1992.

Figure 1. Delegates at the National Maritime Museum, Darling Harbour, Sydney.

Mr Peter Doyle, Chairperson of the Australian National Maritime Museum's Council, Dr Kevin Fewster, Director of the Museum, international, interstate and New South Wales conference delegates and friends.

Welcome to the Australian Institute for Maritime Archaeology *Shipwrecks and Community* conference.

It is very appropriate that the Department of Planning and the Australian National Maritime Museum should be co-hosting this event. In 1988 the Director of Planning became the New South Wales State delegate for administration of the Commonwealth *Historic Shipwrecks Act.* Following this, and not withstanding that the department 'stole away' one of the Museum's curatorial staff to become the New South Wales State maritime archaeologist, the two organisations have worked together closely. This cooperation has had a very significant influence in the development of an exciting and dynamic programme of shipwreck management.

The achievements to date have been considerable. We have not done it alone. Most importantly, and as a result of our programme, there is a clear indication that a significant and increasing number of recreational divers support the need to preserve shipwreck heritage.

We have found that recreational diver training has a strong lean towards environmental awareness. This is clearly demonstrated by the large turnout of divers to 'Clean up Australia' activities. It is also demonstrated in concerns expressed by divers for dredging projects which may affect shipwrecks sites.

It is a relatively small move for divers to transfer this awareness to the impact of their own activities on shipwrecks. In New South Wales, as in other parts of Australia, wreck diving is an important part of the dive industry's activities. Sustainable cultural tourism is therefore an important consideration for our programme.

Shipwrecks have a particular importance to Australia's history. As an island continent all access was by sea until the advent of aircraft. For many thousands of years Aboriginal cultures were able to develop virtually independent of influences from Asia, Europe, Africa or America.

We cannot be sure about the beginning of Macassan trade in northern Australia or of Torres Strait Island trade in Cape York. Speculation that 16th-century Portuguese navigators came to Australian shores continues but hard evidence has yet to be found. Indeed, Australia did not come to the attention of Europe and the world at large until the activities of the Dutch in the Indian ocean during the 17th century.

In 1616 the Dutchman Dirk Hartog was the first to record sighting the west coast. However it was the English vessel *Trial* that first came to grief there in 1622. This, in addition to the notorious loss of the *Batavia* in 1629 as well as a number of other dutch ships in the 17th and early 18th century marks the beginning of the known European archaeological record in Australia.

British colonisation from 1788 led to a considerable increase in the number of vessels wrecked in Australian waters. Most of these were involved in the coastal trade – a dangerous occupation in poorly chartered waters. Many were also engaged in international trade as part of the desperate struggle to keep the fledgling colony

alive. The loss of the HMS *Sirius* on Norfolk Island in 1790 and another naval vessel, the *Guardian* in the Indian Ocean a few weeks later created enormous deprivation in Sydney.

Some shipwrecks, although tragic, had positive benefits for the New South Wales colony. The *Sydney Cove* wrecked on preservation Island, Tasmania, in 1797 is an example. Firstly, the loss of the ship resulted in the charting of Tasmania as an island separate from the mainland. Secondly, the wreck also lead to the development of Australia's first export industry through the exploitation (and almost annihilation) of the Bass Strait seals. And, thirdly, when a number of the survivors of the *Sydney Cove* attempted to sail a long boat to Sydney they were wrecked on the Victorian coast. Their subsequent overland walk to Sydney cost most of them their lives. However, their discovery of coal, during their arduous trek up the New South Wales south coast, had important ramifications for the development of industry in the colony.

We acknowledge that this is all recent history compared to many other countries and especially in comparison with Aboriginal Australia. However it is because of this short European history that the underwater archaeological record is so important in the process of defining a sense of place and identity. A period as small as 20 years still represents about 10% of post colonisation history.

Many records that have survived underwater have been lost in our normal dry environment. Where they have survived on land their context may give them a different meaning. On a shipwreck, context is often literally cemented in both place and time by corrosion products.

Some 7000 vessels have been lost in Australian waters – either in the open waters surrounding this island continent or coastal harbours or inland rivers. Nearly 2000 are in New South Wales alone and, of these, less than 200 have been found. They represent sail and steam, vessels built in Australia and those built overseas, passenger ships, cargo vessels, tugs, ferries, naval vessels and pleasure craft.

Their stories are varied, often bizarre and of immense community interest. An example is the *Queen of Nations* a White Star Line clipper ship built by Walter Hood of Aberdeen which was wrecked south of Sydney near Wollongong in 1881. This occurred during a time of great expansion for the Australian railway network.

Among the *Queen of Nations*' mixed cargo of brandy, ceramics, glassware, copper wire and grave stones was a large quantity of railway lines.

The Captain and Mate had been drunk for most of the voyage and had badly treated the crew. The Captain then mistook the relatively low shoreline near Wollongong for the high bluff cliffs at the entrance to Sydney Harbour. By the time he had realised his error the ship was lost.

The ensuing rescue was made more difficult by the Mate threatening to shoot any crew that left the ship. He and the Captain then hid below decks refusing to be rescued and making strange noises whenever a rescue boat pulled alongside.

A passing steamer, the *Commodore*, added to the confusion by attempting to fire blue rockets to attract the attention of the pilot—but lit them at the wrong end. Great excitement was had as they ricocheted chaotically about the deck.

Much of the vessel's cargo of brandy began to wash up on the beach as the vessel began to break up. It was claimed that most of Wollongong turned up creating some interesting scenes as spectators became hopelessly intoxicated. A report in a local newspaper summed up the attraction of the wreck site—'It is not true that a Bulli woman came home from the beach with six pairs of trousers on, she only had three pairs on'.

The sites and stories of such memorable events possess a particular romance for the general public. The underwater world is the last frontier on this planet. Very little of it has been thoroughly explored and recorded. The shipwrecks in Davey Jones' locker have many stories yet to be told. There is a large public that has an interest in these adventures and the mysteries that can be unlocked through thorough research.

One of the central aims of shipwreck management programmes must be to recognise the cultural tourism potential of shipwreck heritage. Coastal towns in particular, by focussing on the maritime image and history of their towns can increase their attraction to tourists. This may be achieved through coastal walks that link the area to the history of shipwrecks and wreck sites. Diving holidays create business opportunities through tours, boat and equipment hire, dive instruction, accommodation and restaurants.

It is therefore particularly important that access to shipwreck sites is not closed off to the public. The more visitors going to these sites and the more the sites are interpreted to the general public the greater will be the level of support for their protection.

Shipwrecks are more endangered than whales, turtles or coral reefs. They provide a unique record of human activities at a particular point in time—activities which include trade, migration, technology and life at sea. Unlike animal species, the individual shipwreck cannot reproduce itself. The combination of structure, cargo, crew, passengers and the effect of the wrecking process is different on every site. Unlike animals, the effects of human intervention can only be stabilised, not healed. Except through proper recording, any disturbance will result in the permanent loss of information.

The *Atlas of New South Wales Wreck Sites*, published by the Department of Planning this year, is a project that recognises public interest in shipwreck sites. The publication has succeeded in stimulating a two way flow of information between divers and the department of planning as the agency responsible for shipwreck management.

To further this process the department is also initiating, in cooperation with the diving industry, a three-year project to promote wreck diving in New South Wales. The project will seek to encourage divers to research the history of known wreck sites in the state as well as to create site plans and pictorial records. The end product, collated and validated by the department, will be a publication with a large number of contributors. While this project is still in its early development stage, initial responses from the industry have been positive and it is expected to be formally launched in early 1993.

From the outset, New South Wales has focused on extracting ideas from the programmes of other States and overseas countries as well as creating its own strategies based on community interests, activities and available facilities. By blending these, a programme has been developed that aims not only to preserve underwater cultural heritage but also seeks to be relevant and responsive to divers and non-divers alike.

It is this process of extracting and blending that is the central purpose of the *Shipwrecks and Community* conference.

This conference provides an important opportunity for constructive interaction between people from a wide range of backgrounds and experiences. I am sure that you will all be endeavouring over the next few days to identify the key issues associated with community access to underwater heritage. There is no doubt that, given your backgrounds, the perspectives that you bring will vary considerably. It is through the presentation of your own views and through the careful consideration of those of other delegates that this conference will prove its greatest worth.

I therefore thank you all for your attendance and wish you well with your deliberations. I know that your conference will be enhanced by the atmosphere of this marvellous venue and by the hospitality and facilities of Sydney.

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SS *Beaver*: the archaeology of the first steamship on the Pacific Coast of North America

James P. Delgado
Vancouver Maritime Museum, Vancouver, Canada

Figure 1. The *Beaver*, 1870 (Maritime Museum, Vancouver, B.C. File No. 1212A).

Figure 2. The wreck of the *Beaver*, 1888 (Maritime Museum, Vancouver, B.C. File No.144).

Introduction

History and vessel characteristics

The paddle steamer *Beaver* was built to order for the Hudson's Bay Company by Messrs Green, Wigrams and Green of Blackwall, London, Great Britain in 1835. Built of English and African oak, with frames on 2 ft (0.3 m) centres, the 101 ft (30.8 m) long steamer was copper fastened, with diagonal iron strapping. The deck was supported by iron hanging knees. *Beaver* was two-masted and carried a fore-and-aft rig; it was described in contemporary documents as a 'schooner', but the vessel carried a barquentine rig. Registered by Lloyds in May 1835 at 187 tons, *Beaver*'s beam was recorded at 20 ft (6.1 m), with an 11 ft (3.35 m) depth of hold. *Beaver*'s loaded draught was 8.5 ft (2.59 m). *Beaver*'s twin sidelever engines were manufactured by Boulton and Watt. Each was rated at 35 nominal horsepower and drove a 13 ft (3.96 m) diameter, 6.5 ft (1.98 m) long paddle-wheel. The cylinders were 42 in (1.06 m) in diameter, with a 3 ft (0.9 m) stroke. Steam was produced by a low pressure boiler situated aft of the engines and amidships.

Beaver was launched into the River Thames on 2 May 1835. Fitting out proceeded quickly, and the steam trials were successfully held on 25 June. *Beaver* departed Gravesend with the paddles stowed, under sail, in the company of the bark *Columbia*, for the 'North West Coast of America' and service in the fleet of the Hudson's Bay Company on 27 August, 1835. *Beaver* arrived at Fort Vancouver, in what is now Washington State, on the Columbia River on 10 April 1836. The engines and boilers, partially dismantled for the voyage, were reassembled and steam was got up on the afternoon of 16 May. A trip up the Willamette River followed on 31 May, and B*eaver* then departed on a voyage up the coast to Alaska. *Beaver* thus became the first steamer to reach and work along the Pacific coast of North America. The tiny steamer remained in the employ of the Hudson's Bay Company for four decades. Trading voyages for fur, and occasional expeditions to survey coastal inlets occupied *Beaver* from 1836 until 1853.

In 1853, *Beaver* was relegated to transporting general freight and passengers between the Hudson's Bay Company's British Columbia outposts. The discovery of gold on British Columbia's Fraser River led to a rush in 1858. *Beaver* was diverted to that service, running from Victoria up the Fraser until 1860. Laid up until 1862, the steamer was chartered by the Royal Navy for use as a survey vessel. Between 1862 and 1870, *Beaver* charted and surveyed a thousand mile stretch of the British Columbia coast. Sold by the Hudson's Bay Company in 1874 to a consortium of seven Victoria businessmen, *Beaver* worked as a towboat and tramp freighter until lost in 1888.

During the steamer's five-decade long career, B*eaver* was both repaired and modified on several occasions. The boilers were replaced five times, beginning in 1842 when a new set was shipped out from Boulton and Watt's works were installed in January 1850 and in 1855. A set of square boilers manufactured by Low, Muir and Maudsley of London were shipped out and placed in the ship in July 1867. *Beaver*'s last boiler, a single Scotch marine boiler manufactured by the Albion Ironworks of Victoria, was installed in October 1877 during an overhaul that also modified the engine's valves.

Originally flush decked with a small deck-house, *Beaver*'s upper works were augmented in the Fall of 1859 with a larger deck-house and improved passenger accommodations. When chartered in 1862 by the Royal Navy for survey work, additions and modifications were made to the already substantial deck-house to provide accommodations for the crew and a chart room for the survey work. The ship's rigging was stripped, leaving two pole masts. When *Beaver*

was converted to a tugboat, the masts were removed and an elevated pilot house was added to the superstructure. *Beaver* was in this configuration when wrecked. The upper works were damaged by fire in 1880 and repaired, but the nature and extent of the repairs is not known. In February 1883, the *Beaver* struck a rock near the entrance to Burrard Inlet in Vancouver Harbour and sank, but was quickly refloated. *Beaver* was laid up from 1883 until 1887, resuming service for a few months carrying passengers and supplies between logging camps on Burrard Inlet while under the command of George Marchant.

The wreck event

Beaver went ashore at Prospect Point, near the First Narrows of Burrard Inlet, on the night of 26 July, 1888 after departing Vancouver. W.H. Evans, assistant engineer, later recalled that

> …the tide was pretty near high water, but still running in, because the captain hugged the shore pretty tight to get past the eddy off Observation Point, and the first thing I knew she hit, and that settled it. We all got off. We were in too much of a hurry to pack up... We all got off into the water and waded ashore… (Evans, 1941, as cited in Pethick, 1970:104).

Strong inshore currents sweeping along the point, as well as Captain George Marchant's close-in course were the cause of the wreck.

Salvage of the steamer was not economical, and the wreck of *Beaver* was left to disintegrate on the rocks. Over the next four years, *Beaver* was subjected to intensive stripping by souvenir hunters as it fell apart. The deteriorated hulk largely disintegrated on 26 June 1892, when a large wake from the passing steamer *Yosemite* swept over the wreck.

Salvage and memorialization

Recovery of pieces of the historic vessel began almost immediately in 1888. It was a different process than the usual maritime salvage effort. The history of the steamer was well known, and the removal of items, including innocuous enough artefacts like Captain Marchant's clay pipe, was inspired by a quest for souvenirs, if not relics of *Beaver*. Through the years the hulk remained lodged on the rocks, fittings, equipment and timber were stripped from the *Beaver*. A.E. Goodman, quoted in the *Vancouver Daily Province* on 28 July 1929, stated that:

> I have often clambered on her slippery deck at low tide in search of enough teak wood from her sturdy sides to make walking sticks to give to my friends in the east, and each time I ventured on board there were others there with axe and saw on the same errand as I was (Pethick, 1970:108).

The engines were broken up and in part salvaged for scrap. John Williams, one such salvor, stated that 'I blew up her engines with dynamite and sold the old iron to a junk man' (Pethick, 1970:108). However, photographs of the wreck between 1888 and 1892 do not evidence the destruction that blasting would cause. The majority of the engine machinery was removed at the instigation of and by one man, Charles McCain, a history minded bookseller whose attention was directed to the machinery after the wreck disintegrated, exposing the hold.

Working during extreme low tides in December 1892 with two friends, Edward Brown and James N. Menzies, McCain 'succeeded in getting almost everything which then remained worth carrying away, even to the walking beams of oscillating levers'. The 'walking beams' in question were the four sidelevers. Only one of these sidelevers removed from the wreck has survived. Recovered from a garage in the city and presented to the Vancouver City Archives in July 1940 by Menzies' widow, the sidelever was mounted atop Prospect Point in July 1941 by the Vancouver Parks Board. It remained there, on outdoor display, until February 1992, when it was transferred to the Vancouver Maritime Museum.

McCain also salvaged bronze and copper fittings and fastenings which were apparently melted down to manufacture souvenir medallions commemorating the *Beaver*. According to McCain, he stripped 1058 lb (480.3 kg) of metal. It consisted of

> …a vast assortment of copper bolts…several sets of main shaft bearings…various other sets of various dimensions, a variety of copper tubing, several brass plungers, a number of valves and numerous small devices belonging to the ship's machinery, besides two large bronze condenser valves… (McCain, 1894).

At the end of 1892, McCain reported the wreck's visible remains 'at very low tide' were 'a section of the bottom, on which rested a few chunks of iron and promiscuous pile of furnace bricks'.

McCain identified one of the 'chunks of iron' as the intermediate shaft, the centre portion of the paddle-wheel shaft array, a 7.5 ft (2.28 m) long casting with 18 in (0.45 m) cranks at either end. Brown drowned, and McCain nearly lost his life while trying to salvage the shaft on New Year's Eve, 1893. It was apparently left on the site by McCain.

McCain's efforts ended in 1893 and he devoted his attention to the production of medals and a souvenir book. Little attention was paid to the vessel's remains until 1903. On 9 July of that year, the *Victoria Times Colonist* noted that a move

> …to petition the provincial government to raise the venerable timbers of the steamer *Beaver*, patch them up and place them on exhibition… Portions of this steamer…can still be seen above the water at low tide.

These efforts came to naught, however the attention of another salvor recovered additional parts of the steamer's machinery a few years later. C.C. Pilkey of Vancouver, working with an 'exclusive privilege', recovered the *Beaver*'s boiler on 1 October 1906, lifting it with a wrecking scow and depositing the 22 ft (6.7 m) long artefact on the beach at North Vancouver.

The boiler was sold by Pilkey in 1909 to the Washington State Historical Society in Tacoma. In the October 1908, the *Times Colonist* reported that Pilkey was working to recover machinery because 'both Seattle and Tacoma are anxious to secure it [*Beaver*] for the purpose of adding it' to the State's exhibit at the 1909 AYP Fair in Seattle. 'Tacoma', stated the reporter, 'is willing to take all the relics and prepare them in an elaborate manner, with electrical and other displays, if given that privilege'.

Figure 3. Will Fem's view of the wreck, 1892 (Maritime Museum, Vancouver, B.C. File No. 1345).

Figure 4. The wreck site, *circa* 1900, note the boiler (left) and the port propellor shaft (right).

A newspaper report in January 1909 from the local steamboat inspector urged the recovery and display of the 'cylinders, entablature, and jet condenser' of the *Beaver* since 'they are almost the only parts that would be actually of the original structure as from the works of Boulton and Watt', and presumably because he believed them to remain at the wreck site. No major salvage or recovery followed, although in August 1925 divers working on the wreck of the tugboat *Radius* lost near Prospect Point, recovered an old anchor from 80 feet of water that was identified by the elderly George Marchant, *Beaver*'s last captain, as one of the steamer's anchors.

Two large pieces of the machinery that were ultimately recovered as well were the paddle-wheel shafts. In 1908, Pilkey's efforts were reported to be directed at 'the remaining crank shaft'. Pilkey salvaged the port shaft in December, stuck in the rocks near the shoreline and visible at low tide, and sold it in 1909, along with the boiler, to the Washington State Historical Society. The shaft recovered and melted was the centre section sought first by McCain and Brown, however, because in October 1962, divers Fred Rogers and Ed Seaton discovered the starboard paddle-wheel shaft, which they raised in November and presented to the Vancouver Maritime Museum.

In September 1960, Rogers and Seaton became the first modern divers to relocate the wreck. Their effort followed a 1955 report from F.W. Pamphlet, the son of one of *Beaver*'s captains that a 'slab' of the wreck remained at the site that presumably could be raised 'with grappling irons' (*Vancouver Province*, 21 February, 1955). In 1960, Rogers and Seaton salvaged 'brass rods and copper objects' scattered among and embedded in timbers, raising a bronze rudder fork, pieces of iron machinery, brass valves, and sections of copper steam pipe.

Rogers reported that 'Many other large pieces of iron remained buried under rocks and gravel' including 'large pieces of an engine'. One piece of iron machinery recovered by Rogers in 1960 was a rod, from its size probably a connecting rod for the air pump, with a connecting strap at one end. In 1962, at the time the starboard shaft was recovered, Rogers also located, raised, and then lowered back to the bottom the cross-head from one of the steamer's engine cylinders. In April 1964, Rogers returned to the wreck and recovered more brass and copper fittings, as well as an anchor found at a depth of 40 ft (12.2 m) (Rogers, 1978).

The next diving expedition of record to recover *Beaver* artefacts was the Aquabolics Diving Club of Vancouver, whose members recovered a boat davit, bricks, timbers, more rudder forks, and copper fastenings from the wreck in 1973. A number of these artefacts, including the davit, were donated to the Vancouver Maritime Museum. The next series of dives on the wreck were the archaeological assessment dives undertaken in September 1991, February, April and June 1992.

The material record at the site

The 1991 and 1992 dives were conducted by the Underwater Archaeological Society of British Columbia and the Vancouver Maritime Museum, with Thomas F. Beasley serving as coordinator, as part of a provincial government funded submerged cultural resources survey of Howe Sound and Burrard Inlet under permit from and for the Archaeology Branch of the British Columbia government.

Since Rogers' 1964 dives, the wreck site has been partially covered by rock added to the shoreline to construct a pedestrian walkway. Artefacts and features lie beneath and between the large granite boulders and rocks. The bottom in this area, at an average depth of 25 ft (7.6 m), is indigenous rock and gravel, which was the original matrix on which *Beaver* wrecked and where its remains were deposited. The dives in September 1991 focused in this area. At the 40 ft (12.2 m) contour level, the bottom becomes a hard packed sand that continue, with a sharp decline, to the middle of the 200 yd (182.8 m) wide channel at a depth of approximately 120 ft (36.57 m). In September 1991 and February 1992, divers swam transects between the 20 and 30 ft (6 m and 9 m) contour to locate cultural materials that were then mapped and photographed.

Vessel remains observed at that site include an articulated

Figure 5. The McCain medals.

section of oak 2.5 in (6 cm) thick outer hull planking, with copper sheathing, that projected from the rocks. Oriented at 251°, and somewhat parallel to the shoreline, this section of hull included remnants of floors, with $1^{1}/_{8}$ in (28.57 mm) diameter copper drifts, and brass spikes. Inshore of these planks at the same angle is a section of floors, wedged into the rocks. The remains of an engine keelson lie atop the floors.

Lying partially atop the timbers are the remains of bed-plates for at least one of the engines, as well as the flattened remains of a condenser. A flanged section of copper pipe rests next to the concretion. This, and the hull plank orientation suggest that this portion of the ship's bottom—the engine room area—rests in its original depositional context from the 1888–1892 wreck event.

Resting at the approximate 20 ft (6 m) contour, this section of hull is matched by other timbers, some copper fastenings, and two pieces of iron plate that rest in the rocks at the same contour. The remains of the diagonal stays from the entablature that supported the paddle-wheel shafts lie offshore of this section. Flat bands or straps of iron rest at the same level, and are probably remains of the diagonal iron strapping that supported *Beaver*'s hull.

Two separate types of brick are also located on the site. Red 23.5 x 11 x 7.5 cm bricks stamped 'Tamar', are firebricks of unknown origin. The others, yellow bricks stamped 'T Carr', are firebricks manufactured by the Newcastle upon Tyne firm of Thomas Carr and Sons, which produced bricks of this type between 1827 and 1918. These firebricks, which lie scattered in a loose concentration around the engine remains, are from *Beaver*'s firebox and were presumably scattered by the 1908 recovery of the boiler as their grouping is random and not in patterns that would indicate a natural site formation process.

Several flat pieces of iron plate lie in the engine room area. One of the iron plates has a flat surface on the upper, exposed side, with ribbed supports cast into the lower face. This piece, presumably in its correct vertical orientation, is a section of engine bed plate, probably the base for a cylinder given what appears to be a radial pattern for the ribbing. Oriented in an approximate straight line at the 25-30 ft (6–9 m) contour is a row of nine widely spaced cast iron hanging knees. Iron hanging knees were an original construction feature of *Beaver*, and these nine specimens are presumed to date to 1835. They presumably represent an articulated section of upper starboard hull that was deposited below the bottom of the wreck as the ship disintegrated in 1892.

The exposed timbers have largely been consumed by marine organisms, leaving inedible copper-oxide impregnated wood. This fact, coupled with their orientation, suggests a lack of disturbance and the establishment of an equilibrium at the site. At the 40 ft (12.2 m) contour and directly abeam of the articulated hull section and two iron knees is large cast iron plate, while off it, in deeper water yet is turn-buckle. These artefacts were the first modern indicators of wreck scatter into deeper water, as suggested by Rogers' 1962 recovery of the starboard paddle-wheel shaft and his 1964 discovery on an anchor in 40 ft (12.2 m) of water and the 1925 recovery of a *Beaver* anchor near the wreck in 80 ft (24.4 m) of water. Side scan sonar survey of the harbour channel in 1992 discovered linear targets in water below a 30 m depth which may be additional *Beaver* wreckage.

Site formation processes

Despite the position of the wreck of *Beaver* at a busy harbour entrance with strong tidal flow, it rested in a nonetheless protected marine environment protracted the disintegration of the hull and the formation of an archaeological site. It also fortuitously resulted in a wealth of photographic and artistic documentation of the wreck over that period that provides a baseline of historical information from which to gauge the environmental and archaeological evidence to determine the site formation process.

Figure 6. Rogers and Seaton with a cross-head raised and then returned to the site.

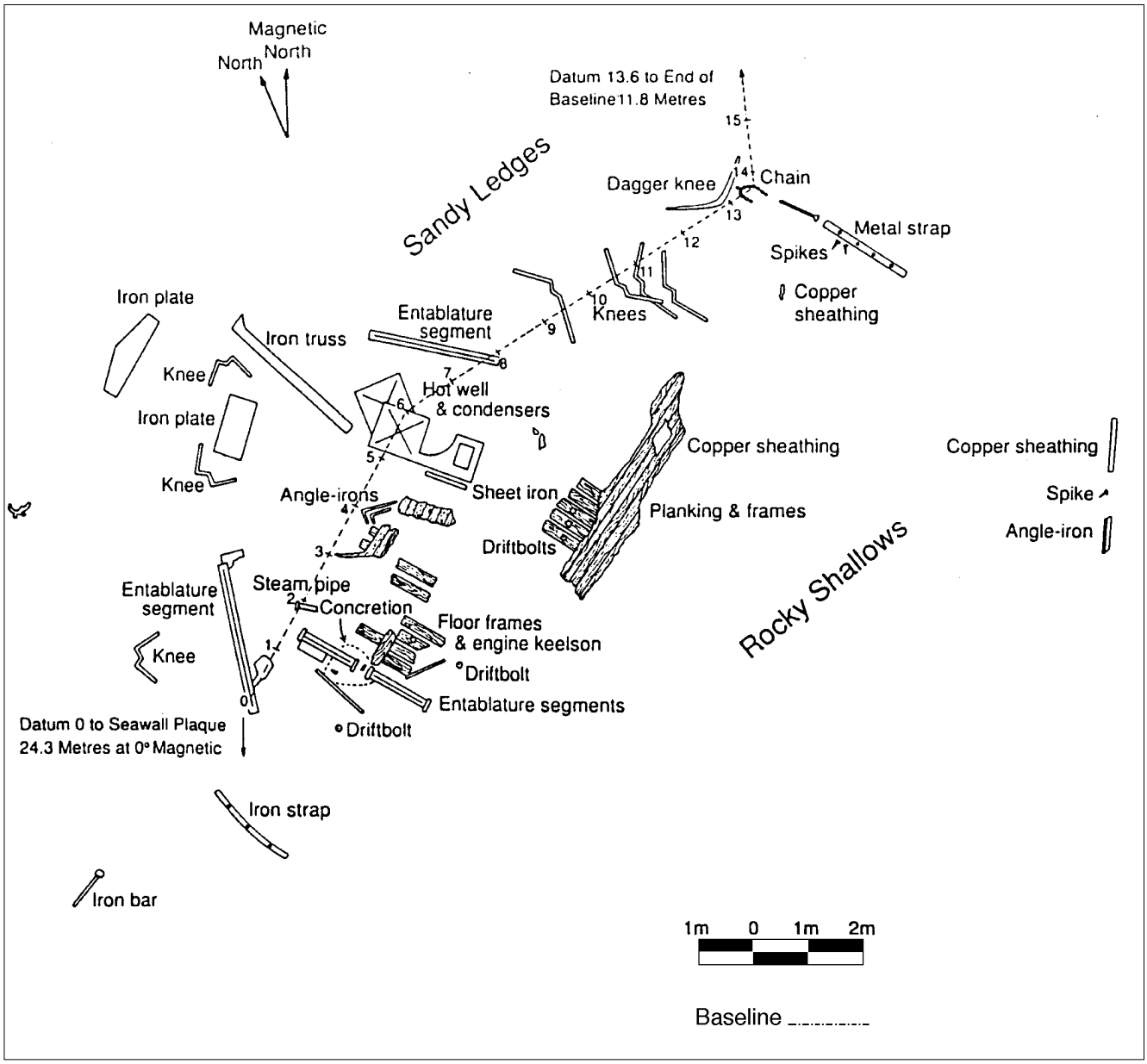

Figure 7. Plan of the wreck site, central portion. UASBC survey map (1 May 1993).

Photographs taken of the wreck from different angles from 1888 until 1892 show at first a slow progression of deterioration. The ship grounded with its bow wedged in the rocks, stern in the rocks but in deeper water, and heeled to starboard. At high tide, the water came over the starboard bulwark and left the starboard paddle-wheel submerged. Stripping of the hulk by souvenir hunters is evident in most photographs as deck fittings disappear taking with the bulwarks, the name board, and the wheel. An interior photograph of the engine room shows the engines intact, the paddle-wheel shafts resting on their plummer blocks, and the boiler in place, while the hull gapes open and large sections of ceiling planking and decking are missing. Scavenging, as indicated in historical accounts, was considerable. Evidence of this is materially offered by the Vancouver Maritime Museum's large collection of pieces of wood removed from the ship prior to 1892, including an intact 4 ft (1.2 m) long section of bulwark. The effects of deteriorating and gravity are evident by 1891–1892. The boiler broke free of its mounts and tumbled to starboard, shifting the angle of the steamer's single stack.

Most informative are a set of five illustrations of the wreck by Wil Ferris of Vancouver between 1891 and 1894. In his first view, a watercolour produced in 1891, Ferris depicts the stripped hulk lying on the rocks, its superstructure intact although greatly deteriorated. His second view, drawn in 1892, shows the superstructure and much of the decks gone, with the starboard sponson drooping into the water. This drawing is corroborated by a later 1892 photograph that shows much of the same, but at a time when the stack alone, twisted and drooping to starboard, remained above the deck level.

In Ferris' 1892 drawing, there is no visible trace of the starboard paddle-wheel, although the rims and buckets of the port wheel are visible. Ferris' third view, drawn in 1893, shows the hull broke, with the starboard side missing, the

bow intact and twisted sharply to starboard and broken free of the port side, and the crank at the end of the port paddle-wheel shaft protruding into the air from the rocks. The decks are missing, the pieces of iron or timber stick out from the water off the starboard beam of the wreck. The fourth and final view shows no visible timber remains, but the boiler, engine framework and diagonal stays, and the port paddle-wheel and its shaft are visible. The wheel, with rims, spokes and buckets bent but intact, remains pointing into the air, its crank end suspended above the water.

Early 20th century photographs of the wreck at low tide show the boiler rising above the surface. Based on the known size of the boiler it was resting in what at low tide was 6 to 8 ft (1.8 to 2.4 m) of water. The port paddle-wheel shaft, then tumbled, rested on the rocks with the mangled wheel lying in the water.

Despite the strong tides that sweep through the narrows at the wreck site, the majority of the ship remained at or close to the wreck site. The alternate wet and dry cycle of exposure of the half-submerged hulk retarded the action of marine borers and other organisms, but encouraged dry rot and structural failure that inevitably led to the collapse of the decks and superstructure, an action capped by the over washing of the wreck at high tide on 26 June 1892 when the *Yosemite* passed close by and threw up a large wake. The hull, weakened, collapsed to starboard, carrying with it the starboard paddle-wheel and portions of the starboard engine. These artefacts and the anchor recovered in 1925, a best bower that probably was stowed to starboard, slid down the steep slope past the rocks and came to rest in the deep water on the sand bottom in the channel. 1925 press accounts stated the anchor was retrieved from 80 ft (24.38 m) of water.

Further up the slope, the still largely intact starboard side of the hull came to rest in 30–40 feet (9–12 m) of water, as shown by the row of iron knees. The bottom of the hull remained on the rocks, slowly consumed by marine organisms since it was almost always covered except at extreme low tides, with loose broken machinery and the bed-plates left inside along with firebricks from the furnace in the aftermath of McCain and Pilkey's recovery efforts. This included the breaking up of the engines, presumably focused in large measure on the shafts and sidelevers since the 1893 drawings of the wreck show a substantially intact engine frame and diagonal stays. The majority of the hull bottom is now buried beneath the pedestrian walkway and seawall built over the former shallows, with portions exposed in the rocks such as the section of articulated copper sheathed midships hull. Despite the consistent efforts of determined salvors over an 80-year period, considerable remains, even of more visible and aesthetically pleasing brass and copper artefacts such as drifts, spikes, copper pipe and valves remain untouched on the site. These materials, as well as the surviving iron, timber and brick, reflect a substantial and revealing material record of a protracted and very public site formation process.

Conclusions

Archaeological survey of the *Beaver* wreck site, and the documentation of materials on the site as well as previously recovered vessel remains have provided a more detailed view of the pioneer steamship on the Pacific Coast of North America. Of particular significance, and worthy of study and analysis is the social process that transformed *Beaver* from wreck to relic. This process is ably reflected in a rich and diverse material record. Also of note is the dynamic of the site formation process. Despite strong tides, deposition on an exposed steep, rocky bottom, and intensive salvage operations between 1888 and 1892 and 1960 and 1973, a substantial, articulated and well preserved archaeological record has survived.

Acknowledgments

The author wishes to acknowledge the financial assistance of the Cultural Services Branch, Archaeology Branch, and the British Columbia Heritage Trust of the Provincial Government. The survey of the wreck of SS *Beaver* was conducted as part of a larger assessment of Howe Sound and Burrard Inlet by the Underwater Archaeological Society of British Columbia. Considerable historical material on *Beaver* was gathered by Leonard McCann, Curator of Maritime History for the Vancouver Maritime Museum. Access to the Museum's substantial collection of *Beaver* materials was also facilitated by Joan Thornley and Shirley Sutherland. Documentation of the materials recovered from the wreck of *Beaver* between 1888 and 1973 was undertaken by Derek Kowalchuk under the auspices of the Vancouver Maritime Museum, with photographic documentation by Michael Paris. Funding for the documentation of *Beaver* artefacts, notably the boiler, was provided by the International Brotherhood of Boilermakers, Iron Shipbuilders, Blacksmiths, Forgers and Helpers, and the Heritage Trust. Fred Rogers shared details of his 1960–1964 dives on the wreck and dived with the author and Thomas F. Beasley on 14 September, 1991 to point out site details, 31 years to the day from his first dive on the wreck.

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Preliminary report on observations made into the techniques and traditions of Maldivian shipbuilding

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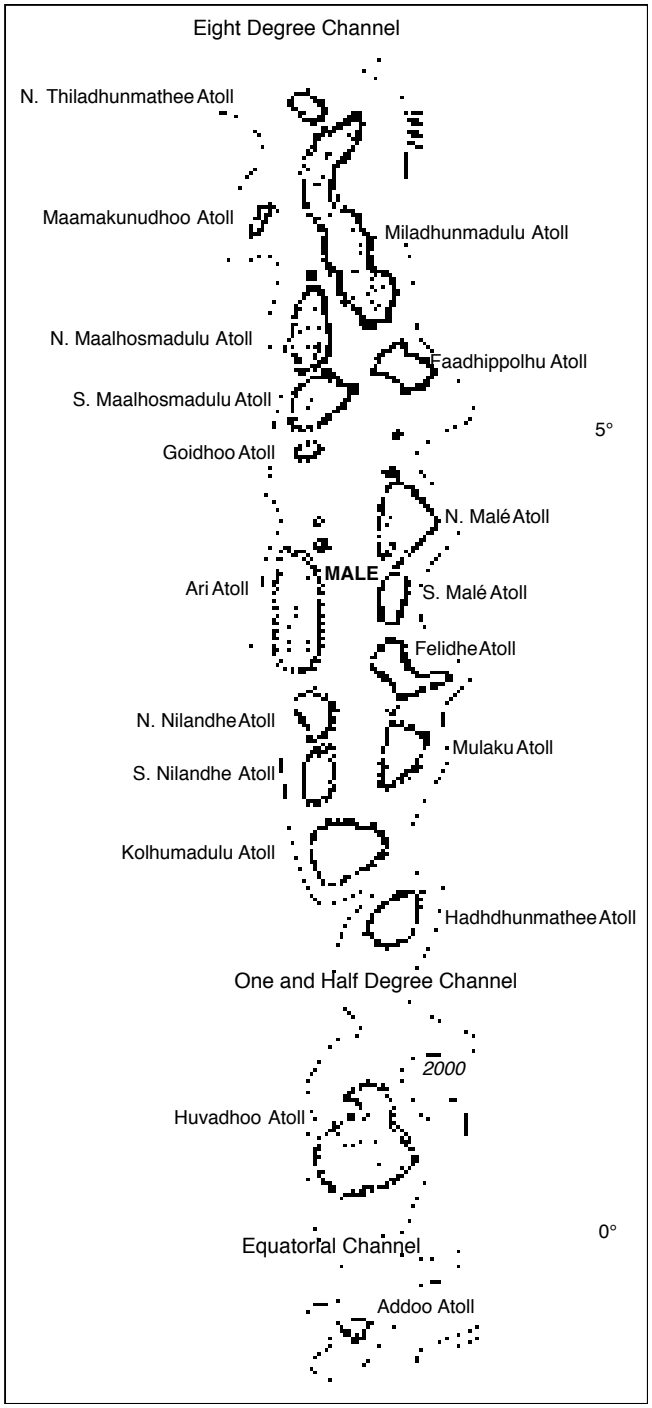

Figure 1A. Map of the Maldive islands.

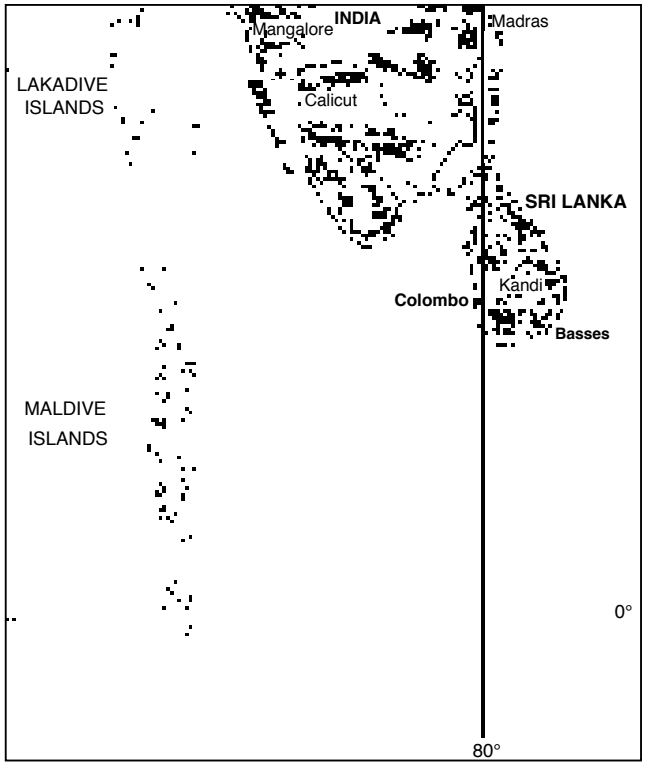

Figure 1B. Map showing the Maldives in relation to India and Sri Lanka.

Location

The Maldives is a group of coral islands lying in the Indian Ocean, the closest neighbours are India and Sri Lanka (which is 640 km in a north-east direction). The group is comprised of 1190 coral islands of which only 202 are inhabited. Each island is surrounded by a shallow lagoon which is enclosed by a coral reef providing protection from the sea. Hundreds of these islands, along with other coral growth, form an atoll. The total population is approximately 200 000 with Islam as the only religion. Coconuts and fish compose the local diet with the majority of the population dependant on their *dhonis*, fishing for skipjack and yellowfin tuna. Tourism now brings some prosperity with about 30 of the once uninhabited islands converted to luxury resorts for European divers. These holidaymakers are strictly segregated from the islands inhabited by Muslims.

Introduction

There are a number of hypotheses regarding the settlement and early history of the Maldives, which may or may not impact on the origins of the Maldivian method of boat-building.

There is insufficient detail in the historical accounts on the extent of the involvement of Maldivian craft in the maritime trade of the Maldives, to answer some of the questions posed by this research. It is not possible to gain a full picture of the nature or degree of this activity and therefore the influence other regions may have had on their boat-building technology. Neither is there sufficient information regarding the extent of trade conducted

Figure 2. *Dhoni* without deck planking showing the many thwart beams.

Figure 4. Stem post lashing.

by Maldivians sailing their own vessels to other ports or details of foreign vessels visiting the Maldives.

On one hand there has been a documented cultural transfer between the Islands and mainland India as well as Sri Lanka, and to a lesser degree Arabia. On the other, reference to, or evidence of, direct Southeast Asian influence on Maldivian culture seems elusive. However L. Varadarajan (in proc.) notes that:

> P-Y. Manguin has drawn attention to a cross fertilisation between the Southeast Asian and Chinese traditions of boat building which led to what he calls the South China Sea tradition. In view of the common trade routes on which ships of the Arabian Sea and Southeast Asia plied there is no reason to doubt that a similar hybridisation could not also have taken place in this sector. It is in this context the sailing vessels of Lakshadweep and the Maldives gain added significance.

Figure 3. Lugs positioning the thwart beams.

Observations

This research programme evolved out of observations made by Jeremy Green (October 1989) and Pierre-Yves Manguin (1988) who visited the Maldive Islands on separate occasions. Both Green and Manguin noted interesting features of Maldivian vessels that are not commonly found in the Indian Ocean region. The boat-building techniques which attracted this interest and which warrant further attention are:

1. The use of shell first construction, rather than frame first which is more common in this region.
2. The presence of thwart beams which are not found in the Indian Ocean region but are common in Southeast Asia and the Pacific.

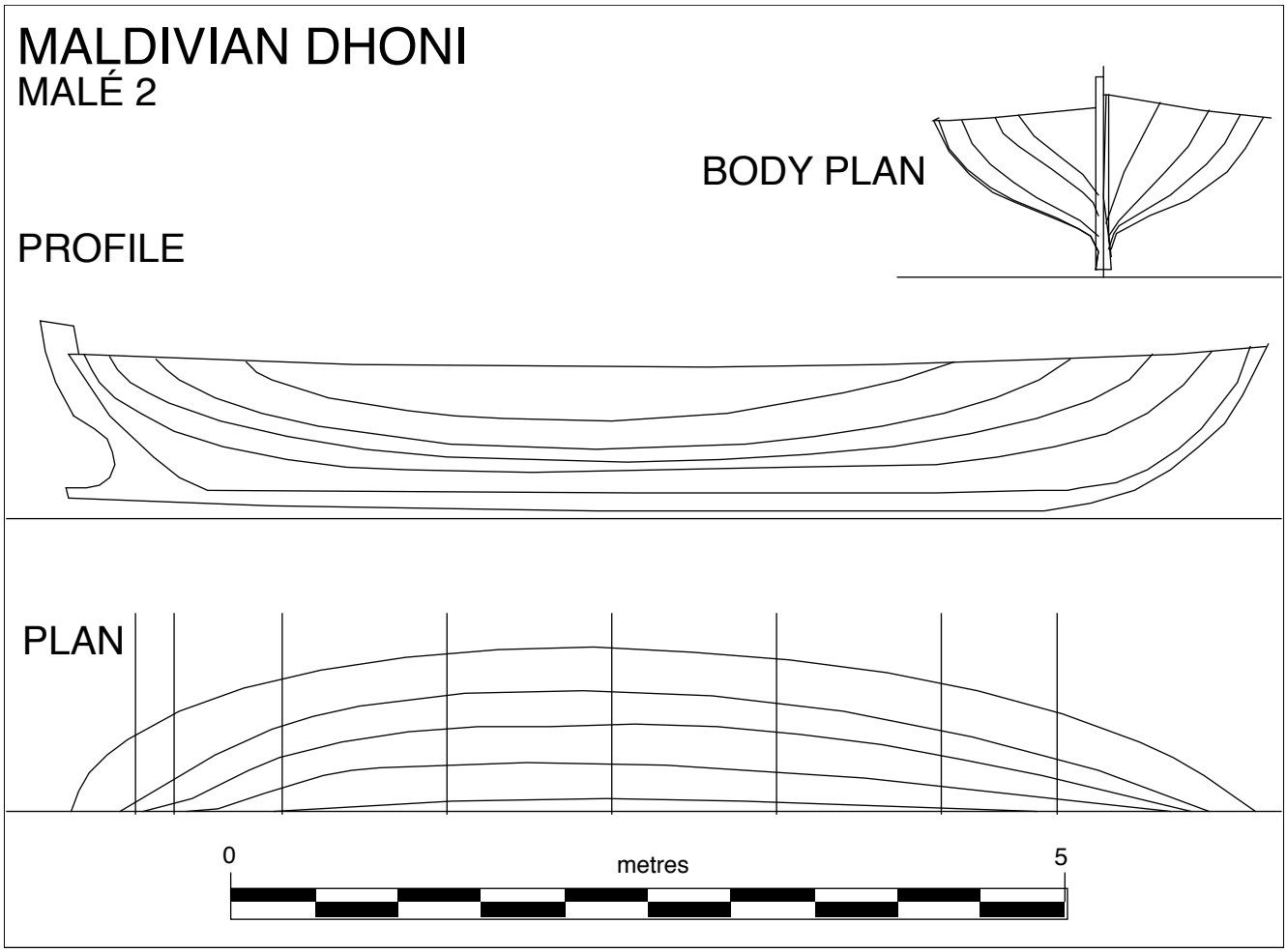

Figure 5. Body plan, profile and plan of a Maldivian *Dhoni*.

3. The presence of lugs which are carved on the inside of the strakes to locate the thwart beams and restrict movement in the fore and aft direction. This seems a remarkably similar construction to that used in Southeast Asia where the thwart beams are lashed to the lugs (referred to as a lashed-lug technique).
4. The strakes are edge joined with dowels.

The research team (including Jeremy Green, Tom Vosmer and Karen Millar) decided to research the boat-building techniques of the Maldive Islands to explore how this tradition evolved. This study became part of an Australian Research Council (ARC) grant to study traditional shipbuilding in the Indian Ocean region. It was fortunate that this expedition to the Maldive Islands could be timed to correspond with a maritime archaeological training programme which the research team was conducting in Sri Lanka. The Maldive field-work was undertaken over a two-week period from 22 March to 6 April 1992 during the fasting month of Ramazan.

Research plan

Research problem

The questions this research will ultimately endeavour to answer include:

- Is there evidence of changes in the boat-building techniques (1–4) employed now from those used in the past on the Maldive Islands?
- Have these boat-building techniques (1–4) arisen independently in the Maldives or are they the result of technological changes over time?
- If changes had been introduced, why were they adopted and what were the motivating factors for change? What local factors influenced the adoption of these new techniques, e.g. shortage or abundance of certain materials, lack of and/or availability of particular skills. Also, when did these changes occur?

In this longitudinal analysis of change we will need to consider the function of the vessels, the environment they were built and sailed in, the materials used in their construction and the skills and tools available to the Maldivians over time. It will be necessary to demonstrate the relationship and development of the traditional forms of boat-building within the Maldives as well as in the wider context of the Indian Ocean.

Field-work objectives

The intention of this field-work season was to observe and record the existing traditions, preliminary to a comparative study of boat-building in the local and wider region. The objective was to record vessels in Malé, in Alifushi and other islands if possible. Preliminary research had indicated that boat-builders were still building traditional boats on the island of Alifushi (in Raa or North Malosmadulu Atoll), as well as on Velidoo Island (which could be either Felidu or

Figure 6. Plank being held in place to determine the shaping that is needed.

Vaavu Atoll) (Fig. 1). There was conflicting information on the nature or degree of boat-building activity in the southern atolls, making this a less favoured destination. Due to the vast distances and our limited time, it was impractical to anticipate visiting islands in the south as well as in the far north (e.g. Raa Atoll).

Recording vessels

In the initial stage of the research, the aim was to record as many boats and their structural details as possible given the available time.

This included recording vessels that were in use, older vessels that were abandoned as well as new vessels being constructed which demonstrated the use of the four techniques of interest. Additionally, the team recorded the lines of a range of hull types and sizes. Comparison of these hull shapes will be made with the use of computer aided graphics.

Construction details were photographed and documented in scale drawings. These include:

- shell first construction methods;
- the thwart beam and lug arrangement;
- the methods used to join and caulk timbers;
- the types of timbers used; and
- the rigging fastenings, decking features and other details.

Oral histories

Oral histories of Maldivian boat-builders and elders are expected to contribute greatly to our understanding of both external and internal impacts on the more recent Maldivian maritime tradition.

Historical background

Monsoons

Malé, the administrative capital of the Maldive Islands (see Fig. 1), is a port of call on the direct route between Southeast Asia, Arabia and East Africa due to the monsoon winds. Shipping crossing from Southeast Asia to Southern Arabia during the winter monsoon (which blows north-east) called at Malé to trade, to provision and for shore leave. Shipping was almost always westbound since shipping from Arabia travelled directly to the Indian mainland with the south-west monsoons in summer, missing the Maldives (Forbes, 1941).

Trade

The main economic wealth of the Maldive Islands lay in their access to marine life and the coconut palm trees. From the historical background of the Islands it is clear that vessels from Arabia, India and China visited the Islands regularly to trade in dried fish, money cowrie, ambergris, tortoise shell, bonito (a large mackerel type fish, also called skipjack), coconuts and coir, among other goods. This trade was witnessed by Ibn Batuta on his second visit to the islands at the end of 1346 (Bell, 1940). The islanders traded with Calcutta and Sri Lanka in their own vessels, chiefly to import rice. Bell (1940:76) refers to the thriving trade in money cowrie:

> From the earliest times cowries, the well known small shells *Cypraea moneta,* a monopoly of the Maldives, formed the sole currency; and had been regularly exported to India, Arabia, Africa, and other places to be utilised both for easy medium of exchange as well as for ornament. As late as the 17th and 18th century it attracted the serious commercial notice even

Figure 7. Carpenter using a mortice gauge to indicate the wood to be removed.

Figure 8. The excess wood was removed with an axe before being adzed smooth.

of the Dutch in Ceylon. In the 20th C such trade as there may be has sunk to complete insignificance, cowries having become virtually a drug in the markets of the outside world.

The Maldive Islands played a leading role as a commercial centre of the Indian Ocean with its many items of export and was a convenient intermediate stop at the centre of the Indian Ocean. The whole of the export and import trade of the Maldive group has always been conducted at Malé to which the produce of each atoll was brought in native boats. Malé is still the administrative capital of the Maldives and it was our initial destination before heading off to the local islands.

FISHING

Smoked skipjack (*bonito*) and yellow fin tuna (*mas*), were traded against essential commodities in Minicoy (Island directly north of the Maldives and West of Cochin, India) and the Maldives. The reason why tuna fishing did not develop on other islands in earlier times was because using the traditional pole and line method of fishing, success depended on access to adequate quantities of the requisite bait fish. These bait fish have very selected habitats. Minicoy and the Maldives have a plentiful supply of these fish. The Maldivians developed their craft specifically for their fishing activities. Despite the variations in the size of the boats, the method of plank fastening is the same in all the Maldivian islands (Varadarajan, *in proc.*).

Vessel Types : Function

MAS DHONI OR *MAS ODI*
: These are the only *dhonis* with a curved prow (*moburi*) and are the fishing *dhonis*, *mas dhoni* or *mas odi* and sometimes the *satari dhonis*. Length (± 9–15 m).

BANTHELI
: Used to take passengers and cargo and has a small toilet. It is bigger than a supply *dhoni* which is the only difference.

SAFARI DHONI
: Has living accommodation for guests. There is no Dhevidi name for safari *dhoni*. Length (± 15 m).

SATARI DHONI
: Is used for carrying passengers. Length (± 9 m).

WADU DHONI
: Small fishing boat with a sail.

Malé observations

Recording began in the Malé shipyard which is situated on the north-east shore of the island, a short distance from our accommodation.

The shipyard had more than 20 *dhonis* in varying stages of disrepair; some were modern powered boats, others were older sailing vessels. The team chose to record vessels which had been constructed using the four techniques of interest. Lines of these hulls were taken using a tape measure fixed to the ground as the baseline, string fastened across the width of the vessel to indicate the stations and a plumb bob attached to a thin measuring tape to give the height off the baseline. A computer graphics program (MacSurf) was used to develop the hull shape from these lines measurements. Construction details were photographed and drawn.

An additional feature of interest was seen on an old *Mas Dhoni* (fishing boat). Lashing penetrated the stem post, though the gunwale and around a short turned spar which was used to attach the foot of the sail. The lashing is called '*kanikuredhibai*' and we were told that this was to add strength.

Alifushi observations

In the Maldives most people return to their home island during Ramazan. We were fortunate that during our stay on Alifushi, which coincided with Ramazan, a group of traditional boat-builders had returned to Alifushi and had decided to build a *dhoni* during this period instead of resting. We were extremely lucky to be able to witness the progress of this *dhoni*, which was being built on the north-east shore of the island. Much of our time was spent recording our observations of the construction process since this provided the greatest insight into the techniques used. A number of other boats were seen on Alifushi which were partially complete, however craftsmen were not working on these at the time. The State Trading Organisation's modern boat-yard had also closed for Ramazan, however viewing these boats provided an interesting contrast in style to the traditionally-built *dhoni*.

Sequence of hull construction— Alifushi boat.

The chief shipwright, Hassan Gasim, has made 60 *dhonis* He began boat-building when he was 25 years old. When

Figure 9. The new plank being fitted to the hull which has been prepared with cotton wool.

we arrived, the boat had been constructed up to about the sixth strake in the shell first tradition. The first two planks were luted with coconut shavings, cotton wool had been used for the rest of the seams.

The planks had been soaked for two days in the sea and then twisted into shape under tension in the sun. A plank was held roughly in place against the hull to determine where to shape and shorten it. Blackened string was used to mark by eye, the wood that is to be removed. This wood was adzed out and the butt joint at the hood end was carefully bevelled using soot. Blackened string was used to mark where the dowel holes were to be drilled. Once this had been set, dowel holes were drilled in the plank.

Thin dowels (pegs) were used to guide the fitting of the strake to the soot marks, they were later removed. The plank was sometimes fitted from the butt end.

The new plank was then fitted to the hull using the pegs and a mortice gauge was used to mark how much of the new plank needed to be cut away to fit. The gap at either end of the plank is equal to the width of the mortice gauge which was run down the whole length of the plank to mark the wood that is to be removed. The carpenter then marks both the underneath and the top surfaces which also gives the angle of the bevel. After the surplus wood was cut away with an axe it was adzed smooth.

The plank was fitted three times using the pegs with the sooted surface and then adzed each time to fit more closely (the black marks were adzed away). The dowels were shaped to fit the holes in the new plank. The upper surface of the plank on the hull was then painted with blue paint and cotton wool applied.

The new strake, with the dowels inserted, was brought to the hull and, starting at the aft end, was knocked in using a large wooden, flat-topped mallet. The boat-builders moved forward easing the pegs into the holes with the aid of a wooden plank with a notch cut out of it to twist it to the right shape. Once the whole plank was fitted in place, the rounded tops of the dowels were sawn flat and hammered down.

The strake was then shaped using a long piece of sooted string (this measuring string is covered with burnt coconut husk) which was run from amidships aft and then forward. One end was held at a predetermined point on the uppermost end of the strake. The person at the other end determines the shape and the position of the line by eye and twangs the taunt line which leaves a mark or dark line on the strake. The man at the other end follows the mark and presses the string to the mark to create the necessary tension and to allow a curve to be created moving along at approximately 10 cm intervals. The person who was determining the direction moved the string outward and inward according to the line or curve he wanted to create. The mark showed where the strake was to be axed away (Fig. 6). The aim was to leave the full width of the plank amidships and taper it off toward the stem and stern. The inside surface was then adzed and planed to give a smooth finish.

A series of long dowels fastened the keel to the hull. They passed through four planks and exited at the bottom of the keel on the opposite side that they entered. These dowels were driven in from the bottom and a hole was dug in the ground to allow for the length of the dowel and to enable them to be hammered in. The holes are drilled from the top

Figure 11. Evidence of the rotting effect on coconut wood lugs.

Figure 10. Lugs holding the mast step frame in position.

down indicated by the irregular pattern of the exit points along the keel. The dowels exit on the extreme bottom of the keel where the hull shape was a sharper V (stem and stern areas) and where the hull shape was flared (toward midship) they exit at the side of the keel.

Added strength was achieved with dowels penetrating horizontally through the bottom of the garboard strake on one side, though the keel and through the garboard on the other side. The dowels, the frames and the stem and stern-post were made from local wood.

Changes from the traditional techniques

Heavy lugs were only found on the older vessels which were made of coconut wood with the modern *dhonis* (made from imported timber) having no or only very light lugs carved on the strakes. Often the lugs are only found on the modern *dhonis* to position the mast step frame. It is too difficult and expensive to cut the hardwood for lugs, as well as this, imported timber only comes in two inch (5 cm) thicknesses.

Ali Ibrahim who has built 60 *dhonis* as well as model boats, told us that 'The strakes used to be made with lugs; they are not now made with lugs since they go rotten when the water gets in between the plank and the frame'. We found part of an old *dhoni* which had heavy lugs showing this rotting effect. The water gets between the thwart and the lug and rots the end grain of the lug in way of the thwart.

Dowels

A discussion about the length of planking dowels with Ali Ibrahim revealed that shorter dowels were used 20 years ago. The boat-builders on this island conferred and a change was made to longer dowels which penetrated through three planks rather than two. This was no doubt made possible with the introduction of the power drill, since manual drilling through the width of three planks would not have been feasible in earlier times.

There is reference to dowels being used on Maldivian vessels in 1854. Henry Coleman Folkard (1854: 259) notes:

> The vessels used by the Maldive islanders are of very ancient appearance, and have many peculiarities, no other vessels being built of the same material; they are constructed chiefly of cocoa-nut wood, there being no other in the islands suitable for the purposes of naval architecture. The planking is pegged together with hard wooden pegs: the large boats are particularly strong.

Sewing tradition

Manguin (1985) refers to early accounts of Maldivian shipbuilding which mention the existence of a sewing tradition.

Ma Huan who visited the Maldives in 1413 and 1421, provides us with a clear description of the ships built there:

> …they never use nails; they merely bore the holes, and always use their [coir] ropes to bind [the planks] together, employing wooden pegs in addition; afterwards, they smear the seams with indigenous pitch; no water can leak in.

Similarly, Correa described Maldivian craft taken in 1503 on the Indian coast near Culicut:

> …they were made of coconut-tree timber assembled with wooden pegs, without any [iron nails] and the sails...

Barbosa elaborates on the fact that the Maldivians

> …build many great ships of palm trunks, sewn together with thread, for they have no other timber,...

Hassan Gasim suggested that they used to sew boats on Addu (Seenu Atoll) and Huvadhu Atoll and Maliku Island (south of India—Laccadives / Lackshadweep). Ali Ibrahim did not know of sewn boats being built in the Maldives but has heard of sewn boats from Maliku. His father and grandfather were both boat-builders. He stated that boats in the old days were not so broad beamed thus enabling more fish or cargo to be carried. They would have a dugout keel when larger trees were available, which is uncommon now. It became obvious that sewing had not been used in the lifetime of the older men on Alifushi.

Velidhu Island observations

The team visited Velidhu Island in Noonu Atoll on their return form Alifushi Island. A number of vessels were being built there. The first seen was a *mas dhoni* built up to the turn of the bilge, the frames were inserted at the 14th strake. This contradicted what we saw in Alifushi where the whole vessel was built shell first before the frames were inserted. The vessel was built of a mixture of foreign and local woods (*kani* and *midhili*). The mast step and upper stern was made with *funa*, *kani* was used for the lower stern-post and coconut husk was used to caulk the hull. There were 16 floors not counting the small piece aft of the stern. The boat had been started

one month previously and the five carpenters would be finished in another month, after the end of Ramazan.

A *safari dhoni* was being built in the traditional fashion. It had been pulled out of the hole in order to finish the cabin. The rudder was a mixture of dark wood (*kani*) and lighter wood (*midili*) and was caulked with coconut. The rudder timber was not good and the boat was generally poorly made.

A *wadu dhoni* (small fishing boat with a sail) was built on a reused dugout keel, the rest of the boat structure was new, using local wood and *diggar* on some of the planking.

We noticed a half-finished *Bantheli* (passenger and cargo boat), made of coconut wood which had lugs where the mast step would be. The planking was about half the width of a boat built using imported wood and it was caulked with coconut shavings. The contractor had run out of money three to four years previously leaving the boat in its construction hole.

Summary

FUTURE RESEARCH

On the basis of the trade activity that flourished between the Maldives and other nations, my expectation is that we will find a combination of factors, both internal and external to the region, which have impacted on Maldivian society. This may or may not have given rise to technological change.

We will need to research the possible ways that change could have come about in Maldivian society; through innovation, through the diffusion of ideas, by economic and/or other (environmental–social) constraints or pressures. I believe there will be no one prominent impact but rather a combination of these factors which together have resulted in the present form of boat-building. The aim is to correlate the ethnographic and archaeological evidence presently available.

The proposed research may provide an understanding of how various influences impacted on Maldivian society. For example, did traders stopping in the Maldives repair and/or maintain their vessels while at the islands, thus allowing others to see and be influenced by the methods they used? Perhaps visiting vessels remained at the islands for an extended period of time allowing some cultural transfer between the locals and the sailors to occur.

From these preliminary observations it appears that certain techniques have been perpetuated and further research may demonstrate a continuity of tradition. The aim is to explore the reasons for this and for discontinuity where techniques have been discarded. The factors which may influence a culture to absorb and accept some external influences and to reject others will be explored e.g. are there resources and skills available to sustain the alternative ways offered. We will need to begin this long term study by researching the society, the economy and then the boat-building technology. It will then be possible to make comparisons with boat-building techniques in the Indian Ocean and Southeast Asian regions.

Nomenclature of Maldivian Terms

FUNA	- upper stem post timber
FUROA	- axe
HIRUDHU	- lower stem post timber
KANIKUREDHIBAI	- lashing on the stem post for attaching the foot of the sail
MARUTHEYO (*mahteeyo*)	- small sledge hammer (with a metal head)
MIDHILI	- stern-post timber
MUGURU	- wooden mallet (huge), small ones have the same name.
ODA	- adze

Short List of Maldivian hardwoods:

FUNA	- Hardwood used for planking,
HIRUDU *	- Hardwood used for stem, stern and frames
KADDU *	- Very hard wood, used for the keel, grows in the North atolls, famous in Neykurendhoo Island (Haa Dhall Atoll)
KANI	- Hardwood, takes a long time to grow, and 5–10 years to season, buried near seashore. Used for frames and planking.
KUREDI	- Small trees are used for treenails and the larger trees for frames.
MIDILI *	- Hardwood used for the interior e.g. thwarts, top planking. Not used much today. South Thiladhunmathi Atoll. This wood takes a long time to grow.

* Used most frequently

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Underwater archaeology as an academic discipline

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Just as different archaeological sites demand different approaches, requiring different techniques, there are different approaches, under different circumstances, to the education of underwater archaeologists. I will talk only about the role of the university, and how it has related to my own group, starting at the University of Pennsylvania in 1960.

By 1960 underwater archaeology around the world was exploding. The *Vasa* had begun its long trip to the museum where it is now so splendidly displayed. The Viking ships at Roskilde Fjord had been mapped. The Civil War ironclad *Cairo* had been located in the Yazoo River. And in 1960 the discovery of fur traders' artefacts soon led to what is known as 'white water archaeology' in Minnesota and Canada.

In the Mediterranean 1960 was a turning point because it was then that an ancient shipwreck was excavated in its entirety on the sea-bed for the first time. This was the wreck of the late Bronze Age ship that sank off Cape Gelidonya, Turkey, in the 13th century BC. Because the excavation was the first in the Mediterranean directed by a diving archaeologist, it is said to have begun a new chapter in the history of underwater archaeology in the classical world.

I should put 'diving archaeologist' in quotes, because I was that archaeologist, and I had made only two dives prior to arriving at the site—one in a swimming pool in America and the other off a beach near Istanbul. As a graduate student in classical archaeology at the University of Pennsylvania, which sponsored the excavation, I depended constantly on advice from Peter Throckmorton, who had located the site, and Frédéric Dumas, chief diver for the expedition. From Dumas I learned how to chisel free from the sea-bed great lumps of cargo-bearing concretion, and how to raise them to the surface with lifting balloons. From Throckmorton I learned of airlifts, and the importance of having a darkroom on site for enlargement of daily underwater photographs.

But my education already played a role, for I had already attended, as part of that education, the American School of Classical Studies at Athens. There I had the good fortune to assist in the excavation of the Bronze Age city of Lerna. This required me to remain in Greece an additional year in order to study and catalogue and interpret the finds from my trench. Thus the approach I took to the sea-bed at Cape Gelidonya was that of an archaeologist rather than a diver. As Throckmorton (1964) later wrote in his *Lost Ships*, I nearly drove him and Dumas mad by slowing the excavation while I tried to understand the site and develop methods of making plans as accurate as those made at Lerna. But, as Throckmorton also wrote, he concluded that mine was the right approach.

Education, however, played a far larger role in the excavation at Cape Gelidonya than my training in Greece. What we raised that summer was not spectacular: 34 flat, four-handled ingots of copper; a quantity of scrap bronze, mostly the fragments of agricultural implements; pottery so badly broken that only one piece, a Canaanite lamp, was intact; 60 small, shaped stones that proved to be pan-balance weights; some stone implements; mushy tin oxide; and fragments of wood so small we still cannot be certain that they were even parts of the hull. Yes, we did have a number of scarabs and a fine Syrian cylinder seal, but taken as a whole the assemblage was hardly worthy of a major museum display.

What made the site so important were the historical conclusions drawn from it and its study.

In 1960, virtually all preclassical archaeologists believed that the Mycenaeans, or Bronze Age Greeks, held a monopoly on maritime commerce in the eastern Mediterranean. And some believed that four-handled copper ingots and most Cypriot tool types were signs of Greek influence, and even colonisation, on Cyprus. Thus, during its actual excavation, I naturally assumed the Cape Gelidonya wreck was Greek.

From research that followed the excavation, however, I concluded that the ship lost at Cape Gelidonya, although its cargo originated on Cyprus, was almost surely Canaanite in origin. Study of Egyptian tomb-paintings and other evidence further convinced me that the Canaanites, or Bronze Age Phoenicians, played a significant role in sea trade, especially in metals. And study of the broken tools on the wreck led me to conclude that Cypriot tools in general were inspired by Near Eastern, not Greek, types.

I doubt that I, or other archaeologists, would have reached these conclusions without the unique education that luck, or fate, had dealt me. For before going to Greece to study classical archaeology, and before beginning doctoral studies in Bronze Age Aegean archaeology at the University of Pennsylvania, I had received a master's degree in Near Eastern archaeology from the Johns Hopkins University. Thus, with graduate training in both Near Eastern and preclassical Aegean archaeology, I could view the Cape Gelidonya finds from two perspectives, with neither a hellenocentric nor Semitic bias. I had no preconceived ideas to lead me astray, but let the evidence lead me to what were then considered revolutionary historical ideas.

Of course the proper education in languages made possible other discoveries that might otherwise have been missed. I would not have understood the significance for Homeric studies of the brushwood dunnage at Cape Gelidonya had I depended only on translations of the *Odyssey*, rather than the original Greek, for no English or German version that I first consulted had accurately translated Homer's words. And although I had chafed at having to learn German as well as French for a doctorate, it was only that which allowed me to read almost everything written on Bronze Age copper ingots before 1960.

You can see why I believe that underwater archaeologists should be trained in the archaeology and history and languages of the areas and periods in which they work. No scholar would excavate a terrestrial Bronze Age site in central

Asia Minor without a background in Hittite archaeology. Requirements for an excavation permit in an increasing number of countries include a doctorate, the demonstration of the ability and will to complete a book on the subject area. This is why I do not approve, in general, of the short courses and certificates in 'archaeological diving' offered by various professional diving instructors' groups. Archaeology has little to do with finding old things, no matter how carefully they are raised, recorded and conserved. As a rule we in the Institute of Nautical Archaeology spend two years on research and publication for every month we dive.

Although an increasing number of countries have begun to treat shipwrecks as archaeological sites no different from those found and excavated on land, this is not universal. One need not be a trained archaeologist to excavate a wreck in France, although permits are reviewed annually by the Department of Antiquities. One need have no proven knowledge of Spanish or Spanish colonial history to excavate a Spanish wreck in the New World. And treasure-hunting is still legally allowed in too many places.

I have stressed those parts of my academic training that were of benefit to the interpretation of the Cape Gelidonya shipwreck. But I have taken no courses in ancient seafaring. I knew nothing of ships or ship construction. And nothing of the conservation of underwater finds. Nautical archaeology—the archaeology of ships—was not then an academic subdiscipline of classical or Near Eastern archaeology. Fortunately, the Cape Gelidonya wreck was not nearly as well preserved as the wreck we are excavating today.

And that leads to the difference in our field-work now and in 1960. For the past nine summers the Institute of Nautical Archaeology has been excavating another Late Bronze Age ship, from the 14th century BC, at Uluburun in Turkey. Had we begun our work at Uluburun rather than at Cape Gelidonya in 1960, it would have been a disaster. We would have destroyed a most important site. We would not have known how to map the tiny fragments of wood. And even if we had, we would not have known what they meant. Nor how to conserve them. Nor how to reassemble them and make research models and hull replicas to test. We would have hosed the mud from the ship's intact jars, losing clues to the variety of food carried on board. Then we would have simply soaked our finds in fresh water before putting them into storage or on display. That was the extent of our conservation in the early 1960s.

Why has our work improved? Some improvement is due simply to experience: excavators only 90 feet (27 m) deep at Cape Gelidonya were often confused, and thought themselves frighteningly deep at 130 feet (39.6 m) on other wrecks we excavated in Turkey in the 1960s. Now some of these same excavators work routinely 185 feet (56 m) deep at Uluburun.

But there is more to it than greater experience. And it has little to do with advances in equipment or technology, with the exception of improved wide-angle camera lenses. I say this with some irony since I spent most of the 1960s developing new gadgets, such as the first private research submarine ever built and sold in the United States, a method of mapping underwater by stereo photography, and a new kind of submersible decompression chamber; we were the first people ever to locate an ancient shipwreck with side scan sonar.

The Uluburun site was found by a Turkish sponge-diver, as was the Cape Gelidonya wreck, not by remote-sensing equipment. It is being mapped mostly with metre tapes, as back in 1960, and the same airlifts and chisels and lifting balloons we used in the 1960s remain our tools. Diving gear has not changed much. The difference in our excavations today and a third of a century ago stems primarily from academic training. Nautical archaeology, or maritime archaeology, both on land and underwater, has become an academic discipline like classical archaeology or Near Eastern archaeology or Middle American archaeology or post-medieval archaeology, although it cannot be divorced from them.

Most divers at Uluburun are graduate students of nautical archaeology at Texas A&M University, where the Institute of Nautical Archaeology has been based since 1976. Indeed, the director of the excavation, Cemal Pulak, is one of those students. I turned the site over to him because he can excavate it better than I could. He is better trained.

He and the other students at Uluburun have had courses in the history of wooden hull construction, as well as a laboratory course in wooden hull reconstruction. The most accurate plans are of no help if the archaeologist who makes or uses them cannot recognise every part of a wooden ship. Fragments of wood that were meaningless to us in the 1960s are familiar to these students. Sheila Matthews, with an MA from us, recently reassembled in the Bodrum Museum of Underwater Archaeology in Turkey, from a thousand fragments of wood, a Late Byzantine hull that she had helped excavate. Another former student is building a tenth-scale research model of the vessel for study and eventual display.

Such students have taken courses not only in the specific history and archaeology of the lands in which they wish to work, and have learned the appropriate foreign languages, both ancient and modern, so they can do their own archival research in Spain and elsewhere, but have also taken courses in the history of maritime commerce and naval warfare. They can interpret their finds with the kind of knowledge that can be gained only through years of study. I mentioned earlier my reservations about short courses in underwater archaeology, which sometimes overly emphasise the technical aspects of underwater excavation. In none of our courses do we even mention techniques of survey or excavation. Students learn these by serving summer apprenticeships on our projects.

Students, in return, bring expertise to field-work. Cheryl Haldane began the study of palaeobotany while completing MA work at Texas A&M, and followed that with a second MA in archaeobotany, from the University of London. Now she has identified figs, olives, grapes, whole pomegranates, coriander, wheat, barley, almonds, sumac and safflower on the Bronze Age wreck at Uluburun. Another of our students has studied zoo-archaeology in order to interpret the animal bones we find on all wrecks. And other students have spent entire years becoming expert in such things as anchors, rope, or ivory cosmetics boxes shaped like ducks.

We now require all of our students to take at least an introductory course in conservation, and many take a

second, advanced course. Conservation is much more than stabilising artefacts for museum storage or display. It dramatically expands the knowledge one can gain from an archaeological site. And our improved conservation does not come from technological advances so much as from education, for most conservation techniques used today were state-of-the-art a quarter century ago, except for those that require exotic equipment that most laboratories cannot afford. One of our students, Claire Peachey, spent a year at the Institute of Archaeology in London devising a method of conserving corroded metals on the sea-bed at Uluburun, to prevent their disintegrating on recovery. Another developed a method of treating waterlogged wood with sugar. Others have experimented with new epoxies for casting iron objects that have vanished through corrosion.

How else does the academic environment help our work? Student involvement leads to timely publication. The Cape Gelidonya publication was largely my doctoral dissertation. Most of the chapters in the final publication of the Yassiada 7th-century Byzantine wreck were written by students, and included Frederick van Doorninck's doctoral dissertation on the ship's hull. Half of the final report on the Porticello wreck was Cynthia Eiseman's dissertation. Thus, all three of the wrecks we excavated completely in the 1960s have been fully published, largely by student authors. Chapters in my *A history of seafaring based on underwater archaeology* (Bass, 1972) similarly sprang from term papers in an early graduate seminar on ancient seafaring I offered at the University of Pennsylvania.

Not only does student participation speed the publication of sites, but it enhances quality. Chapters written by students, anxious to prove their ability, are usually better than chapters by noted authorities who have reached the stage of their lives where they are distracted by administration.

My approach to a future shipwreck excavation will be to choose in advance several doctoral candidates, and say to one: "You are totally responsible for the cargo of amphoras and their contents, and you may write your doctoral dissertation on them". To another: "You are responsible for the hull, anchors, and ship's fittings, and you may write your dissertation on them". And so on. Then I can be sure that each amphora will be plotted accurately on site plans, raised carefully to the surface and emptied so that its contents are sent to the appropriate archaeobotanist, and its clay sampled for neutron-activation analysis. Each amphora will be drawn and photographed with care, and its graffiti copied and interpreted—even if, as Fred van Doorninck has done in the past few years, the student must learn Russian and Bulgarian and Romanian to follow the literature. The site should be ready for publication in ten years, the limit for doctoral work at Texas A&M University. The report on Cape Gelidonya was completed by a certain date because I was told that I would be offered a faculty position only if I completed my PhD that year. Of course there are other incentives to publish by those who work for museums or government agencies.

If I stress publication, it is because an unpublished wreck, no matter how carefully excavated, is a looted wreck. Underwater archaeology has little to do with the search for artefacts, and everything to do with the search for knowledge. Yet we know more about a number of wrecks salvaged by treasure-hunters than we do about many of the sites excavated by scholars, because the treasure-hunters have at least published popular books on their sites. Is it sometimes simply a case of the wrong people doing underwater archaeology, regardless of their academic credentials? University training cannot guarantee publication. The director of a shipwreck excavation recently said that although he is a professor, his teaching load prevents his having the time to publish, yet he annually returns to the romance of wreck diving. This is selfish and immoral. If one has all the data from a site, but lacks the time or funds to publish them, then he or she should remember that at Texas A&M University alone there are 48 MA candidates and 7 PhD candidates in the Nautical Archaeology Program, all looking for original materials to study for publication.

As part of our educational mission, we have attracted to our graduate program students from Greece, Jamaica, Japan, Denmark, Turkey, South Africa, Belgium, Canada, the United Kingdom, Peru, China, and the United States. We hope that some of them will start similar programmes in their own countries. Most will receive only an MA from us, and will pursue more specialised training in, say, Egyptology, medieval Arabic, classics, or post-medieval archaeology as doctoral work at other universities, although we urge some, while they are still our own degree candidates, to spend a year in residence elsewhere to get courses that our university does not offer.

Even so, our institute's record is not perfect. We have sent out excavation directors who did not know the languages of the people who had sailed the ships they were excavating. We aim for the day when such a situation will be considered old-fashioned, when each excavator has the best possible training. I would never tackle the excavation of a recent steamship, for example, for I know nothing of engineering or the naval architecture of steel vessels. Simply being an archaeologist does not qualify anyone to take on the study of the *Titanic*.

Let me repeat that I am speaking about what has worked for us. A university is not the only place from which to conduct nautical archaeology. I have stressed publication perhaps because we work abroad and thus have little control over how the museums of the host countries, usually pressed for funds, exhibit the material we have excavated. But knowledge is also disseminated to the public through museum displays, and we offer no training in museology. Only last month did I see the *Vasa* Museum for the first time, and my only visit to the *Mary Rose* Museum was within the past few years. Both were awe-inspiring. Nothing like them has been done by a university. The Maritime Museum in Fremantle, with its excellent publication record, displays shipwrecked artefacts far better than the artefacts we have excavated in the Mediterranean, Caribbean and Indian Ocean. Archaeologists working at home have a greater obligation to their own public through museum work; they are conserving their own national heritage, supported by public funds. Thus, their educational requirements are slightly different from those who work abroad. As are the requirements of

those who become government archaeologists and must protect and manage their entire maritime heritage, from canoes to steam vessels. They cannot be expert in the history and languages behind every ship wrecked on their shores.

When I say that the future of underwater archaeology lies in academic training, I do not belittle the great self-taught pioneers of the present. The next generation, with the added advantage of more academic training, should simply be even better. Some of my students are already more qualified than I to excavate wrecks.

The future of underwater archaeology rests largely in its acceptance and spread among academics as a normal part of archaeology. Fred van Doorninck, who revolutionised our field by demonstrating that a ship's hull can be reconstructed on paper from its fragmentary remains, had, like me, also excavated on land. As had David Owen, director of our Porticello project. And Michael Katzev, the first person to raise and restore a classical Greek ship. In 1966 I wrote that I looked forward to the day when no one would speak of underwater archaeology, just as they have never spoken of jungle archaeology or mountain archaeology or desert archaeology. If students of classical archaeology can learn the technical terms of classical architecture, coins, and pottery, they can surely learn the technical terms of ships. The study of ships should be a normal part of every archaeologist's training. To reach that stage, more programmes like ours should be instituted around the world.

It is so easy to learn to dive. And if you know what information it is you are after, common sense will lead you to determine how to get it, regardless of the circumstances.

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The *Vasa* Museum—popular maritime heritage

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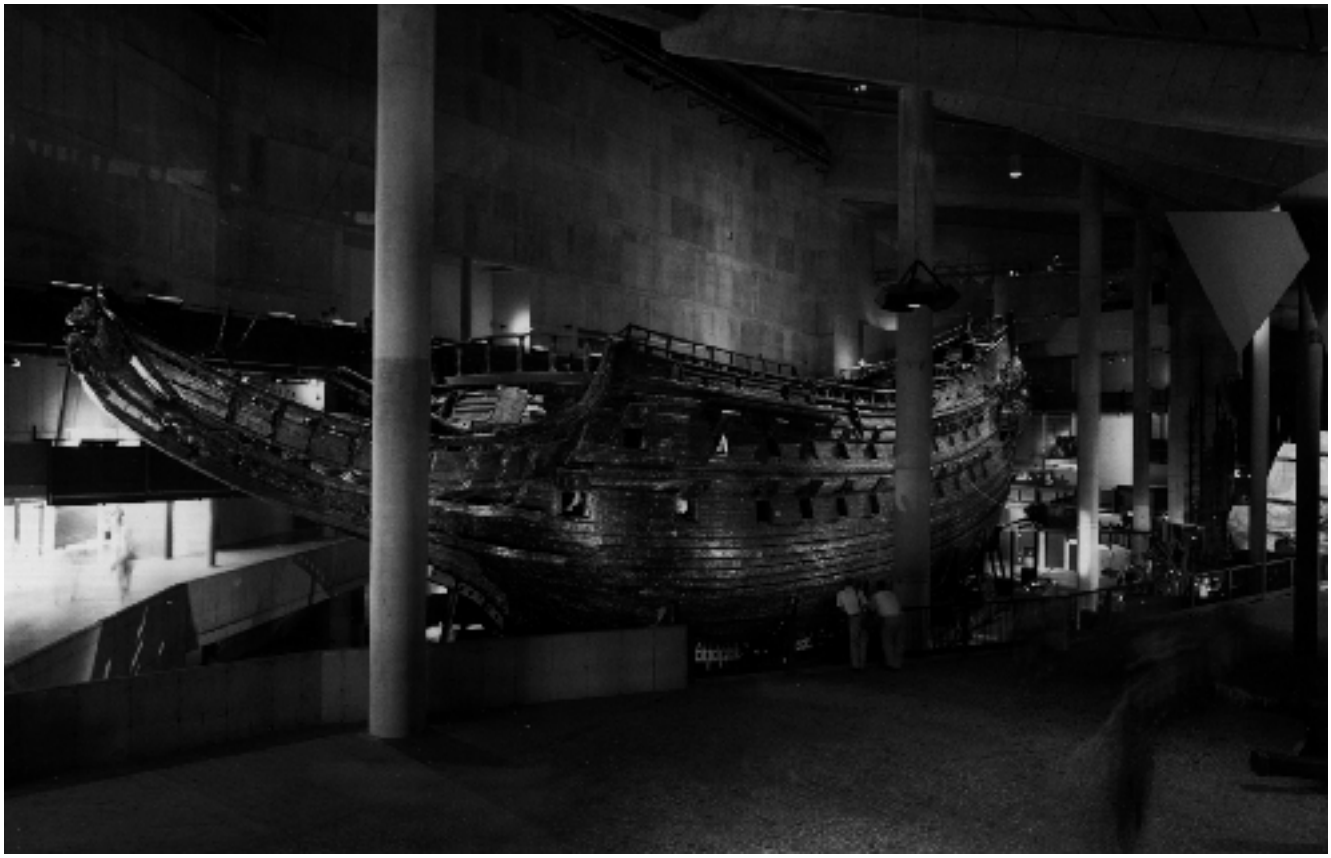

Figure 1. The royal warship *Vasa* in her new museum. The port side with open gun ports and the beak-head with its impressive lion. The entrance level is one of seven and represents the assumed water-line (Photo: H. Mammarskiöld, *Vasa* Museum).

Rediscovering a ship that sank long ago and salvaging it is to capture a time machine of a fascinating kind. We can thereby travel in time to peer into a society in miniature which ceased to function at a certain stroke of the clock and where, at best, all that shaped this particular society remains and can be studied. We have a rare chance for time travel to a miniature society reflecting the large society of which it formed a part.

The further back we proceed in time, all the more interesting does the ship become in itself. Soon enough we leave behind the time from which drawings, models and technical descriptions are available and it is the rediscovered ship that can alone tell us about all the technical details that can never be gleaned from oil paintings, drawings or engravings.

Something else that adds to the fascination is the intrinsic captivating capacity of 'treasures'—not necessarily gold or silver—recovered from the depths of the sea. Rediscovered and salvaged objects can in themselves enthral a visitor to a museum where they are exhibited. One has only to see the strong feelings that are still aroused today by the finds from the most 'romantic' catastrophe of all time—the loss of the *Titanic*. At an exhibition at the Maritime Museum in Stockholm in 1991, these discoveries attracted a full year's public in the space of six weeks.

Size also plays a role that is not unimportant. As an object, a ship is very large and exciting. Besides, if it has to be exhibited indoors, like the warship *Vasa*, so that it can be saved for posterity, it provides an impressive experience with an added dimension.

It was in 1956, in Sweden, that the private researcher Anders Franzén located the wreck of the proud warship *Vasa*, which had sunk ignominiously on its maiden voyage on 10 August 1628 even before it managed to leave the harbour of Stockholm. The ship then lay where it had sunk, at a depth of 32 metres, until Franzén succeeded in rousing enthusiasm for salvaging the *Vasa*. On 24 April 1961, the ship broke the surface of the water before the eyes of the assembled world press and radio and TV teams. The sensation was a fact. One of the largest warships of its time had entered our age—we had our time machine.

As a result of the extensive media coverage that it received, the *Vasa* rapidly became known world-wide. The rediscovery of the ship aroused the curiosity and interest of the public. It had an intrinsic captivating force that portended that it could become a magnet for the public. But the people involved in the project realized that the initial help given by the media had to be utilized professionally and be based on knowledge about the ship. It was necessary to work further, first on a national and

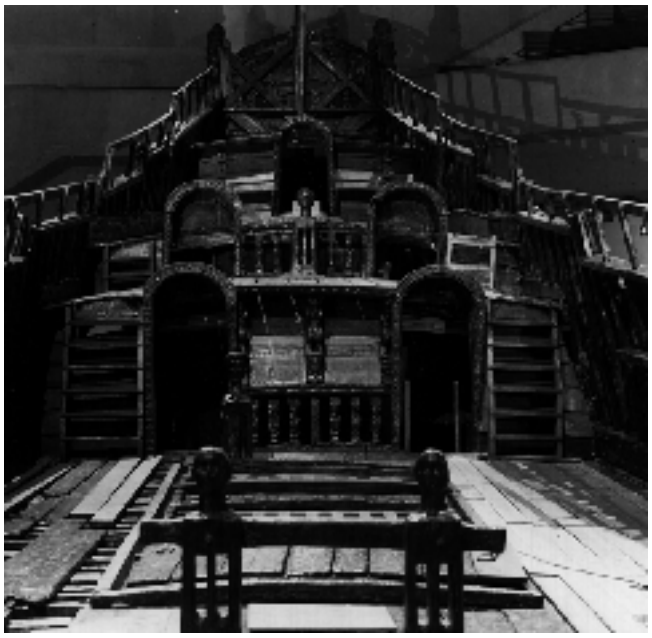

Figure 2. Detail of the *Vasa*'s upper decks. Foreground knightheads and bitts (Photo: H. Hammarskiöld, *Vasa* Museum).

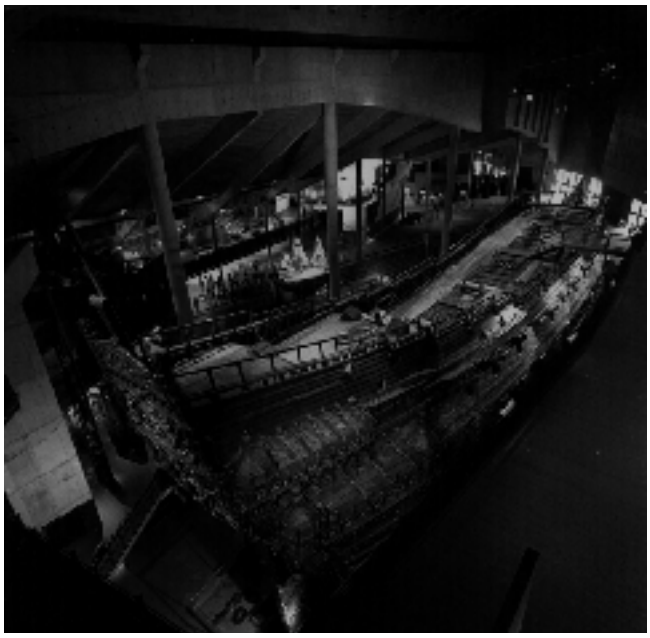

Figure 3. View over starboard stern section of the *Vasa* in the new museum (Photo: H. Hammarskiöld, *Vasa* Museum).

then on an international basis. For that reason, competent persons were recruited for informational and PR activity.

The temporary museum, christened Wasavarvet, was opened in early 1960. It was intended to serve as a combined workplace—where the ship could be preserved and restored—and exhibition hall, where the public could be admitted to see the ship and to witness the ongoing work of restoration and preservation. And the public continued to flock to the museum.

The views of the committee for the *Vasa* project were unorthodox for their time. Long before the concept of cultural tourism had been introduced, the committee realized that the *Vasa* was a cultural object of international interest which could become a cultural attraction for both domestic and international tourism. Accordingly, a professional information manager was hired, the first at any museum in Sweden. The museum was also provided with a souvenir shop and a restaurant, features which had been foreign to museum activities up to that time, but which were gradually to become self-evident in the museum world.

In 1964, Wasavarvet became a department of the then National Maritime Museum. It thereby acquired the status of a national museum, which meant guarantees for the future and a permanent museum staff to conduct its activities. At the same time, the public interest—large by Swedish standards—offered the prospects of a higher degree of self-financing than had been possible at other Swedish museums.

After the *Vasa* had been salvaged, two large tasks occupied the museum staff. First, the gigantic object of waterlogged wood, which could not be left to its fate to dry together with the thousands of loose objects that had been found, had to be preserved. Second, an attempt had to be made to reconstruct the ship. It is true that the hull was whole and in one piece, but about 12 000 loose constructional components were also to be fitted together like a giant jigsaw.

Preservation was carried out with the help of a new method worked out experimentally based on a Swedish patent for the treatment of waterlogged wood with polyethylene glycol. Loose objects could be treated in large vats at the preservation plant which was constructed for the purpose. On the other hand, the ship had to be treated by spraying all its parts on the inside and outside. This process continued from 1961 to 1979, before carefully controlled, slow drying could be begun.

The purpose of restoration, which started at the same time as preservation and was carried out concurrently, was to reconstruct the ship primarily by incorporating all the original parts that had been salvaged. It is true that it had been possible to salvage the hull in one piece, but the beak-head and aftercastle had been crushed and all the parts had now to be identified from among the thousands of loose constructional items found that formed the basic material for the restoration.

A specially interesting group of items found on salvaging were all the sculptures which had together adorned the *Vasa*—about 700 sculptures and carved items. As far as these were concerned, it was a matter of finding their original positions on the ship so that a true picture could be gained of how the ship had been decorated and of the principles underlying the selection of figures.

Scientific work and handicraft proceeded hand in hand in order to solve the problems that were gradually encountered. The warship *Vasa* belongs to an age when constructional drawings were not made. Instead, construction was based on a table of dimensions. Thus, much of the work of reconstruction consisted in piecing together, by practical means, the building fragments that were available.

The temporary museum, Wasavarvet, was to be more long-lived than had been expected. But despite its temporary character, it functioned well in many respects and the public came in large numbers. From the annual figure of 250 000–300 000 visitors during the first few years, the number peaked at 575 000 in the early 1980s.

The ship in its protective house was naturally the most important attraction despite the fact that the premises, of a temporary character, were not a fitting place for display. The building was cramped and did not allow much scope for viewing the vessel. At any rate, from two balcony levels it was possible to see the ship and follow the ongoing work of preservation and restoration. Some limited place was also available for a few exhibitions. For most of the time the exhibits consisted of finds from the equipment of the crew and finds from the equipment and decorations of the ship.

The need for a new, permanent museum grew more pressing with the passing years. It was not simply a matter of alleviating the shortage of suitable space for meeting the requirements and wishes of the public. The growing realization that the temporary premises were by no means satisfactory for maintaining the climate required by the ship for its future preservation was decisive in eliciting the decision by the government to build a new museum.

A Scandinavian architectural competition was held in 1982 for a new *Vasa* museum. The site was Gälarvarvet, the area not far from the temporary Wasavarvet that had been used by the navy for hundreds of years. The site had been abandoned by the navy towards the end of the 1960s and the area had been converted into a park adjoining the pleasure and recreation grounds on the island of Djurgården, much loved by the Stockholmers. The competition had more entrants than anybody had expected. The jury had no less than 384 proposals from which to choose.

The choice ultimately fell on a Swedish proposal, drawn by the Stockholm architects Göran Månsson and Marianne Dahlbäck. The museum that they drew for the *Vasa* corresponded well with the intentions in the programme specifying our requirements. As far as the ship was concerned, the first and foremost consideration was to make the future secure by providing the large ship's hall with an advanced air-conditioning system, since maintenance of the preserved ship is dependent on a very uniform and stable climate.

The first spadeful of earth was dug up in January 1987 and by December 1988 building operations had progressed far enough to permit the ship to be brought inside so that the building could then be completed. Following the salvaging operation, the *Vasa* had rested throughout on a floating concrete pontoon. Thus, the old protective house could now be demolished and the *Vasa* could be towed on its pontoon into the water-filled museum which stood with one side open towards the sea. When the *Vasa* was in place, the building was enclosed on the side, after which the water was pumped out and the ship's pontoon was lowered gently onto prepositioned slabs.

Parallel with the building work proceeded the work of preparing the basic exhibitions that were to be ready in time for the opening of the museum. The time available for making the practical arrangements for the exhibitions in the new building was very tight. The construction workers marched out in the middle of February 1990, whereupon the museum staff marched in. The solemn opening was scheduled for 15 June, which meant that only four months were available for implementing the decision to set up five basic exhibitions in time for the inauguration. In all, the exhibition programme of the museum comprises the gradual setting-up of nine basic exhibitions.

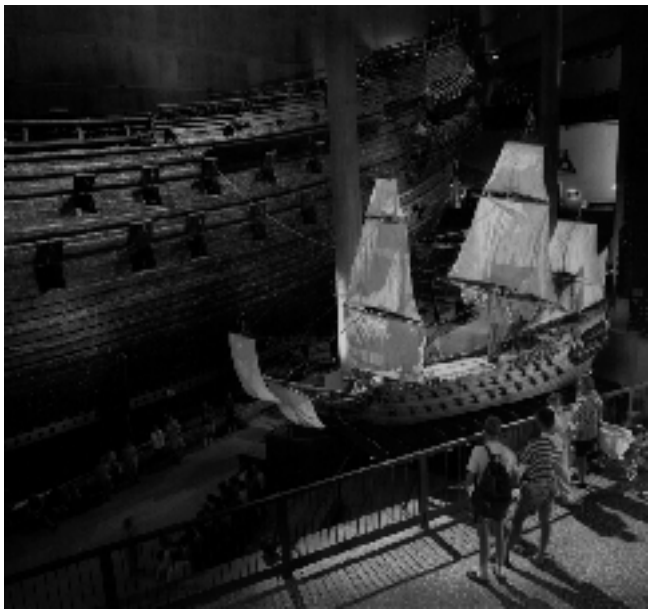

Figure 4. The 1:10 model of the *Vasa* Zeen beside the original vessel.

The opening of the museum was preceded by extensive marketing. The ship was even on show during the building phase in the summer months of 1989, when it lay in what was still a building site and not yet a completed house. The reason for this was that we did not wish to lose contact with all the tour operators who normally would have the *Vasa* on their programme for visits to Stockholm and neither to disappoint all those tourists who had journeyed to the capital to see the warship. The media were informed and Swedish and foreign journalists, representatives of news agencies, radio and TV, as well as representatives of travel agencies, congress organizers, authorized city guides, etc., were invited to special showings before the opening date.

Thus, on 15 June 1990, King Carl XVI Gustaf performed the solemn inauguration of the new *Vasa* Museum in the presence of the royal family and 700 invited guests. The museum was opened to the public on the following day and long, winding queues formed over the next few months. Expectations ran high and, when the stream of summer tourists had receded, the more difficult-to-entice Stockholmers also came. There was an attendance of 1 150 000 during the first year. Viewing the mighty warship from the year 1628 in this specially designed setting was a great experience.

In the ship's hall with its ample dimensions, the visitor can survey the ship from a good distance and can gain an impression of its lines and of the picture as a whole. From six different levels, the *Vasa* can be viewed from the keel right up to the top of the aftercastle, more than 20 metres above. And if viewers find themselves at a distance from the ship on one side, they can approach it all the closer from the other. The lighting is kept at a low intensity—not more than 100 lux—in the interests of preservation and has been arranged by a stage lighting expert in order to create the greatest possible effect. Placards placed near the ship bear

Figure 5. The lower gun deck viewed towards the bow after completion of the excavation.

texts in seven languages explaining what visitors see from the respective viewing points. The ship has been completely restored apart from the rigging. The *Vasa* will be equipped with standing lower rigging. The mainmast and foremast as well as ten of the ship's original sails have been preserved. It has been possible to make a reconstruction of the rigging, which we consider is very close to the original in appearance, although certain details may still not be clear.

The *Vasa* Museum is primarily a tourist museum, since the warship *Vasa* is unique. There is nothing like it in the world. Consequently, among the visitors there are also many people who do not know what a warship of that time looked like. It is not easy for them to imagine the enormous extent of the rigging above the ship. As an aid to understanding this and using the imagination to visualize the expanse of sails and the tangle of ropes over the ship's hull, the Maritime Museum's model-makers have built a fully rigged waterline model of the *Vasa* on a scale of 1:10, which forms part of the exhibition. In time, as greater certainty is gained about the way in which the extensive carvings on the ship were painted, the carvings on the model will be painted in the light of the findings.

An important element of the visit to the museum is the film about the history of the *Vasa* and how it was salvaged, shown non-stop in the large film theatre which accommodates 300 visitors. There is also a smaller hall which is intended to be used as premises for temporary exhibitions during the winter season and which can be used as a film theatre for 150 visitors during the summer season. The film is shown in a Swedish version with English subtitles but, for showings ordered in advanced, the commentary is available in 12 languages, including Arabic. The film has also been distributed to Swedish embassies and consulates throughout the world, also in cassette form, and is available to those who wish to borrow it.

The museum exhibitions are intended to set the warship in its context in time and space, to show it as a part of the life and culture of society, and also to give a description of the ship itself. A total exhibition space of 2 000 square metres is available for use for these basic exhibitions. These exhibition premises are located at different levels around the ship, from keel level up to various balcony levels. The open, large ship's hall and the *Vasa* as the hub around which everything else revolves make it easy for visitors to survey the museum and find their way in it despite its size. On the whole, wherever the visitor happens to be in the museum, he or she can see the ship or feel its presence.

We have deliberately refrained from making use of a single designer for the planned exhibitions. Instead, an exhibition team has been formed for each exhibition. Some particular designer has been engaged for several exhibitions, others for a single exhibition. The advantage of this arrangement is that repetition is avoided and, as a result of variety of form and manner of expression and of colouring and lighting, visitors experience change and stimulation when moving from one exhibition to another. The factual content is the responsibility of the museum's exhibition producers and a special exhibition group including representatives of the educational staff and information and marketing personnel.

Of the basic exhibitions presented in time for the opening day, one deals with Anders Franzén's rediscovery of the *Vasa* and the salvaging of the ship, another deals with the Swedish fleet and shipbuilding in the year 1628 as well as the foundering of the *Vasa* with the following salvaging attempts and divers' hazardous ventures. The exhibition is supplemented with a picture show describing the trial held after the loss of the *Vasa* in order to find one or more scapegoats for what had happened. A third exhibition describes the three master carvers who were responsible for decorating the *Vasa* and the result of their work. A fourth provides a vision of Swedish

Figure 6. A computer station containing two interactive programs about the *Vasa* (Photo: G. Ilonen, Statens Sjöhistoriska Museum).

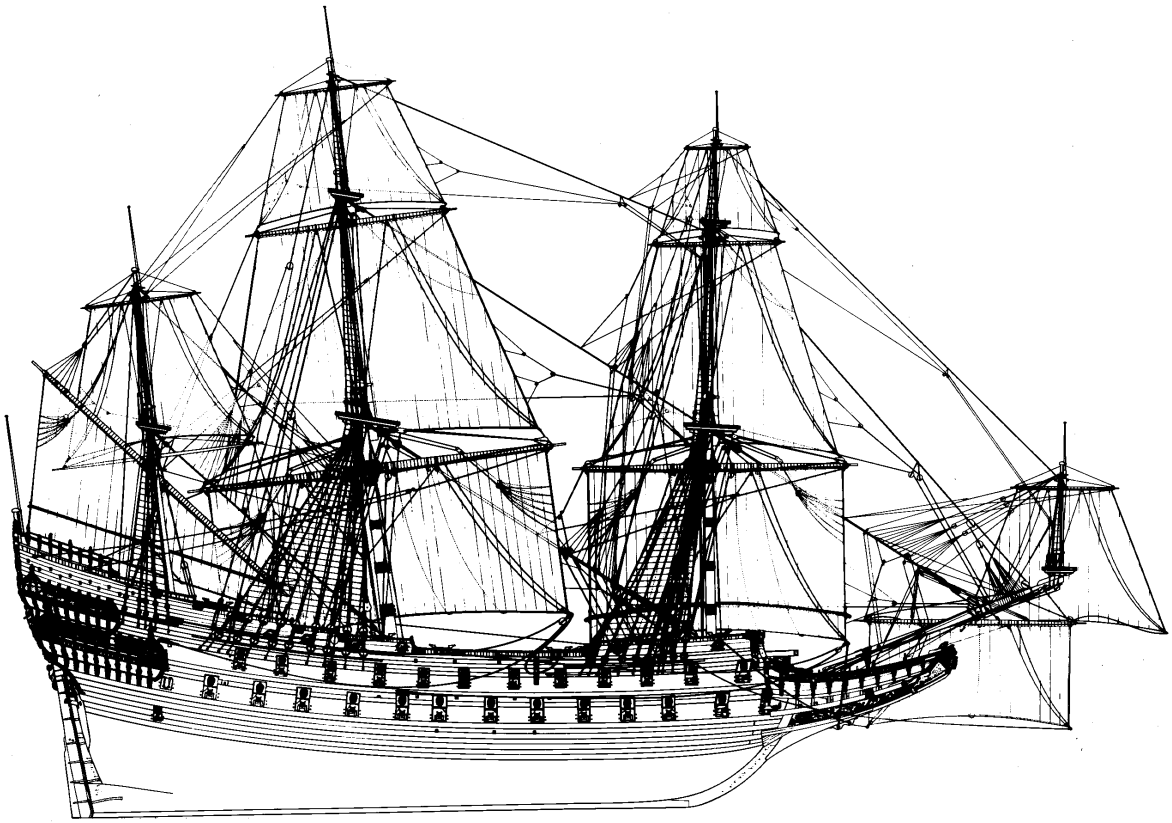

Figure 7. Rigging plan for the *Vasa*.

society in 1628 and its picture of the world. A fifth describes life on board ship. This takes place in the form of a reconstruction of the upper gun-deck, from the mainmast to the large cabin in the stern, built of solid oak in an exact copy of the *Vasa*. The reconstruction is supplemented with an exhibition that displays a number of the finds made during the salvaging operations and archaeological excavations. The finds span a range of materials and various social categories of ownership.

The sixth exhibition, dealing with sea warfare, was opened in the autumn of 1991. It is a compact and powerful exhibition which partly uses traditional exhibition techniques but which, in order to create an emotional experience, also utilizes special film and sound projection techniques in a hemispherical room. The next exhibition, which opened in the spring of 1992, describes shipbuilding in the early 1600s. In order to complete our basic exhibition programme, it remains for us to set up an exhibition dealing with the iconography of the ship's decoration, an exhibition about rigging, sailing and manoeuvring and an exhibition showing the results of the interdisciplinary research that a project like the *Vasa* can necessitate.

In fact an element of the last-mentioned exhibition has already been in place since the inauguration of the museum. It is a computer station called 'Computer Adventure', which has been set up in long-standing co-operation between the education department of the museum, the National Board of Education and IBM, which sponsored the entire project. A number of computers are provided here for use by museum visitors as instruments to enrich their knowledge about the *Vasa*. There is a choice of two interactive programs—'Close-up *Vasa*' and 'Sail the *Vasa*!'

In the program 'Close-up *Vasa*', the visitor has the opportunity, with the help of multimedia technology, to acquire information about everything concerning the *Vasa*—design, equipment, the life of the crew, decoration of the ship and much else—through commentaries, drawings, and pictures in black and white and in colour. The program also incorporates an encyclopaedia, in which the visitor can look up topical words and have them presented by multimedia technology. Not the least interesting feature is that the extensive pictorial and drawing material kept in this way can be made generally available.

The other program is a simulation program that places the user in the shipbuilder's shoes. It offers the possibility of testing various hull designs, sail settings, numbers of guns, ballast sizes in a wind where both the direction and intensity of the wind can be varied. This program, on diskette, is sold in the museum shop. Apart from the museum, this program is used in schools throughout the country for students from the 10–12 age group up to students at technical colleges.

While the interactive computer programs are the most modern that can be produced for instructional purposes, the *Vasa* Museum has also invested in an old instructional aid that was popular during the first half of this century in Sweden—a school garden. There happened to be a plot of land outside the museum that could be used for this purpose and the museum laid out a 17th century garden comprising a cabbage-garden, onion-garden, herb-garden and hop-garden,

surrounded by low hedges of hyssop, lavender and boxwood. Some of the plants are raised by pupils at Stockholm schools. School classes come in the autumn to carry out research on the *Vasa* and its times and can then harvest vegetables, make soup and eat in 17th-century fashion with wooden spoons from a common bowl.

On the whole, the museum attaches great weight to showings and instruction. For the ordinary visitor, there are hourly guided tours, which are not conducted only in Swedish. It is usually possible to have guides in English, German and French. It is often possible to have guides in Finnish, Italian and Spanish. In addition, all texts on placards are both in English and in Swedish. Instruction is given by the Head of Education and three Museum Teachers. They instruct thousands of children who come on prearranged visits. Great importance is also attached to giving instruction to teachers, to teach them to use the museum's resources as an educational aid so that they can themselves use the museum's resources both on the spot and in the classroom in order to prepare for, or follow up, a study visit. We are also engaged in the ongoing work of developing educational aids in our field, either independently or jointly with other museums. This has resulted in far-reaching, intensive co-operation with schools in the Stockholm area, as well as with schools throughout the country.

The museum shop is an important part of the service given to the public by the museum. Visitors wish to have the chance of buying books and souvenirs serving as an extension of their museum visit and, in time, a memento of it. Museum shops are also showing a tendency to grow in interest as potential shopping places for business gifts—in the case of the *Vasa*, particularly gifts from companies and suchlike, since the *Vasa* is very well known as a cultural object, even internationally. There is a threefold advantage in having a good souvenir shop with a high-quality range: it provides a service for which there is a demand, it generates profits, and it helps to spread knowledge about the museum in the world.

Another important part of the service offered in the museum is a good restaurant that can serve coffee, sandwiches and cakes, as well as hot meals, to visitors. A visit to the restaurant is something which, whether it turns out well or badly, influences the rest of the visit to the museum. Accordingly, importance must be attached to the activity of the restaurant. The restaurant functions as a cafeteria during the opening hours of the museum, but in the evenings it takes on the role of a banqueting room with a very good restaurant kitchen. The restaurant is so situated that it can function entirely unconnected with the museum but, in general, parties of this kind are often combined with showings of the museum.

The museum can also hire out the ship's hall for banquets or receptions, for which the restaurant does the catering. The restaurant can then make arrangements for 250–300 guests to be seated at table under the *Vasa*'s beak-head for a large dinner or for 1 000 standing guests at a reception. Even gatherings of this kind are generally combined with showings of the museum in some form. The fantastic setting provided by the ship's hall, with the large ship in the subdued light, has proved to be very attractive as an exclusive backdrop for various kinds of festivities. On the whole, during the first year, virtually every evening was booked for some arrangement or other in the museum and restaurant.

All this has to be marketed and an information department sees to it that the museum and its activities become known both in and outside Sweden. An important task is to inform and take good care of the mass media at all times, partly those representatives who come on their own initiative and partly those who are invited to attend press conferences, special showings, informational meetings, etc. Another is co-operation with the various representatives of the tourist industry, irrespective of whether they are national or municipal agencies, tour operators, bus lines or airlines, hotels and restaurants, motoring organizations, etc. Much of the museum's image is also created in the information department by means of printed materials, advertisements, posters and informational material. Besides, we have taken part in a number of international tourist trade fairs in order to promote the museum. The information department is also responsible for the publication and distribution of an informational brochure with news about the *Vasa* Museum four times a year.

The intention is, over the next few years, to complete the remaining basic exhibitions, to build up a reference library about the *Vasa* and its times and to work up programme activity dealing with this subject and period. Since the basic exhibition programme has been finalized, the museum will start producing temporary exhibitions linked to the *Vasa* period, internationally and nationally. We try consistently to enlarge the framework of our activity without losing sight of our central theme. The *Vasa* Museum must be regarded as a good example of what is called cultural tourism, something which is to be expected to acquire increasing importance in the highly important tourist industry. Cultural objects like the *Vasa* are stimulating. They enliven the imagination, are instructive and belong to those things that embody and promote a sense of national identity in an increasingly changeable world—a consideration that is becoming all the more important in a world with open borders.

Finally, a word about finances. The *Vasa* Museum forms part of the National Maritime Museums, which in addition to the *Vasa* Museum includes the Maritime Museum in Stockholm. The organization as such is a State authority and thereby financed by means of grants. However, within that framework, the government has assigned the *Vasa* Museum the task of trying to be self-financing in all else but the house costs. The necessary revenues are provided by entrance charges, hiring charges for evening events, restaurant business and souvenir sales. With the public attendance during the first year in the new museum it has been possible, initially at any rate, to cover operating costs as well as the fairly large investments that are necessary to start and keep up intensive activity. It is to be hoped that the museum will be able to cover its own costs for activities in the future as well. This will be possible if we can continue to attract a large public.

The archaeology and history of the Sydney Sailors Home, The Rocks, Sydney

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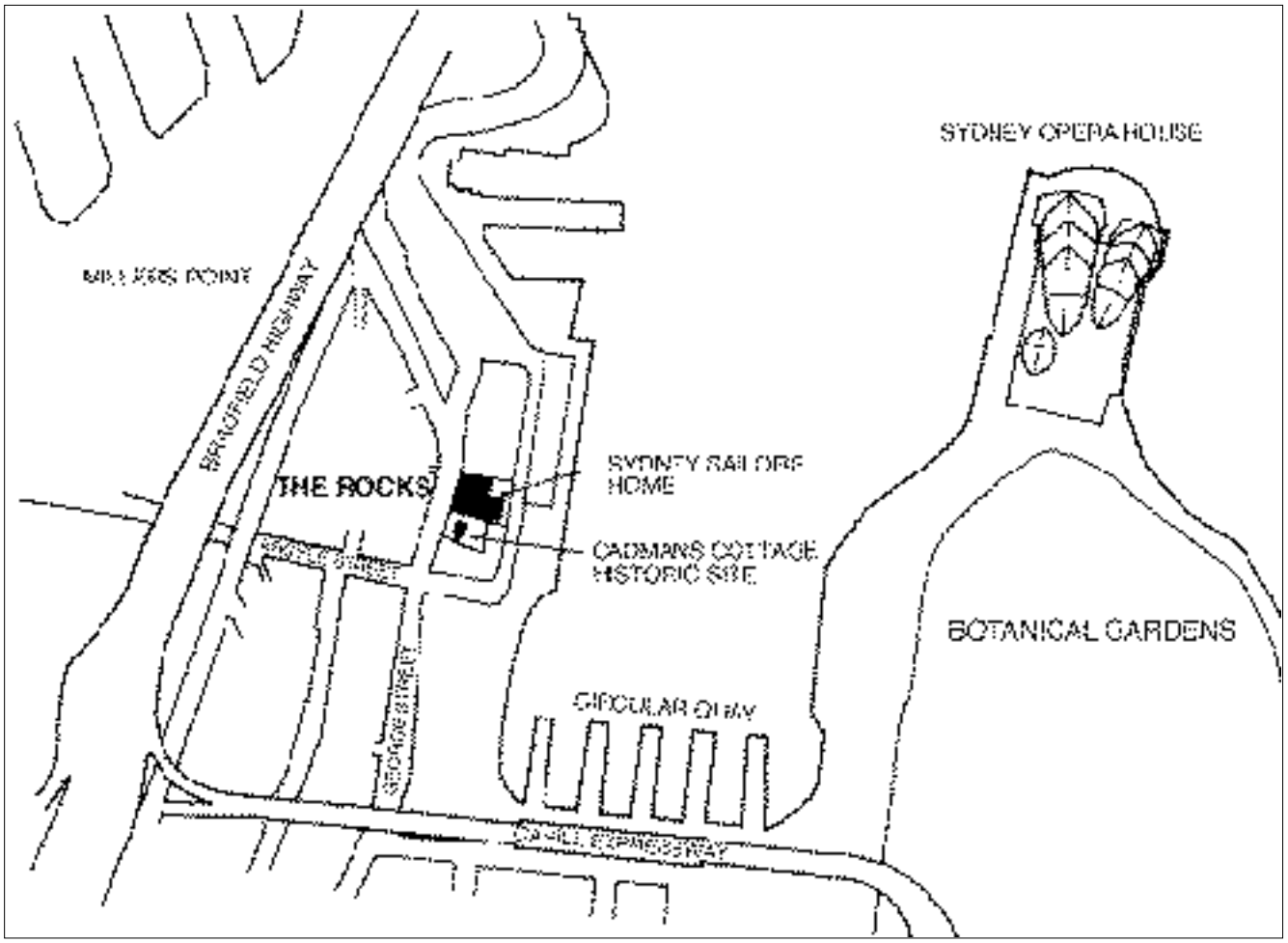

Figure 1. Location plan showing the Sydney Sailors Home and Cadmans Cottage (photograph: D. Gojak).

Introduction

The subject of this paper is the Sydney Sailors Home and how historical archaeological study of this site contributes to our knowledge of the lives of seamen in the 19th and 20th centuries. This initial paper draws together the results of excavations, analyses of artefacts (still in progress) and standing structures, documentary, cartographic, pictorial and oral history sources. It presents an opportunity to outline the results thus far and places these in the broader context of research into the archaeology of Australian social institutions.

The site of the Sailors Home lies between George and Quay Streets in The Rocks, the site of first settlement in Sydney, on the western side of Circular Quay (Fig. 1). The former Sailors Home now consists of two buildings—the main Sailors Home building, with its 20th century additions, which is owned by the Sydney Cove Authority (SCA, formerly the Sydney Cove Redevelopment Authority), and Cadmans Cottage, which is gazetted a Historic Site under New South Wales National Parks and Wildlife Service (NPWS) ownership.

The Sydney Sailors Home building is presently being conserved by the SCA to accommodate the new Rocks Heritage and Information Centre. Next door Cadmans Cottage is being conserved and studied by the NPWS. Together they will form a focus for the future public presentation of The Rocks. A substantial and significant part of that heritage throughout the past 200 years has been its role as the maritime heart of Sydney. As The Rocks has changed from a rough and squalid working class area to a superficially colourful tourist spot, many aspects of its maritime past have either disappeared or have been left isolated and out of context. For this reason it is even more important to study the links between the maritime history of the area and the evolution and growth of The Rocks and Sydney as a major port.

The Sydney Sailors Home operated for more than a century, from the time of its establishment in the early

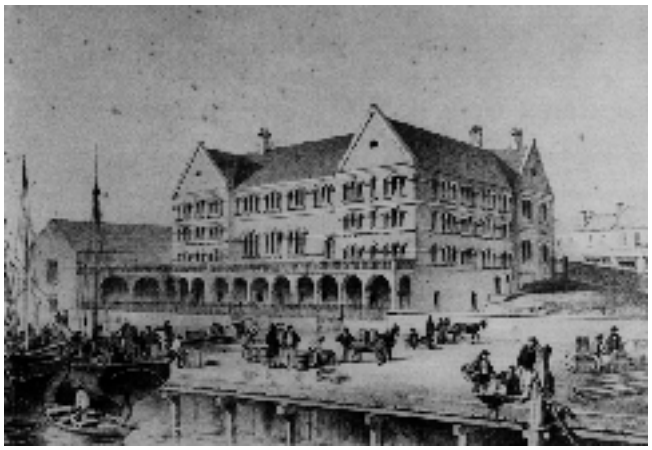

Figure 2. Weaver and Kemp's 1860 design for the Sailors Home. Only the north wing on the right was ever built (Mitchell Library Pictures Collection).

1860s. It was built on the site of the Water Police Office, then housed in Cadmans Cottage. The complex has been investigated by two archaeological excavations (Thorp, 1986; Gojak, 1989), a thorough archaeological analysis of the standing structures (Gojak, in prep.; Bligh Robinson, 1990), archaeological monitoring works (Godden Mackay, 1992), documentary research (Thorp, 1986; Proudfoot *et al.,* 1988; Iacono, 1993) and oral history interviews with some of the more recent inhabitants (Iacono,1993).

Artefact analysis is continuing, but preliminary findings are incorporated in a series of conservation management plans (Proudfoot *et al.,* 1988; NPWS, 1991; Bligh Robinson, 1990). Although these studies were prompted by specific conservation needs, their diversity and range allows us to chronicle the development of conditions for sailors on land over a period of nearly 150 years.

Sailors' homes and other charitable institutions for seamen were common features in trading ports throughout the world in the 19th and 20th centuries. They reflect the influence of Christian evangelical reform and the efforts of the elite trading class to create a better controlled and more pliant work-force out of the seamen (Fingard, 1982). Seamanship was generally seen as a lower-class occupation. Whilst sailors were considered an undesirable, sometimes even threatening, element of society guilty of drunkenness, violence, whoring, civil disorder, spreading disease, and generally failing to observe any law, this was really only applicable to a minority.

In the period from 1850 to 1950 there were phenomenal changes to the conditions of life aboard ship. These reflect broader social processes and are also evident in the evolution of the Sydney Sailors Home over the same period. Seamen could easily spend up to half of their career time in places such as sailors' homes.

Life for seamen on board ship and on land was not considered separately. Maritime institutions, such as the Sailors Home, conveyed an atmosphere of life aboard ship but, perhaps more importantly, the sailors' homes, bethel unions and missions for seamen were a vital avenue for channelling broader social concerns about living and working conditions onto the ships.

Early history of the site to 1864

The Sydney Sailors Home was built on the western side of Sydney Cove, mainly on land which was used by the Water Police, who had been based at Cadmans Cottage (Provis and Johnson, 1972; Thorp, 1986). It is immediately to the south of the Mariners Church, built in 1856. The shore of Sydney Cove was defined by Semi-Circular Quay, a raised timber deck pier running parallel with George Street, on the present alignment of Quay Street. An 1860 survey plan marks the small embayment in front of Cadmans Cottage as 'covered at high water mark', indicating that it was not reclaimed until the Sailors Home was built in the following years (Thorp, 1986: fig. 9A).

Cadmans Cottage was originally erected as the Coxswains Barracks, and served in that capacity until 1846 when the last Government Coxswain, John Cadman, retired. The building was then set up to serve the Water Police. They continued to use the building until the early 1860s, moving from there to new premises in Phillip Street.

The seamens' lodging house system 1853–64

In order to understand the context of the Sailors Home it is necessary to document the situation immediately prior to its establishment. From 1853 until the Sailors Home was built in 1864, seamen arriving in the port of Sydney without a forward engagement were only allowed to stay in specially licensed lodging houses for seamen. It was illegal for them to stay in normal lodgings, pubs, with friends or even relatives.

Although the Water Police had been formed in 1840 with powers to prevent desertion (4 Vic. No.17, amended by 7 Vic. No. 21), these were inadequate to deal with the increased rate of desertion brought about by the gold rushes of the early 1850s in NSW. The loss of ships' crews through desertion was a serious problem for shipowners and captains, causing delays, raising the cost of labour and encouraging crimping.

In 1853 the NSW Legislative Council passed 'an Act to amend the laws relating to engagement, discharge and desertion of seamen and for the regulation of Seamens' Lodging- houses and for the better management of the Water Police Department' (17 Vic. No. 36) to deal with the problem. It was based on legislation enacted in Canada, also aimed at reducing desertion (*Votes and Proceedings New South Wales Legislative Council,* 1853.**1**:3).

Under the 1853 Act seamens' lodging houses were licensed by the Shipping Master's Office, and seamen also had to register themselves with the Shipping Master's Office once in port. Ostensibly this was to reduce the opportunity for crimps to make private arrangements with individual seamen, and to allow seamen to be easily found for departing ships. More importantly, the Act enabled Water Police to enter such premises without warrant in search of deserters. Additionally the Water Police could arrest anyone on suspicion of being a deserter (NSWLA, 1861).

These restrictions were greatly resented by the seamen as an infringement on their liberty, and many shipowners found the operation of the Shipping Master's Office

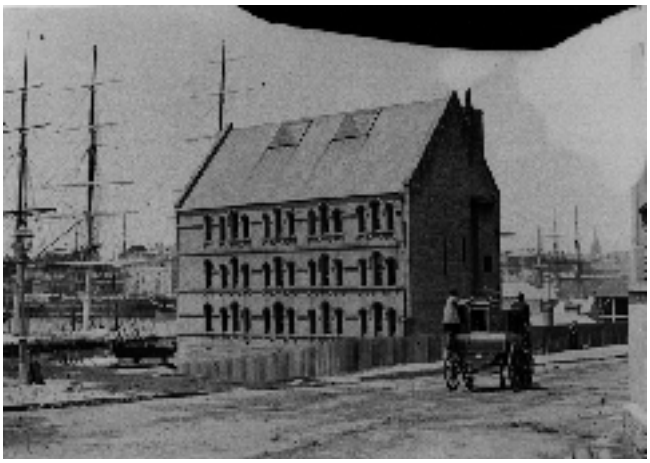

Figure 3. Photograph of the Sailors Home looking south east, *c.* 1870 (State Library of NSW, Government Printing Office Collection).

inefficient. A Select Committee of the NSW Legislative Assembly to report on Seamen met in 1861, in response to such concerns (NSWLA, 1861). The Committee took testimony from the Shipping Master, shipowners and seamen. It revealed that the Shipping Master's Office and seamens' lodging housekeepers and the Water Police had developed a relationship which amounted to institutionalised crimping.

The lodging house keepers and the runners from the Shipping Office were still acting as crimps for the shipowners and the captains. Not only were seamen being denied the ability to choose their own lodgings, but the limited choice of legal lodgings meant that the lodging house keepers could charge exorbitant prices for low quality lodgings with impunity. Most of the lodging houses were located in The Rocks, along Gloucester, Cumberland, Harrington and Lower George Streets (NSWLA, 1861: Testimony of Samuel North 9.question no. 5).

In the Select Committee's questioning about the quality of the accommodation at the lodging houses several witnesses before the Select Committee had been asked about sailors' homes they were familiar with, and all expressed that they were vastly preferable to the lodging house system operating in Sydney. Robert Towns, a shipowner, thought the lodging house system was

> …a masterpiece of humbug; unjust in its operation, and a failure in the results. Sailors, for the short time that they have on shore, deserve at least the common freedom allowed to landsmen (NSWLA, 1861: Testimony of Robert Towns, addendum).

The benefits of sailors' homes included the fact that they were run as charitable institutions, and were therefore relatively cheap. They also provided a point of contact for seamen with no knowledge of the port, as well as being able to provide some welfare in times of need and, importantly to some witnesses, were run as temperance institutions. In light of the flaws revealed by the enquiry into the operation of the system, and the broader issue of discrimination against seamen, the Select Committee set the scene for the construction of a sailors' home in Sydney.

The Sailors Home

ESTABLISHMENT AND DESIGN

Sailors' Homes were familiar to seamen from other ports and by 1860 a committee featuring prominent merchants had been set up to help raise funds for such a home in Sydney. This appears to have already been well established before the Select Committee was undertaken. The members of the board conveniently combined a range of commercial and religious interests. Sailors were not directly represented in the operation of th board.

The evangelical movement behind the Sailors Home had its roots in early 19th century Britain. In Sydney the Bethel Union Society was established in 1822 and the first Mariners Church in 1844. Although not, as far as we know, specifically associated with any temperance organisations, the Sailors Home is one manifestation of the phenomenal growth in Christian philanthropy in the mid 19th century which was directly and most actively tied to the temperance movement (Dillon, 1985; Powell, 1988).

The site chosen to build the Home upon was the block previously used by the Water Police, which was granted in 1860. The grand plan designed by Weaver and Kemp was a U-shaped building with a prominent façade facing the Quay (Fig. 2). There are obvious parallels with the Brunswick Maritime Establishment, the main London sailors' home. Although the north wing was completed in 1864, the remainder was never built, due to insufficient funds. As a result Cadmans Cottage, which would have been destroyed by the southern wing, survived and was used as the Superintendent's residence (Fig. 3).

The first and second floors of the Sailors Home were originally built as dormitories which were later divided into 56 individual 'cabins' or cubicles. These were arranged around open galleries lit by four large skylights. On the ground floor there was a reading room and social hall, with kitchen and dining hall in the basement. Residents of the Sailors Home, during oral history interviews, often remarked that the spatial arrangement of the Home mimicked that of a ship. As one seaman who lived there in the later years remarked

> See your Sailors Home was a bit like a passenger ship—every sailors' home, not just that one...with a deck outside going around and a rail (Iacono, 1993: Interview with a seaman who lived at Sailors Home:10).

The issue of similarities in arrangement, living conditions and social interaction between land and sea institutions is an issue that should be further explored.

In 1926 an L-shaped wing was added, providing another 26 cabins, amenities, a new residence for the Superintendent and an extra dining room. Plans indicate that the sailors were to be segregated by race. Much of the interior detail relating to the building's function as a sailors' home was removed by occupants renting the premises after ownership was transferred to the SCA in 1970. Following removal of the most recent additions during conservation work by the Authority in 1990–93 sufficient archaeological evidence of the cubicles has been revealed to provide an impression of their size, which was barely bigger than a single bed (Bligh Robinson, 1990).

Documentary sources

Our knowledge of life in the Sailors Home in its early years comes from three separate sources—two documentary and one archaeological. The first is an article published in the Melbourne *Argus* in 1876 by 'Vagabond', regarding his visit to the Melbourne Sailors Home dressed as an old sea dog ('Vagabond', 1876). The Melbourne Sailors Home was built in 1865 and was in many ways similar to the Sydney establishment. Vagabond's article discusses the diet of the sailors, the tribulations of their seafaring life and life on land, how they spent their time waiting for work and how the Home was run.

There is also an interesting sub-text about the 'good' and 'bad' character of seamen. Vagabond notes the dramatic inroads made by the temperance movement among the sailors in the previous years, and the impact of the Christian tone of the Home's management. In Sydney there was little recreation in the Sailors Home; seamen would spend their free time in the Mariners Church next door instead (NSWLA, 1886: 428).

The second documentary source is the Royal Commission on the Excessive Use of Intoxicating Liquor (NSWLA, 1886). Included in the testimonies are the accounts from Thomas Davis of the Seamen's Union and the Reverend Bradley, Chaplain of the Sydney Bethel Union, as well as others with experience of life in the Sydney Sailors Home. All confirm that it was a dry establishment—no grog allowed. The diet provided by the Home, and the management is described in great detail.

Archaeological evidence

The third source is archaeological and forms a good contrast to the picture provided by the documentary evidence. As shown earlier the construction of Semi-Circular Quay across the front of Cadmans Cottage in the 1850s created a small embayment which was still unfilled by 1860. The area was reclaimed and turned into a garden after the Sailors Home was built. The reclaimed area has been investigated twice. In 1985 Wendy Thorp dug a trench in its centre, revealing a straightforward fill stratigraphy (Thorp,1986). From the top this consisted of modern landscaping, garden soils accumulating over a century, and then various fill materials such as ferrous slag and crushed sandstone rubble. Excavation was ceased at high-water mark without reaching the base of the fill.

In 1988, as part of the Cadmans Cottage Archaeological Project, a trench was dug into the north-west corner of the reclaimed area to verify Thorp's stratigraphic sequence and to get information about the retaining wall in front of the cottage. The upper level of the stratigraphy was the same as Thorp's, but below the introduced sandstone rubble fill was encountered a layer of wet, black and greasy matrix containing ash, coal, sinter and water- sorted sediments. It was full of artefacts including glass and ceramics, food remains and some personal items. A sample was excavated but the total depth of this deposit is unknown as it rested just above high-water mark and was saturated, rapidly turning to unconsolidated slurry when probed (Gojak, in prep.).

Analysis of this material is continuing, but a few preliminary statements can be made. The deposit definitely consists of material thrown out of the Sailors Home in its early period. The artefacts are tentatively dated from the mid 1860s to the mid 1870s at the latest, which accords with the known history of reclamation in the area. The date of the deposition may be able to be refined after further study.

The deposit appears to be a combination of food preparation waste, dining room discards, sweepings and fireplace emptying. In typical Sydney tradition this was all tipped straight into the nearest available part of Sydney Harbour. The tip lines in the stratigraphy indicate that it was dumped from the landward end of Cadmans Wharf, at the head of the steps leading to the lower level of the Cottage. When it was dumped it was left open for a time, where rats went through the matter, as evidenced by gnawing marks on bone.

Like shipwreck material this deposit can provide us with a finely dated, accurately provenanced 'snap-shot' of an assemblage. The context is sufficiently wet to have preserved bone and other organic material. Unlike shipwrecks however, there has been very little post-depositional disturbance of the material, some of which is extremely small and fine such as beads, buckshot and fish scales.

Looking at this early Sailors Home deposit can answer a variety of questions that are of importance to both maritime and land-based archaeologists. With the added benefit of two documentary accounts which examine the same sort of material it will be possible to look closely at the lifestyles of sailors on land, in a way that is not usually possible.

The overall assemblage represents a particular institutional response to feeding and housing a class of men. During the mid 19th century ideas of nutrition altered dramatically (Walker and Roberts, 1988). It will be possible to see the consequences of these changing ideas and when and how they reached seamen. The unionist Thomas Davis, before the Excessive Drinking Royal Commission, for example, says "The food, instead of making a man think he was in the Sailors Home on land, would make him fancy he was afloat again". Clearly there was an expected relationship between the conditions on board ship and those provided on land. 'Vagabond' (1876) also provides stern opinions of the diet of the seamen in his article on the Melbourne Sailors Home.

Temperance was another big issue, and both Davis and the Reverend Bradley assert that the Sailors Home was dry, that is, liquor was not allowed on the premises. As case gin and other alcohol bottles were excavated from among the food remains in the early Sailors Home refuse deposits, there beckons an opportunity to go beyond the seemingly naive assertions in the documentary record.

Temperance was not just a matter of self-control and personal choice, it was also about making sailors conform to late Victorian images of appropriate behaviour. Through the period during which the Sailors Home operated, seamen were transformed from a stigmatised social underclass, effectively on the periphery of society, to an effective labour force (Fingard, 1982). The first seamen's union in the world was set up in Victoria in 1872, with other colonies following soon after (Fitzpatrick and Cahill, 1981). This was a fundamental change, affecting all aspects of maritime industry. Elements

of this change can be traced in the archaeological remains of the sailors and in the fabric of the Home.

The traditional community of sailors was multicultural and multi-racial, with communal sleeping and living quarters. Change is seen in the conversion of dormitories at the Sailors Home to individual cabins, and in the segregation of races. Both of these changes reflect that seamen adopted general social attitudes, or had them imposed upon them. The traditional life and culture of seafaring as it existed into the first half of the 19th century could no longer continue, given other changes which were taking place in Victorian society.

Some of the artefacts recovered during excavation reflect signs of social processes at work. The grog bottles which should not have been there hint at continuing resistance to an imposed order. Clay tobacco pipes found at Cadmans Cottage are decorated with Irish nationalist slogans. It has been argued that these pipes indicate overt resistance and social segregation of an Irish underclass (Gojak, 1991).

Regardless of whether the sailors were Fenians, ethnic Irish, sympathisers or merely identifying as members of the working class, they were choosing particular symbols, which were nationalist or class-based rather than reflections of their maritime life. One especially interesting artefact is a painted glass disk, possibly from a pocket watch. What survives is comprehensible as an early unofficial Australian coat-of-arms. As with the Irish tobacco pipes the sailors are participating in a broader social and political debate and expressing their allegiances with appropriately chosen symbols in their material culture.

Just as the conditions for sailors changed, so did the nature of maritime industry. Geographically the centre of maritime trade shifted from Circular Quay to Darling Harbour, and thus the Sailors Home moved from the centre to the periphery of maritime activity (Proudfoot, 1984). It was still needed, however, as the 1920s extensions show, but after the Second World War things began to change. Air travel, more efficient shipping and increasing domestic production all reduced the demands for seamen. Coastal trade gave way to road and rail freight.

Oral histories of the residents and other people associated with the Sailors Home clearly support that the shipping industry and all institutions associated with it were in irreversible decline.

> …they [the shipping companies] wouldn't take it over because they had no ships out here—too much responsibility...and Tom Parker [second last Superintendent] he died...and the Sailors home went to the pack (Iacono, 1993: Interview with a seaman who lived at Sailors Home).

At the end of its days the Sailors Home accommodated a dwindling number of mariners, retired seamen, non-sailors and down and outs with nowhere to go.

Conclusion

The life of seafarers in port changed dramatically in the century between 1850 and 1950. The distinctive traditional lifestyle of seamen broke down under pressure from broader social changes. Seafaring, which was seen as a problematic lower class occupation, was increasingly brought under control through legislation, policing and moral control. The evidence of these methods can be traced in the development of institutions for seamen in Sydney during the period.

Sydney's Sailors Home was established as a Christian temperance mission, seeking to overcome a failed, corrupt legislative system of control. Laws enacted in the early 1850s enabled the Shipping Master's Office and the Water Police to restrict the activities of sailors in port. As acknowledged in the Select Committee of 1861, seamen were unfairly singled out by these restrictive lodging laws. The Sailors Home offered an alternative solution to the problems arising when sailors were in port. It was established as a non-exploitative, charitable institution for the comfort of sailors. Consequently, the design, organisation and operation of the Home approximated that aboard ship.

The impact made by Christian evangelism and the temperance movement among seamen was clearly profound but, as the archaeological record suggests, there was resistance to this and evidence of participation by seamen in broader political agendas, including active unionism.

There is need for more research on the sailors who crewed the ships that most maritime archaeology focuses on. We have tried to show the potential contribution a land site can make to understanding the changes that were also occurring aboard ship. The advantage of examining a site such as the Sailors Home is that it is able to contribute evidence not just of a single point in time, but can reveal process as well. We are fortunate also that the sources upon which we can draw include official and anecdotal documentary records, oral history and the archaeological evidence provided by artefacts and structures. These can be compared and tested against each other for veracity and omissions.

It is important to identify the context of the research we have undertaken. Although most of the data was gathered as part of the conservation and management of the Sailors Home and Cadmans Cottage, it aims to contribute to a broader debate about social change within and between classes in Australian society in the 19th and early 20th centuries. It may be possible to use shipwreck and other evidence of sailors lives and material culture to contribute to this debate as well. It has to be recognised that although many maritime sites are unique in their environment and the techniques required for their study, the knowledge which we can obtain from them can have more general applicability.

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4 Vic. No. 17 An act for the further and better regulation and government of Seamen within the Colony of New South Wales and its Dependencies and for establishing a Water Police (assented 6 October 1840).

7 Vic. No. 21 An act to amend an act entitled An act for the further and better regulation and government of Seamen within the Colony of New South Wales and its Dependencies and for establishing a Water Police (assented 22 December 1843).

17 Vic. No. 36 An act to amend the laws relating to the engagement discharge and desertion of seamen and for the regulation of Seamen's Lodging-houses and for the better management of the Water Police Department (assented 31 October 1853).

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The Australian shipwreck database; an interim report

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Introduction

For a number of years maritime archaeologists and historians have been involved in accumulating data on shipwrecks known to have been lost in Australian waters. This information has inevitably developed from simple card indexes into complex databases. The type of information collected by research workers has tended to differ, depending on the nature and interest of the organizations or individuals involved in the recording. Recording shipwreck information as part of a State management plan was first started in Western Australian by Henderson (1977). Since the declaration of the *Historic Shipwrecks Act 1976,* most of the delegated authorities in the States have also started to collect shipwreck information as part of their heritage management programme. In 1985 following discussions at the Australian Institute for Maritime Archaeology (AIMA) annual general meeting it was decided that a national register of sites should be compiled. The initial co-ordination was carried out by a working group established by AIMA. As a result of this work, agreement was reached on a set of interim variables or fields which would be common to all State shipwreck databases; these became known as the 'Lorimer Variables', (Lorimer, 1985 and 1986) see Table 4. In 1990, it became clear that there was a need to further co-ordinate this work so that the information that was being accumulated would be compatible and could, if necessary, be combined into a national database.

Part of the objective of the project was to eventually to integrate the various State databases so that a national register could be formulated. This quickly became a priority as there was concern that, as the State registers developed, they would become more difficult to integrate. The importance of the national register was emphasised in the Kendall Report (Kendall, 1990) which pointed out that under that *Historic Shipwrecks Act 1976* the Commonwealth government was required to establish a national register of shipwreck sites. As a result, AIMA approached the (then) Department of the Arts, Sport, the Environment, Tourism and Territories (DASETT, now under present restructuring DAS) for funds to implement the integration of the various State registers and to start formulating a national register which would fulfil the requirements of the legislation.

Implementation of the program

It was appreciated from the outset that the establishment of a national database was likely to be a very complex and time consuming project. Firstly, the various State bodies accumulating the information were doing so on a variety of different computers and different database programs. The first part of the project was therefore to determine how best to gather the data from the various state bodies and how then to import information into the most appropriate database program. The second problem was that there was no common agreement on how the information contained in the 'Lorimer Variables' should be recorded. Thus some States recorded the vessels known dimensions in feet and inches using at least three different Imperial forms (3ft 6ins; 3' 6"; 3.5ft) together with a metric system. Similarly, dates were recorded in various ways (6 July 1888; 6-7-1888; 6/7/88; etc.). It was essential therefore to resolve these conflicts and to assess the significance of the Lorimer Variables.

In consultation with the State working groups it was decided that some of the fields were either unnecessary, redundant or required modification. As the main purpose of the database was for research, and in particular the gathering of statistical information, the logic of including the names of the builder, master and the owner, seemed inappropriate or at least obscure; so these variable were dropped. In addition, the coding of complex fields such as ports of departure and destination and engine types, as suggested in the original Lorimer Variables, although important, do not greatly benefit the operation of the system. In the former cases (ports of departure and destination), it was decided to first code the country in a separate field and then give the name of the port in full. In this way information about country of origin or destination could quickly and easily be obtained, whereas the more obscure, although still of importance, port names would still be available. In the case of engine types, the complexities in classification, which include number of engines, number of cylinders, orientation of engine and basic engine type, all of which can vary independently, it was decided that there was no real benefit in coding. Generalised agreement was reached over the coding of different types of vessel rigs and country codes were taken from the international vehicle identification codes.

Structuring the database

The basic database program which was initially used to develop the shipwreck register was Omnis 5; a program used on the Macintosh system in the Department of Maritime Archaeology where the project was coordinated. Omnis 5 is a high-level relational database, which, in common with most high-level databases, allows complex manipulation of fields and formats. It was not seen at the time to have any particular merit over a variety of other database programs, it was simply what was available. As with these types of packages, there is a considerable amount of work required in developing the application to suit the needs of the data and the users. In mid-1990, Omnis 5 was upgraded to Omnis 7. This has had an important significance for the implementation of the national database, firstly because Omnis 7 is available for both Macintosh and IBM (using Windows) and also because the identical data and application files can be used on either machine, with need for translation whatever. The implications of this will be discussed below.

Initially the application program was written in mid-1990

in Omnis 5. Data was received from the various States on a variety of media: MSDOS 3.5 and 5.25 inch high density (HD) and double density (DD) formats and Macintosh HD and DD. Unfortunately, the 5.25 inch Apple DOS reader in the Department of Maritime Archaeology was only capable of reading DD discs, so one of our first problems was the inability to read 5.25 inch HD disks.

The data was requested in ASCII format deliminated by tabs with no formatting. This ensured that the data was easy to read and easy to manipulate. Although the States had been requested to send their data in a standard format (that is the field list following a particular convention) this was not possible in all cases because of the nature of the export facilities of some of the programs.

Structural problems

The data was first read off the discs and filed on the hard disc in the appropriate State database file. Each file was then read into a Microsoft Excel 3 in a spread sheet and reorganized to fit into the new field conventions. Thus, all dates were converted to the simple format of YYYY-MM-DD (i.e. 1874-02-11). By formulating dates this way and not treating them as true database date fields, the information was more universal. Firstly, not all programs have common conventions for dates, particularly 19th century dates, and in addition, because all systems treat a character field differently from a numerical field, the only way a character-date field can be sorted chronologically is to make the order year–month–day and the day and month must be two figures. For example, if the convention YYYY-M-D (i.e. 1874-2-11) was used, a series of dates which coincide with the first of the month of a particular year, the series would sort as follows: 1874-1-1; 1874-10-1; 1874-11-1; 1874-12-1; 1874-2-1; 1874-3-1; 1874-4-1;…; 1874-8-1; 1874-9-1. This is because characters are not sorted numerically as numbers but alphabetically in the following way: 1; 10; 100; 101; 11; 111; 112; 12; 2; 21; 3; 33; etc, just as an alphabetical index would be. To avoid this problem it is necessary to prefix the number with zeros so that every entry has the same length, thus the numerical series above now sorts correctly: 001: 003; 010; 011; 012; 021; 033; 100; 101; 111; 112. For dates it is necessary to give two digits to both the day and the month, so that the date series given above will sort correctly, ie: 1874-01-01; -02-01; -03-01; -04-01;…; -08-01; -09-01; -10-01; -11-01; -12-01.

Unfortunately it is not possible to make the date a number, since there must be deliminators, or some non-numerical character, to differentiate between the day, month and the year; nor is it possible to use Jan; Feb; Mar; etc. because with this convention the months sort alphabetically in the order Apr; Aug; Dec; etc. Finally the fields must be ordered correctly; the year must be given first, then the month and then the day to give a fully chronological sort. If the fields were given in day–month–year, the sort would result in all 1 January entries for all the years, then all the 1 February entries for all the years and so on. To complicate this situation, Microsoft Excel has its own unique conventions regarding dates, thus if fields are read into the spread sheet with certain deliminators, the program interprets these as dates, not characters, and to further complicate matters Excel on a Macintosh has to be told to use the European date system dd-mm-yy rather than the American mm-dd-yy. Dates were the most difficult fields to manipulate, firstly because they had to be set in a non-date format for Excel and then the normal day–month–year had to be changed to year–month–day.

Fortunately Excel has a powerful programming capability. Firstly, the date deliminators were globally edited to a non-Excel date deliminator (e.g. "*"). Next, dates that used the name of the month format (i.e. 1*July*1889) were globally converted to a numerical month, requiring one global edit for each month of the year (i.e. all *Jan* were converted to *01*). Then dates were tested to see if they had a day and a month as well as the year; if they did not, dummy dates ("00*00*") were entered. At this point all the entries had either the format "dd*mm*yyy" or "d*m*yyyy". The days and months were then all converted to double character format (dd*mm*yyyy) using the formula (IF(MID(date,2,1) = "*" THEN date = "0" & date ELSE date) (i.e. if the second character is a "*" then the day is a less than 10 and therefore a "0" has to be added to the front of the date, if it is not a "0" then leave the date as it is. When this was done, all the days have two characters and the process can be repeated for the month. Thus (IF(MID(date,5,1) = "*" THEN date = LEFT(date,3) & "0" & RIGHT(date, 6) ELSE date) which puts a "0" in front of the month if the month is one digit. At this point, all the dates were configured dd*mm*yyyy and it is a simple matter to transpose the year and the day (date = RIGHT(date,4) & MID(date,3,4) & LEFT(date,2)). Once these equations had been written for a single cell in the spreadsheet it was possible to automatically apply the calculation to the whole date column. Finally, as the date could not now be confused with a date field, the deliminator was globally replaced with something more appropriate ("-").

Because there was a great variation in the measurement units used, the identification and editing, which had to be done manually, was time consuming. Generally, Imperial measurements were manually set in a decimal convention and terminated with "ft", i.e. 12.5ft (meaning 12 feet 6 inches) and the letters ft initially differentiated these measurements from the metric. A calculation was then conducted on all the measurements to test if the cell terminated in "ft" and if so the number was then multiplied by the factor 0.3048 to convert it to metres.

Likewise, all ships' rigs and countries were manually coded. Minor adjustments were required, particularly as the IBM character set is not always compatible with the Macintosh system. This was a particular problem with the high order ASCII codes and the difference between plain quotes and typesetters quotes.

Having formatted the fields, they were then ordered in the field input order and imported into the Omnis 5 data file.

Data file management issues

At this point it was noted that there was an on-going problem with the database. The composite data file containing all the various States entries now had a number of duplicate ship name entries. Thus, for example, the name *Fanny* for a shipwreck might occur twice in Western Australia,

three time in South Australia and once in Queensland. In the process of updating, ordering and exporting records, there is a need for the database program to be absolutely sure it is working on the particular entry of the six *Fanny* records. The importation of data requires that the program identifies the record that it is updating, therefore, under the existing system, as the unique identification field was the name, the program had no idea which *Fanny* it was dealing with. A variety of approaches were considered to resolve this problem, including numbering (*Fanny* 1, *Fanny* 2, etc.) and number and State coding (*Fanny* 1 (WA), *Fanny* 2 (SA), *Fanny* 3 (WA), *Fanny* 4 (QLD), etc.). All of these approaches had problems, and it was therefore decided to introduce a unique sequence number to the database field list, so that each entry had a unique number which, once created, could not be deleted (although the other fields of a particular entry could be deleted or edited). The above situation was therefore resolved. The program no longer had to work out which particular *Fanny* it was dealing with, it simply worked on the sequence number.

The question of exporting data in a form appropriate for each State was next examined. It was obvious that there was a similar set of problems in exporting data into any State database as there was for importing it. Since Omnis 7 offered the possibility of a system which could operate across the platforms using the same application and same data files, the advantage of changing to Omnis 7 became obvious. Instead of exporting a data file and then translating and then importing it into a different program, each State would be working on the same data and application, there would be no need to become involved in the import translation or export translation at either end. All users would have a common program. All that is necessary is that the master database needs be kept up-to-date. Even this situation, which seems quite simple, has some interesting management implications.

This problem relates to updating sub-master databases. Take, for example, the master database (MAUS) and the sub-masters in South Australia (SMSA) and Victoria (SMVIC). We first must ensure that Victoria does not change South Australian entries on SMVIC because these will write over the South Australian changes that may have been transferred onto the MAUS. That is fairly straight forward. If a State sees an anomaly in another State's data they should inform the relevant State who will effect the change. New entries are a problem. If a new entry is placed in the blank record unique number 4563 on SMVIC at the same time as a new entry is put in 4563 on SMSA, one or other of these entries will be written over when they are transferred on to MAUS. To solve this blocks of entries have been allocated to each State; States can then put new data on entries that have been allocated either by writing over a deleted State entry or by adding to a blank entry in their reserved number group.

We are now on version 8 of the application program which going through a process of constant refinement. The data has been prepared for IBM and Macintosh machines and trial operations have just begun. Doubtless there is more work to be done. Until each State has learnt to use and has become familiar with the system there will be computability problems between the State databases and the national database. We have already discovered a number of shipwrecks that according to the national database are due to be lost in the year 2014 and we have several vessels that are over 300 metres long! There are a total of 3164 shipwrecks, broken up by state as follows:

	Count
WA	471
VIC	614
SA	712
NSW	177
TAS	726
QLD	464
Total	3164

The potential

The best way to illustrate the potential of the database is to take some examples. There are several areas where the database will be useful. Firstly in management, in other words the database will assist the regulatory authorities in the management of their program. Take for example a recent case that occurred in Western Australia, a member of the public reported that they had found the remains of a large iron shipwreck in the general area of Point Cloates. If the Western Australian database was finalised, one would expect that this information would be run through the shipwreck register, to search for all iron vessels over say 20 m in length that were lost in the region of Point Cloates. We would expect that all the sites known to be lost, not just in the general locality, but in the general region would be listed. The search would be find all iron ships and then any ship that has a latitude range within the latitude of Point Cloates. Therefore, any vessel known to be lost somewhere on the Western Australian coast would be included as well as all sites known to be lost in the general area. At present, none of the State databases have this level of sophistication in their recorded data.

What is possible at present is to obtain statistical information.

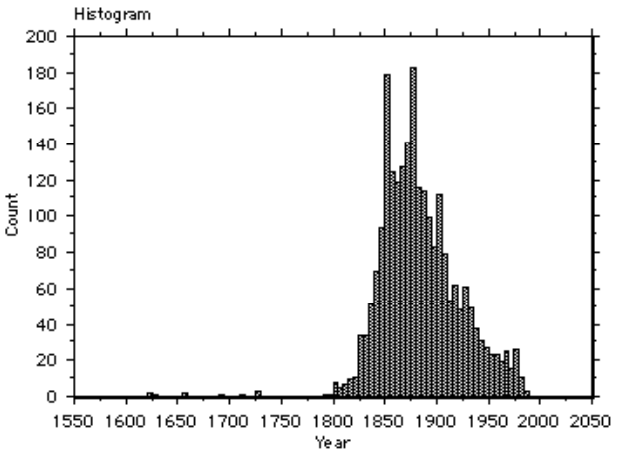


Figure 1. A frequency histogram showing the present date range for all entries

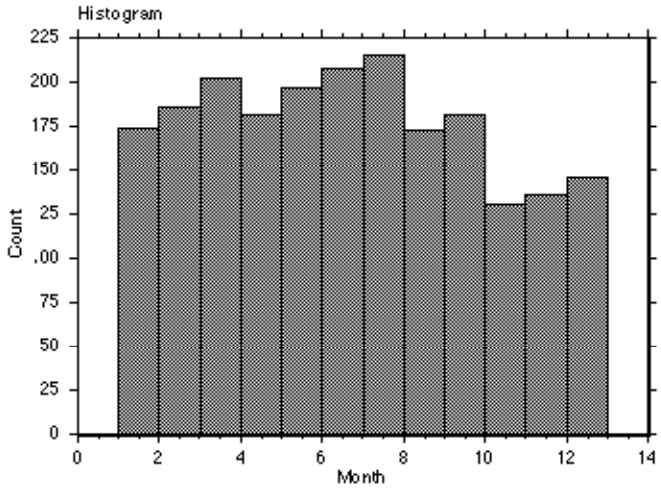


Figure 2. A histogram showing the frequency of losses by month.

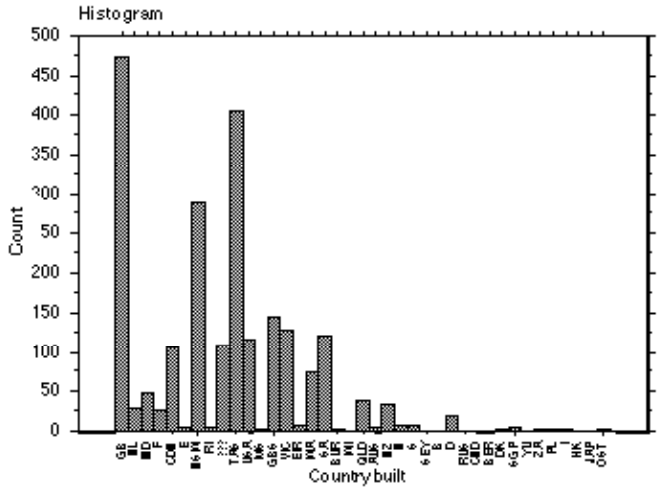


Figure 3. Frequency histogram showing number of vessels built by country.

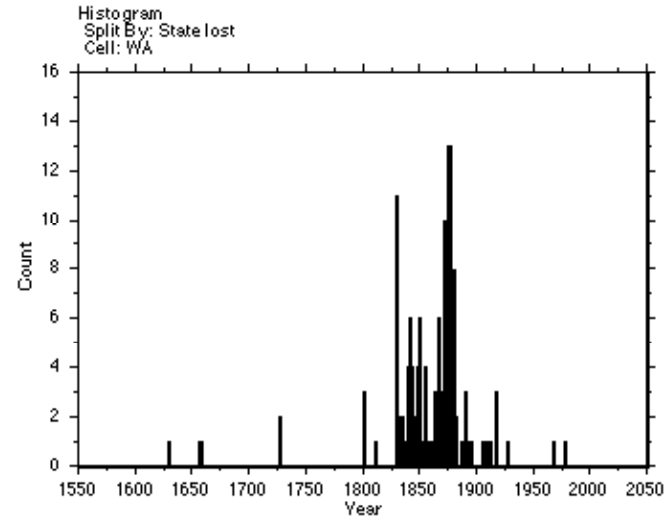
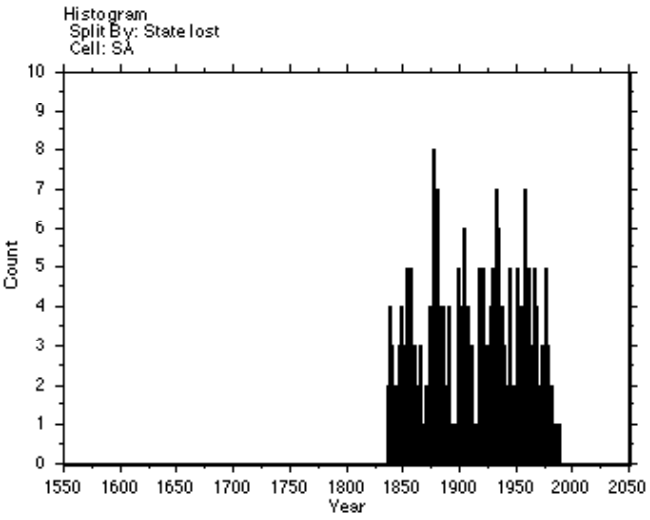


Figure 4. Frequency of losses in Western Australia.



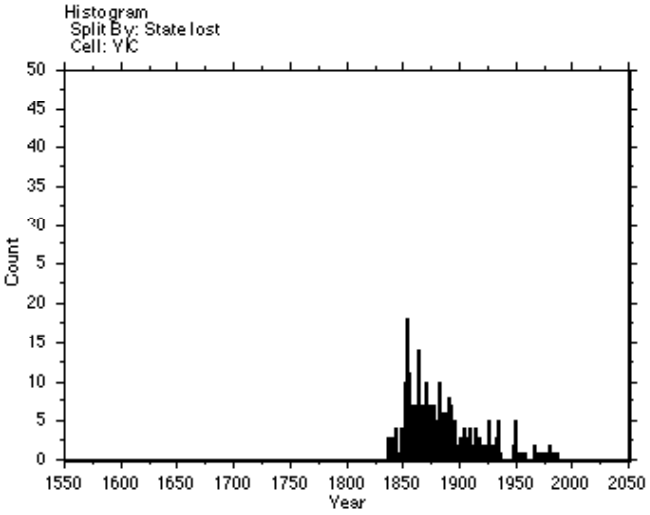


Figure 6. Frequency of losses in Victoria.

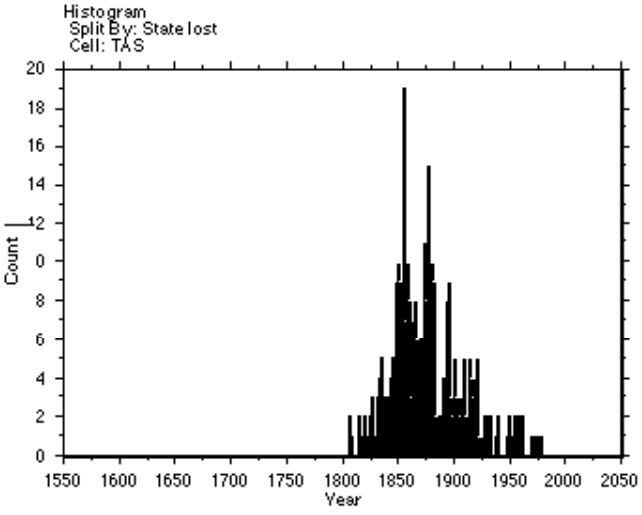


Figure 7. Frequency of losses in Tasmania.

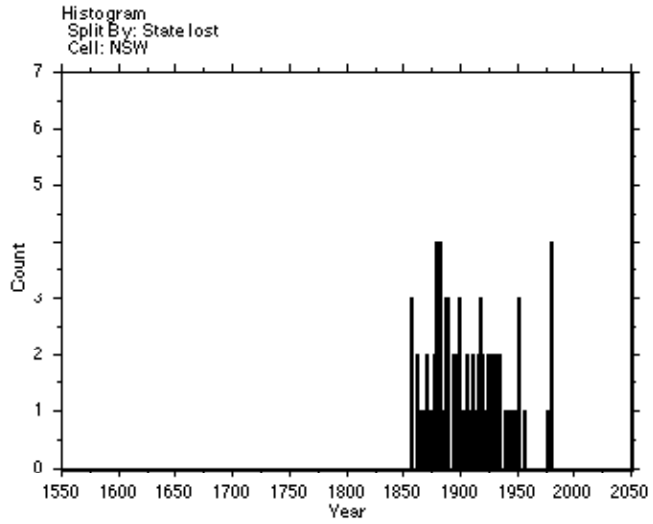


Figure 8. Frequency of losses in New South Wales.

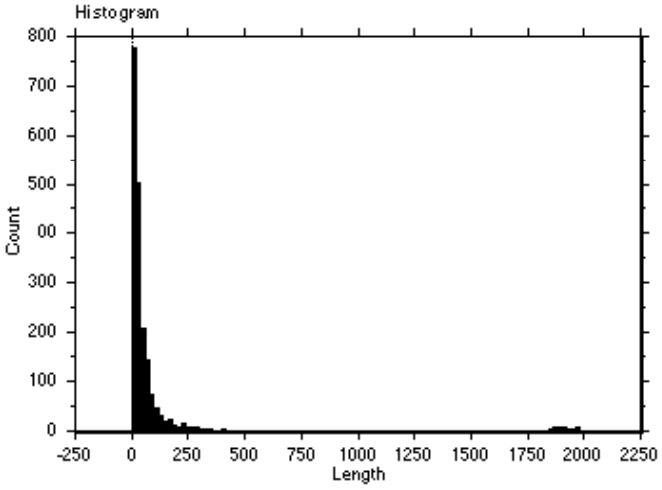


Figure 10. Histogram of lengths in metres showing anomalous lengths.

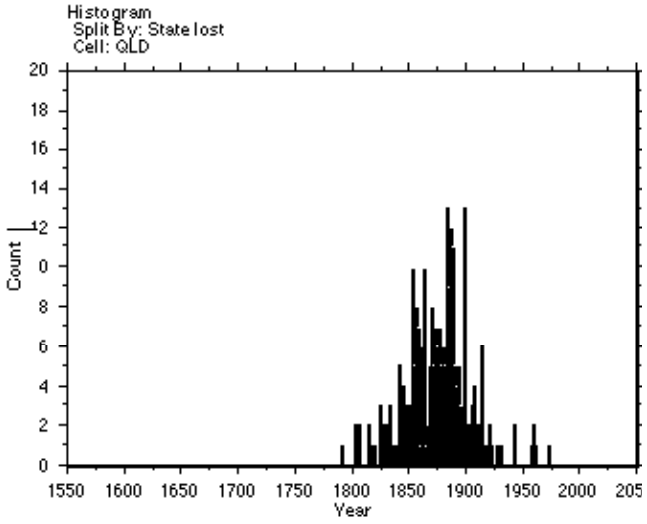


Figure 9. Frequency of losses in Queensland.

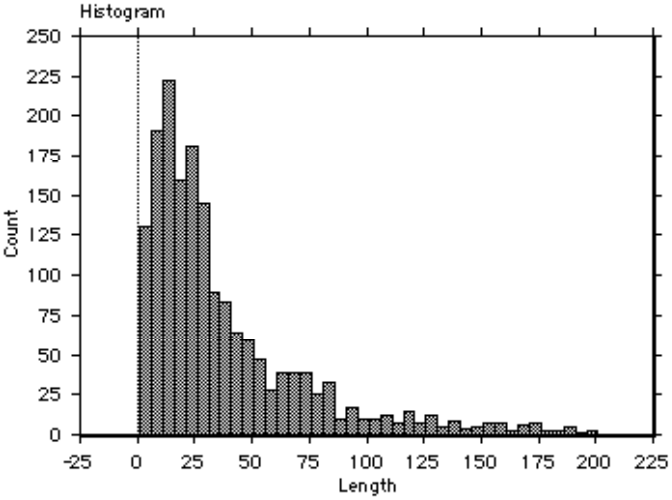


Figure 11. Detail of histogram of lengths.

The future

There is every possibility that the database will be finalized in the near future. This will depend on the ability and dedication of each state to bring their registers up to date and correct the present entries. Once this is done, and I would hope that this could be finished by the end of 1993. The main work of the project will be finished. There are, however, a number of problems which we can anticipate. Firstly, each state may update their registers in different ways; for example some states have been recording all shipwrecks up to the present day, whereas other states have made a more detailed survey of nineteenth century sites. Therefore, we need to agree on priorities: do we concentrate on all sites up to 1850, or 1880 or 1900? The other problem relates to the ultimate form and destination of the database. It is quite clear that the only sensible way to operate is via a modem. Now each state can operate the application either on an IBM or a Macintosh system, then essentially the common data file can exist on hard disk at any remote location and access is made via a telephone system. The program can be modified to enable password protection so that each state can read any data but can only write on their own state data. The location, obviously needs to be central to the system. This will mean that initially, during the development phase, it will be in Western Australia. However, once the system is working, it is anticipated that it should be physically located at DASET. There are a number of very high speed modems available communicating at 14400 bit/sec which will allow very fast data transmission. In reality, if one is only updating the database, a relatively slow modem would be quite adequate. However, in the case of data transfer (uploading or down loading information) or in complex sorting jobs, a fast modem is going to be required. Naturally, the ultimate location of the database, using a high speed modem become irrelevant.

There is no doubt that there is still a lot of work to do. However, the main issues of the database have been resolved and it is hoped that with some application, the Australian National Shipwreck Database can be finalized into a working and extremely useful research and management tool.

Table 1. List of current variables used in the shipwreck database. Record length is between 38 and 640 bytes, 1000 records may use between 362000 and 1297000 disk bytes.

	NAME	TYPE		DESCRIPTION
1	NAME	Character	50 IND	Name of ship
2	RIG	Character	3 IND	Rig (coded look up table)
3	CONST	Character	1	Construction (coded look up table)
4	TONA	Character	5	Tonnage gross
5	TONB	Character	5	Tonnage net
6	STBLT	Character	5	State or country built (coded look up table)
7	PTBLT	Character	50	Port built
8	WNBLT	Character	6	Date built
9	UNINO	Sequence	IND	Unique identification number
10	PTREG	Character	50	Port of registration
11	OFFNO	Character	6	Official number
12	REGNO	Character	8	Registration number
13	LNTH	Character	5 IND	Length
14	BM	Character	5	Breadth
15	DPTH	Character	5	Depth
16	ENG	Character	30	Engine description changed from lookup
18	STATUS	Character	3 IND	Status of site (code)
19	WNLST	Character	11 IND	Date lost
20	WRLST	Character	50	Where lost
21	CREW	Character	4	Number of crew
22	SUNK	Character	1 IND	Method of sinking (code)
23	SINKING	Character	20	Sinking information
24	PSGRS	Character	4	Number of passengers
25	PTFRM	Character	50	Port from
26	PTTO	Character	50	Port to
27	CARGO	Character	20	Cargo description NOT coded
28	DTHS	Character	3	Deaths
30	LATMAX	Character	8 IND	Latitude maximum
31	LATMIN	Character	8 IND	Latitude minimum
32	LONMAX	Character	9 IND	Longitude maximum
33	LONMIN	Character	9 IND	Longitude minimum
34	STATE	Character	3 IND	State wrecked

Table 2. List of codes used for ship's rigs.

Code	Rig
???	Unknown
BAG	Barge
BAQ	Barquentine
BAR	Barque
BC	Bulk Carrier
BRG	Brigantine
BRI	Brig
CUT	Cutter
DNY	Dandy
DRE	Dredge
FB	Fishing Boat
HBR	Hermaphrodite Brig
HUL	Hulk
KET	Ketch
LAU	Launch
LIG	Lighter
LUG	Lugger
MV	Motor Vessel
SBR	Snow Brig
SC3	Three-Masted Schooner
SC4	Four-Masted Schooner
SCH	Schooner
SHI	Ship
SLO	Sloop
SMA	Smack
STP	Steamer Paddle
STS	Steamer Screw
SUB	Submarine
TSC	Topsail Schooner
WB	Whale Boat
YAC	Yacht
YAW	Yawl

Table 3. Country codes used in shipwreck database.

???	Unknown
AUS	Australia
B	Belgium
BR	Brazil
BUR	Burma
CDN	Canada
D	Germany
DK	Denmark
E	Spain
EC	Ecuador
EIR	Ireland
F	France
GB	United Kingdom
GBS	Scotland
HK	Hong Kong
I	Italy
IND	India
JAP	Japan
MEX	Mexico
MS	Mauritius
N	Norway
NL	Netherlands
NSW	New South Wales
NT	Northern Territory
NZ	New Zealand

Table 4. The original 'Lorimer Variables'.

	NAME	TYPE		DESCRIPTION
1	NAME	Character	30	Name of ship
2	RIG	Character	3	Rig (coded)
3	CONST	Character	1	Construction (coded)
4	TONA	Number	6	Tonnage gross
5	TONB	Number	6	Tonnage net
6	STBLT	Character	3	State or country built (coded)
7	PTBLT	Character	3	Port built (coded)
8	WNBLT	Number	4	Year launched
9	BUILDER	Character	40	Builder's name
10	PTREG	Character	3	Port of registration
11	OFFNO	Character	6	Official number
12	REGNO	Character	8	Registration number
13	LNTH	Number	3	Length
14	BM	Number	2	Breadth
15	DPTH	Number	2	Depth
16	ENG	Character	3	Engine type (coded)
18	OWNER	Character	40	Name of owner
19	MASTER	Character	40	Name of master
20	WNLST	Character	10	Date lost
21	WRLST	Character	40	Where lost
22	CREW	Character	4	Number of crew
23	SUNK	Character	1	Method of sinking (code)
24	SALVAG	Logical	1	If salvaged
25	PSGRS	Character	4	Number of passengers
26	PTFRM	Character	3	Port from
27	PTTO	Character	3	Port to
28	CARGO	Number	2	Primary cargo (coded)
30	DTHS	Number	3	Deaths
31	SITETY	Character	3	Depth range of site (coded)
32	LATMAX	Character	10	Latitude maximum
33	LATMIN	Character	10	Latitude minimum
34	LONMAX	Character	10	Longitude maximum
35	LONMIN	Character	10	Longitude minimum
36	STATUS	Character	3	Site located/protected (coded)
37	ID	Number	4	Identification number
38	SECURE	Number	1	Security classification
39	SOURCE	Number	3	Organisation providing information

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Maritime Archaeology of Andhra Pradesh Prolegemenon to a study of a Roman influenced Buddhist culture in South India

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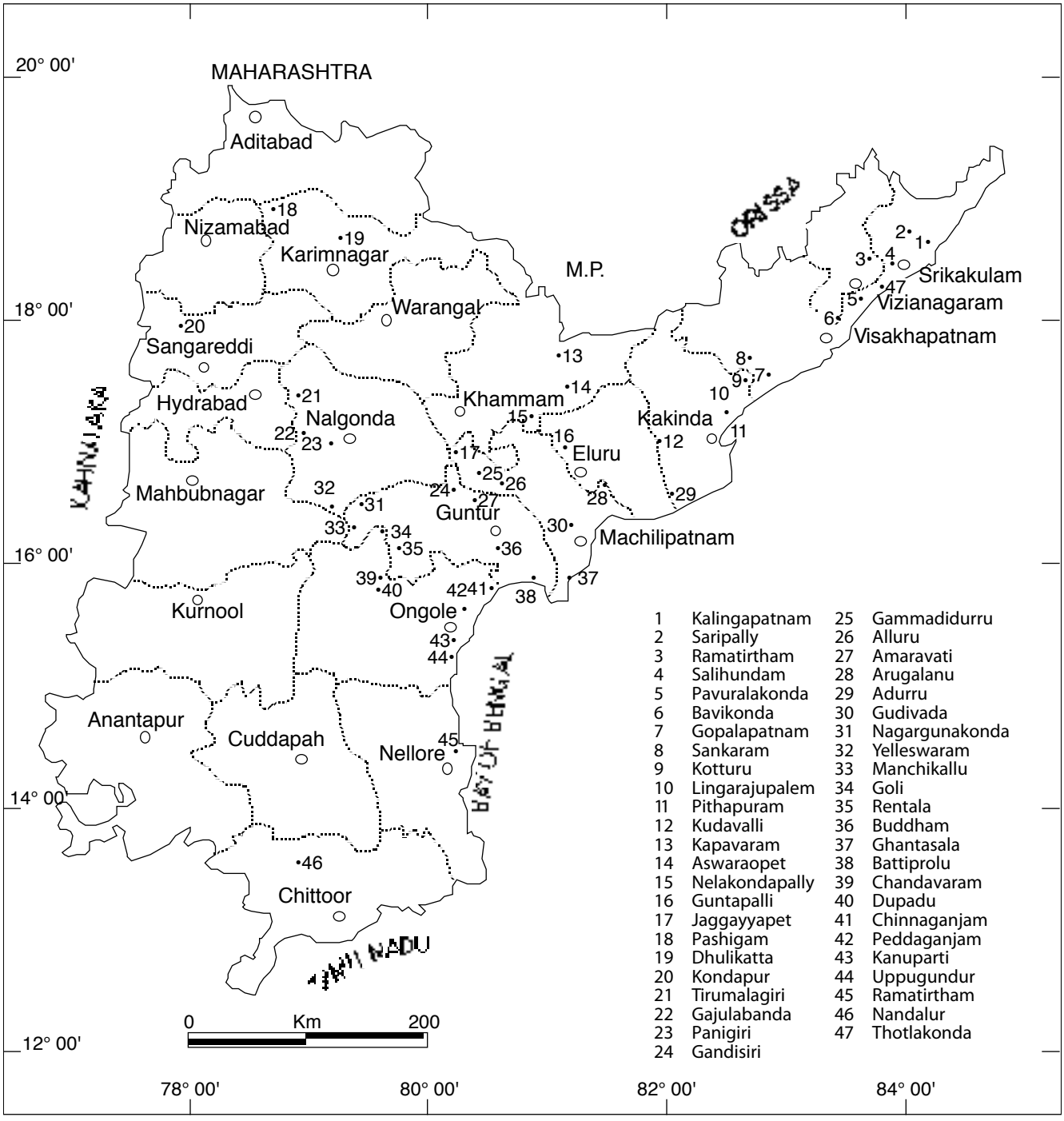

Figure 1. Buddhist sites in Andhra Pradesh.

Recent archaeological excavations at several places in Andhra Pradesh have generated a new chapter in the maritime history of India in general and of Andhra Pradesh in particular. Abundant quantities of Roman pottery, coins, seals, sealings and terracotta figurines found in almost every early pre and post-Christian era site suggests this region's prominent role in the seaborne trade of the time. The magnitude of this seaborne trade

is also associated with the proliferation and prosperity of Buddhist sites along the coast (Fig. 1), the maintenance of which were taken up often by the trading class. The spread of Buddhism across the ocean, especially to mainland Southeast Asia may also be attributed to this Mahayana Buddhist trading class who seemed to have exhibited a missionary zeal.

These findings thus contradict an earlier opinion reached by some scholars[1] that the people of Andhra coast had very few contacts with other countries, especially western world. Studies based only on foreign sources simply cannot give a comprehensive picture of this region's activities. Many of the port towns that existed during ancient times were not even identified properly by earlier scholars since their research was dependent mostly upon existing contemporary place names. Further, many cities and towns ceased to exist because of the transgression and regressions of the sea and the consequent build up of deposits in the form of sand dunes. Sometimes changing courses of the rivers ultimately effected a shift of the river mouths causing the abandonment of ports. In this regard, previous archaeological finds may help us locate ports and other busy emporia that were quite inland, especially those on the banks of the rivers.

Here, attention is focussed on the study of archaeological findings in Andhra Pradesh including inscriptions, coins, seals, sealings, pottery, terracotta objects, structural remains and pictorial depictions.

Inscriptions though small in number contain very important and authentic information that give a definite clue to the nature, extent and significance of Andhra's maritime history. The donative inscriptions at various cave temples of western India (*Indian Archaeology Review* (IAR), 1977-8:71) record the names of several Roman traders most of whom were the residents of Dhenukataka, i.e. Dharanikota (Amaravati) on the western bank of river Krishna in Andhra. Amaravati, famous for its spectacular Buddhist art and early Mahayana literature during the early centuries of Christian era, was accessed by river from the sea. Other archaeological finds, such as Roman amphorae and Roman coins, also indicate that it served as a great emporium for Indo-Roman trade where Roman traders found permanent settlement. The permanent nature of the Roman settlement is known from its adoption of Indian names and its conversion to Buddhism. Four Prakrit inscriptions (*Epigraphia Andhrica* (EA), II, 1974:1-3) of late Satavahana period at Ghantasala were published in 1974. Among them a fragmentary record says that this place was a port (*patan*). A second inscription mentions a gift made by a daughter-in-law of a great mariner (*mahanavika*). The third refers to a gift made by a son of a merchant by name of Dhamma (*Dhamma vaniya*). Further, an epigraph at Amaravati (Luder's List, No. 1303) mentions gifts made by the residents of this place in support for the great *stupa* at Amaravati suggesting that their wealth arose out of successful trading activities. The Roman connections with this region are supported further by an inscription at Alluru (Sircar,1939:330) which mentions the gift of Roman (*Yonaka*) lamps by a certain Mahatalavara.

Numismatics also has a fundamental role to play in the study of the early maritime history of this region. On one side, the indigenous coinage issued by Satavahana kings, a ship motif shows symbolically their serious involvement in maritime trade. On the other side the bulk of Roman coinage unearthed at Andhra shows the quantum of exports made by this region resulting in the gain of profits.

The ship motif coins (Fig. 2) unearthed in coastal Andhra and elsewhere were issued by Vasishtiputra Pulumavi (145-152 AD) and Gautamiputra Yajnasri (165-194 AD). It seems the coastal tracts of Andhra came under the control of Satavahana kings only during the time of Gautamiputra Satakarni (54-88 AD), the predecessor of Pulumavi. He must have taken some time to assert his full powers over the land. By the time of his successor, the consolidation must have been complete and he gained full control over maritime trade. To make this clear, Pulumavi issued double mast ship motif coins. These have been unearthed at places (Sarma, 1980:99) like Amaravati, Penumuli, Mandur and other places along the Coromandel coast. After a few generations the ship motif coins were reissued by Gautamiputra Yajnasri, one of the successors to Pulumavi. All these coins show the same double mast ship motif as those issued by Pulumavi. Except for one at Poona all other coins of this type are reported (Sarma, 1980:103) along the east coast. The places of these finds include Buddham, Vidyadharapuram, Guntur and Chebrolu. A special type of ship motif coin issued by Yajnasri has been cited in the British Museum collection recently by Sobhana Gokhale (*Journal of Numismatic Society of India* (JNSI), XLVI:47). Five ships, three with double masts are represented on the obverse side with the usual *ujjain* symbol on the reverse side. This coin, which is almost double the size of the above noted coins, is unique. All the five ships on this coin represent a fleet of cargo indicating the magnitude of export activity during this period.

Among the coin finds of this period, Roman coins comprise the major portion implying that most of the

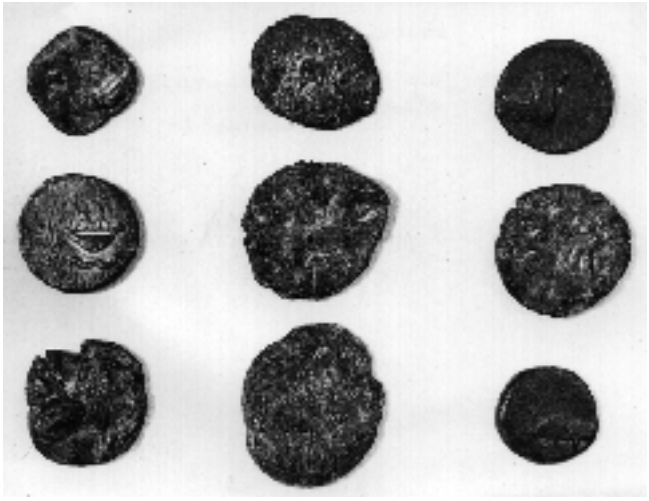

Figure 2. Ship type Satavhana coins—obverse, Guntur District, (State Museums Coins).

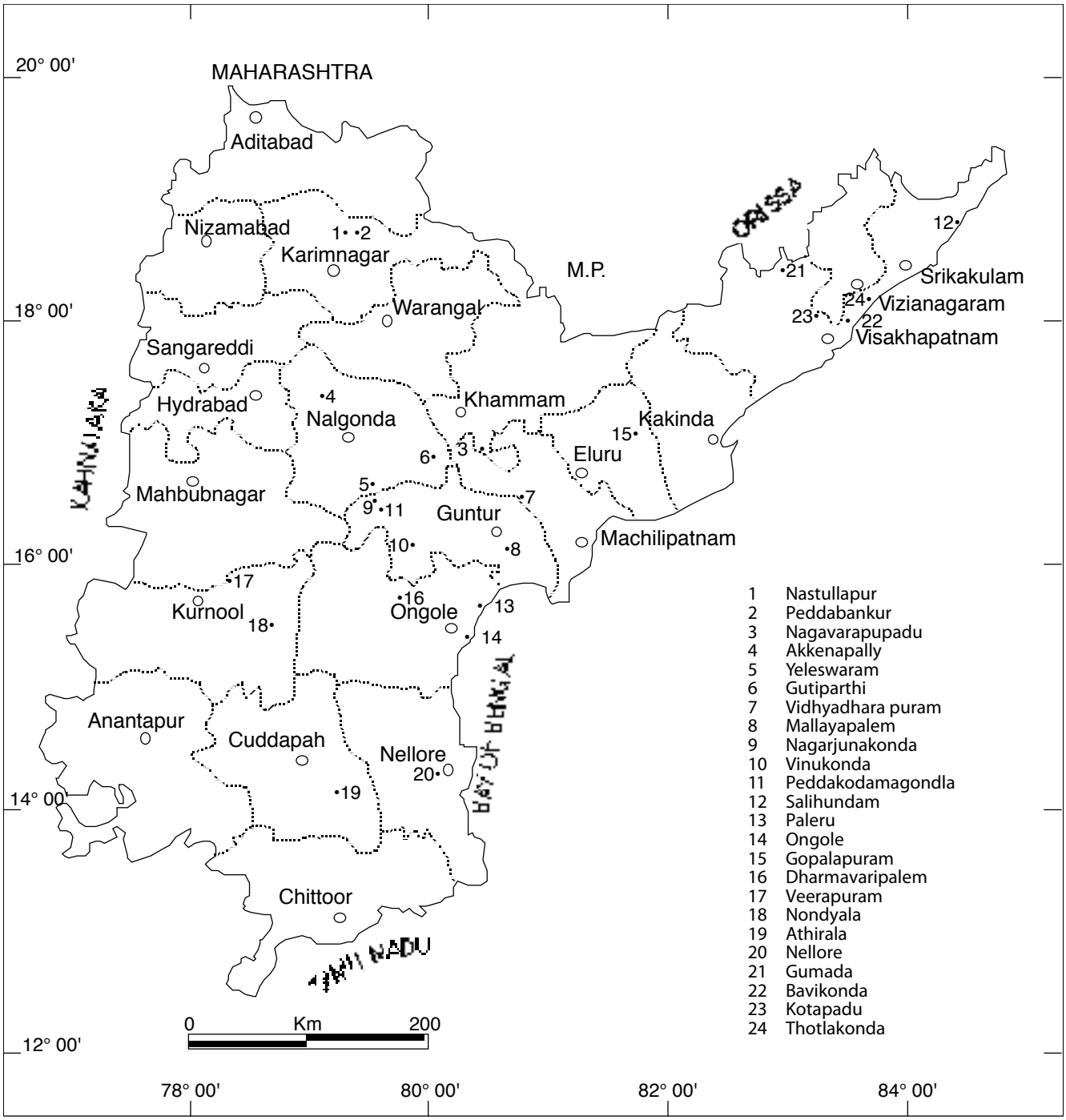

Figure 3. Location of Roman coin discoveries in Andhra Pradesh.

foreign trade of this region was with the Romans at this time. A major portion of Roman coinage found in India comes from this very region (Fig. 3). Hoards of coins are found either along the coast or inland identifying the major port towns and emporiums of those times. These Roman coins are generally either of gold or of silver and the obverse contain the portrait of a king or queen with his/her name inscribed (Figs 4 and 5). The pure metal and beautifully carved portraits must have attracted Andhra people who fashioned their use as ornaments for personal decoration. Sometimes the attraction was so great that many facsimile coins were made of lead with gold covering. The portraits on these coins include Roman kings from Augustus (1st century AD) to Anastasius (6th century AD), the Byzantium king pointing to the time period of trade activity as nearly 600 years. Considering the proliferation of Roman coins it can be surmised that direct sea-borne trade with this region flourished from the reign of Augustus to that of Caracalla (3rd century AD), for nearly 400 years, if not beyond.

The find spots of Roman coins along the coast starting from southern tip are Nellore (*Asiatic Researches*, II:240–41), Ongole (*Annual Report of the Madras Government Museum* (ARMGM), 1905:5,8), Dharmavanipalem (*Annual*

Figure 4. Roman coins from Dharmavaripalem—obverse.

Figure 5. Roman coins from Dharmavaripalem—reverse.

Top—left to right: Julia Domma, Diva Faustina, Diva Faustina.
Bottom—left to right: Nero Casu Augustus, Julia Augustus, Faustina Junior.

Report – Department of Archaeology and Museums (ARDAM), 1983–84:6–7), Mallayyapalem (ARMGM, 1915:4–6), Pedakodumagundla (Sastry, 1992:3), Vinukonda (*Numismatic Chronicle*,IX:325-328), Nagarjunakonda (Gupta,1965), Yeleswaram (IAR, 1977–78:13), Vidyadharapuram (*Report of Archaeological Survey of India* (ASI), 1858:2–5), Kotpad (ARMGM, 1915:5–6), Gumda (ARMGM, 1915:5–6), Bavikonda (Sastry, 1982–86), Thotlakonda (ARDAM, 1989–90:46), Kalingapatnam (IAR, 1978–79), Salihundam (ARMGM, 1899:5, 8). The bulk of Roman gold and silver coinage recovered in the above coastal districts show how much favourable the trade was for the people of this region. This is even more emphasised when the spread of these coins to the internal spots such as Nandyal (ARMGM, 1935:5), Veerapuram (Sastry, 1992:8), Nasthullapur (JNSI, XIX:1–4), Peddabankur (Sastry, 1983:205), Akkenapalle (Gupta, 1965:63), Nagavarappadu (Sastry, 1992:4–6), Kudavelli (JNSI, XLII:11–17) and Wepagundla (JNSI, XXXIV:1–6) is noticed.

The above evidence is an undeniable proof for the deep-rooted trade relations of Andhra and Rome. The pure metal and beautiful depiction of portraits on the Roman gold and silver coins attracted the attention of masses who, as we have noted, wanted them to wear as ornaments. Gradually, it must have become a fashion of the day thus creating an increasing need for more coins. This led to the production of facsimiles evidenced by the discovery of terracotta cast, clay seals, sealings and bullae. A terracotta cast in double mould was recovered from Yeleswaram during the course of excavations (IAR, 1977–78:11). Clay seals, sealings, bullae depicting masks and tridents, probably the specimens of Roman emperors, were unearthed at Nagarjunakonda (IAR, 1957–58:9). Clay bullae resembling that of Roman gold coins were also found at Vijayapuri (*Indian Historical Quarterly* (IHQ), **38**.4:277–8), near Nagarjunakonda. The above types of clay seals, sealings and bullae were recovered during the excavations at Kondapur (Sankalia, 1960:201). These types of clay bullae, seals and sealings also have been recovered from various places mostly from other coastal tracts of Indian sub-continent.

In addition to Roman coinage, Andhra people were also impressed very much by the size, shape and fabric of Roman pottery. They came into contact with and made use of Roman pottery in the same manner that they came into contact with Roman coins: through trade activities. As the Andhras were not in much need of goods from Rome they accepted mostly either gold or silver coins or decanters and wine coolers. The wine containers were called amphorae (Fig. 6) and were generally quite large in size so that from a single one of them four persons could quench their thirst at mid-summer. Struck by this fanciful kind of pottery, they started importing other varieties along with terracotta figures, glass bangles and beads. After some time, they started manufacturing facsimiles in Andhra. The variety of pottery consists of Roman amphorae, Arretine ware, Rouletted ware, Samian or Red polished ware. Among the varieties, the Rouletted ware is especially prolific in this region.

Fragments of Roman amphorae have been discovered during the course of excavations at Nagarjunakonda (IAR, 1957–58:9), and Yeleswaram (IAR, 1977–78:9–10).

Figure 6. Roman type sprinklers (decanters) from Yeleswaram, Nalgonda District.

Yeleswaram excavations also yielded the Samian type of ware (IAR, 1977–78:9–10). Arretine ware was noticed at Dharanikota (IAR, 1963:1–2). Rouletted ware was noticed at a number of places such as Kotilingala (ARDAM, 1981–82, :22), Kondapur (Saundararajan, 1980:35), Chintamadidibba (IAR, 1971–72:4), Neredubandagudu (IAR, 1971–72:4), Dharanikota (*Ancient India*, 13:19), Amaravati (IAR, 1973–74:5), Satanikota (IAR, 1976–77:7–8), Siddhirajalingapuram (IAR, 1976–77:7–8), Vamulapadu (IAR, 1976–77:7–8), Chagatur (IAR, 1976–77:7–8), Karapakota (IAR, 1976–77:7–8), Kudavalli (IAR, 1976–77:7–8), Vyaparladevipadu (IAR, 1976–77:7–8), Tipparaipalli (IAR, 1976–77:7–8), Chandavaram (IAR, 1976–77:9), Kalingapatnam (IAR, 1976–77:9), Salihundam (IAR, 1977–8:8), Yeleswaram (IAR, 1977–78:8). Some sherds of rouletted ware and russet coated painted ware were also unearthed (IAR, 1963–64:4) from Jambuladinne, Mittapalli and Nilugondla.

Terracotta figures and sculptures of Roman influence were also reported from many early historic sites of this region. The terracotta human figures found at Yeleswaram (IAR, 1977–78:9–10) bore striking resemblance to similar figures recovered in Mediterranean countries. Nude female figures are goddess figures of Graeco-Roman origin. Many terracotta portrait heads of figures of unmistakably Roman stylistic affiliation were also unearthed (Yeleswaram Excavations:9–10) at Kondapur and Nagarjunakonda. The terracotta finds at Dhulikatta (ARDAM, 1975–76:7) included a red slippered human figurine, possibly fashioned after a Roman trader, wearing a discular hat with a rosette at the top with his mouth wide open. The model of the face with aquiline nose and open mouth showing teeth is typical. The other finds include a Kaolin figure seated in Dhyanamudra and two figurines of mother goddesses of Hellenistic and Roman inspiration.

Along with a Roman coin made of base-silver with the portrait head of emperor Augustus, many types of beads made of terracotta, amethyst, crystal, jasper, faience and also gold were recovered from the excavations at Dhulikatta (ARDAM, 1976–77:16). A few unfinished beads of crystal are proof that beads were manufactured and exported from here. The Roman coin suggests that the exports were probably intended for the Mediterranean region. Such type of bead-making industry was also reported at Kondapur (Dikshit, 1952) Among other items, the Dharanikota excavations (IAR, 1963:1–2) also yielded Roman glass bangles of varying shapes and colour including cameocut. One of the *stupas* at Nagarjunakonda yielded two gold medallions of pure Roman form and workmanship.

Intense trade relations thus prevailed contributing to cultural and religious transformation. The Roman impact in Andhra is seen in the form of sculpture and architecture. Many sculptural representations of Roman males and females at Amaravati (Sivaramamurty,1956:116–119) and Nagarjunakonda (Krishnamurthy, 1977:36–56 & 253–255) provide evidence for the free mixing of Romans and native people in those times. The discovery of a stadium (Sarcar & Misra, 1957:22) after a Roman model (amphitheatre)

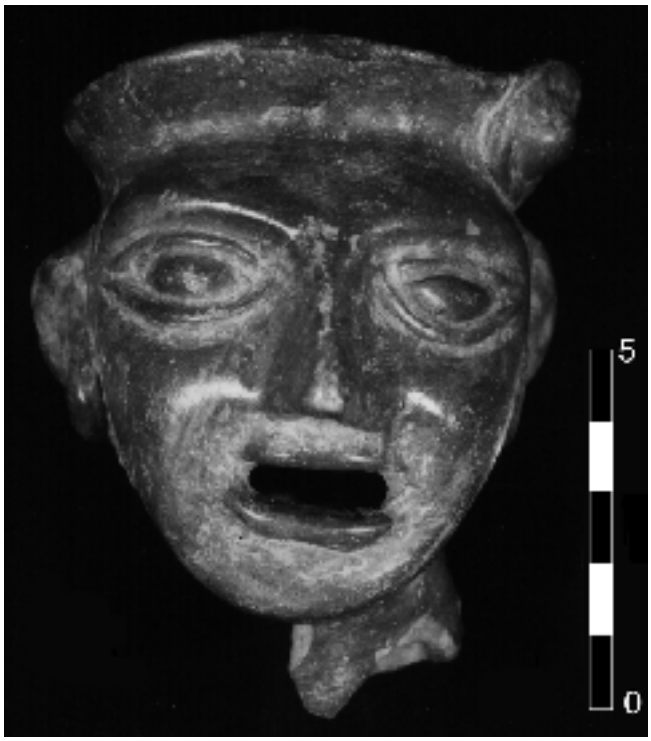

Figure 7. Roman trader terracotta figurine from Dhulikatta, Karimnagar District.

at Vijayapuri near Nagarjunakonda is the best example for the importation of architectural styles. Evidence from epigraphs reflects how Roman traders were Indianised by changing their names and converting to Buddhism. A great cultural synthesis occurred during this period.

The change in the climate and atmosphere of the society can be noticed from the sculptural reliefs from Amaravati and Nagarjunakonda. Some reliefs depicting drinking scenes, where drinks are being served by girls of foreign origin, are unmistakable testimony for the luxury and lavishness of the society probably due to the wealth acquired from trade. This is again said to be contemporary Roman society—decadent, devoted to vanity and pomp—reflected in sophisticated court life and in group gatherings where women played a seductive role.

Economically this region witnessed a tremendous change due to urbanisation. Many a centre rose to the position of cities with their market facilities. The cities such as Amaravati, Nagarjunakonda, Goli, Peddabankur, Dhulikatta, Kotilingala, Brahgmagiri, Chandravalli, Maski, Kondapur, Kolhapur, Masulipatnam, Ghantasala, Kalingapatnam, Salihundam etc. come under this category.

Thus, the society on the whole was exposed to altogether new traits that were brought from the West due to intense oceanic trade activities. However, the impact was felt within a stipulated time of about 400 years when trade contacts prevailed with the West. Later this trade was aborted and a great epoch remains buried under the layers of the earth awaiting the archaeologists' spade to unravel its mystery.

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[1] The archaeological evidence during the early 20th century did not throw much light on the participation of Andhra in maritime trade. The literary descriptions also do not give much information about this aspect. Hence scholars like Mookerji (see: Radha Kumud Mookerji, 1912, *History of Indian shipping and maritime activity from the earliest times.* Longmans, London:118–141 and Warmington, E.H., 1928, *The commerce between the Roman Empire and India.* Cambridge University Press, London: 9–10, 56–57, 63 and 112–16) opine that Tamil Country alone had a great role in South Indian maritime history.

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Between the devil and the deep blue sea: maritime archaeology and museums

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In this paper (presented in November 1992) I summarise the historical development, within Australia, of the relationship between maritime archaeology and maritime museums, and I go on to look at current issues affecting the Western Australian Maritime Museum.

Australia has rediscovered its maritime roots during the past 30 years, partly as a result of the efforts of a small group, calling themselves maritime archaeologists and associating in various ways with museums.

Until the 1960s interest in old shipwrecks was a private affair. Divers raised souvenirs but there was no government research involvement, and no material to be seen in museums. The Receiver of Wreck, an officer attached to the Customs Department, was the only person with an official interest.

This situation changed suddenly in 1963 with the finding, in Western Australia, of the 17th century Dutch shipwreck *Vergulde Draeck*. The finders assigned by legal deed their finds and their legal rights as owners to the wreck across to the Western Australian Museum, an institution that had no previous interest in maritime history or archaeology. In accepting the rights to the wreck the Museum took on a responsibility for its care. The Museum mounted a display of shipwreck relics, and responded to community pressure for specific legislation to protect historic shipwrecks. The legislation was passed in 1964.

It should be remembered that the initiatives came initially from members of the diving community - the finders - who went to the Museum to lobby for a responsible approach to the permanent care and exhibition of the relics, and to the legislators to gain full protection of the wreck as an archaeological site.

In the 1970s in Western Australia maritime archaeology passed through an exciting 'pioneer' phase. The Museum, after a damaging period of contemplation, during which it employed ex-Navy divers simply as 'watch keepers' to protect sites, took the view that looting of sites containing silver bullion could only be avoided by excavation. Large Museum collections were subsequently obtained from the four early Dutch shipwrecks and from four other early post-Australian-settlement sites.

In the 1980s Western Australia exported its pioneer vigour to the other States of Australia and to Asia. In the other States I initiated archaeological work on the rum trader *Sydney Cove* (1797), the British Navy pursuit ship *Pandora* (1791), and the flagship to the First Fleet to Australia, the *Sirius* (1790). In Asia, Jeremy Green started with surveys and excavations in Thailand and has now run programmes in a number of countries.

At the same time, a number of other developments were occurring in Australia. Concerned diving groups were establishing links with State governments, using the Commonwealth's legislation, the *Historic Shipwrecks Act 1976*, to lobby State governments to start programmes in each State. A course at Curtin University, using Western Australian Maritime Museum staff, was providing the professionals for the new programmes in the other States. And all States were becoming increasingly conscious of the differences in approach between maritime archaeology and cultural resource management. This latter approach was also emphasised by the Department for the Arts, Sport, the Environment and Territories - the Commonwealth funding body (now DAS, the Department for the Arts and Administrative Services) and very few excavations now take place in Australian waters.

Within Australia today there are scores of maritime museums: a reflection of demography and recreational preoccupation with the water. But maritime archaeology museums - museums with a predominant, or at least substantial, focus on interpreting the results of maritime archaeological investigations - are few in Australia, even among States with maritime archaeological programmes.

The Western Australian Maritime Museum at Fremantle, the Geraldton branch of the Western Australian Museum, and the *Sirius* Museum on Norfolk Island, are the only museums with a predominant focus on maritime archaeology, and of these, only the Western Australian Maritime Museum has any resident maritime archaeologists. In Western Australia, Queensland and the Northern Territory the maritime archaeology units have been based within general State museums (the Western Australian Maritime Museum has been effectively a branch of the Western Australian Museum). The Tasmanian unit is housed in the Department of Parks, Wildlife and Heritage but has an exhibitions outlet at the City Council funded Queen Victoria Museum and Art Gallery in Launceston. The New South Wales unit is based in the Heritage Branch of the Department of Planning, but has the potential to develop links with the Australian National Maritime Museum in Sydney. The South Australian unit (housed in the State Heritage Branch, Department of Environment and Planning) and the Victorian unit (housed in the Maritime & Historic Archaeology Unit, Aboriginal Affairs Victoria), have both so far missed out on effective museum linkages. There has been a tendency in the States having such linkages (notably Western Australia and Queensland) to engage in more active field research programmes involving excavations, while States missing such a facility (notably Victoria) have given greater emphasis to cultural resource management. None of the maritime archaeology units have developed within university structures, although in Western Australia there are close links with Curtin University, and the University of Western Australia is developing one student through a PhD, on a subject which fits the broad definition of

maritime archaeology.

Among the recent issues and trends impinging on maritime archaeology units and associated museums in Australia are the recession—resulting in belt-tightening for us all, government sector reviews and restructures, moves toward devolution, moves toward self sufficiency—as State government funds inexorably dry up, cultural tourism—our salvation perhaps?, support for community access—'increase your attendance figures or else', and 'put glass walls on your collection areas so that the public can see everything happening', and regional access—'now the country towns want culture!'

I will dwell now on the current situation of Australia's foremost maritime archaeology museum. We are annually increasing our attendance figures. Last year the Maritime Museum (including its B Shed annex) attracted 180 000 visitors—up substantially from 130 000 in the previous year. Current projections for this year are closer to a quarter of a million, an increase of 20%. This is a good performance during a recession. But we have lost 2 staff (an 8% reduction) this year, and the maritime archaeology department has again had its State Government operating budget cut.

As a result of an external inquiry looking at museum policy for government—the State Government Taskforce on Museum Policy, and an internal inquiry looking at cost-saving measures—accountants Ernst and Young, the Trustees of the Western Australian Museum determined in June 1992 that the Maritime Museum should become a State Maritime Museum, independent of the WA Museum, by June 1994. The decision has been warmly welcomed by the staff of the Maritime Museum, who have a clear sense of mission, and a confidence in their product.

Management challenges over the next 18 months include the recruiting of a new board, restructuring to effectively operate independently with a direct grant from State Treasury, maintaining funding levels, drafting enabling legislation, developing a corporate plan, and moving the delegation of the *Historic Shipwrecks Act* from the Western Australian Museum across to the Maritime Museum.

Another challenge, rather more ominous, has arisen during the past several months. The centrepiece of the Maritime Museum's displays is the reconstructed stern of the *Batavia* wreck. The wreck site lies 48 km out to sea, 480 km north of Fremantle. Back in the 1960s and 70s, when the wreck was excavated, the relics were brought to Fremantle because that was where the research, conservation and exhibition facilities were. A number of Geraldton residents (Geraldton is the nearest mainland city to the *Batavia* wreck, and the home of its finders) argued that the relics should be 'returned' to Geraldton when conservation was complete, and a small museum was indeed created there during the 60s as a branch of the Western Australian Museum, to house some of the *Batavia* wreck material.

But now it has become a big issue. One of the finders argues boldly that **all** of the *Batavia* relics should be in Geraldton, along with **all** the relics from the *Zeewijk* and the *Zuytdorp*. The local president of the Chamber of Commerce has formed a committee for the sending of the *Batavia* to the 'Batavia Coast', and he has developed quite a crusade in Geraldton. A couple of the local politicians have also entered the campaign.

An election is due soon in Western Australia, where the government has just spent over $M50 on a Royal Commission into WA Inc.—a phenomenon whereby government developed overly close associations with business in an attempt to create a corporatist state. The Government has also created a Parliamentary Select Committee to determine whether some more or all of the *Batavia* material should be sent to Geraldton.

It is appropriate that regional communities be given equity in museum matters. Every museum director must be delighted if his or her exhibitions and collections evoke covetous desire among other museums. The Western Australian Maritime Museum has in the past gracefully acceded to the demands of the Netherlands Government and the Commonwealth Government, and sent representative samples of Dutch shipwreck material to those two bodies. And at a time when we are headed for the status of an independent State maritime museum we are interested in developing productive linkages with regional museums such as that at Geraldton. But the idea of sending **all** of the relics from those three shipwrecks to Geraldton raises important research and conservation problems, as well as a threat to the museum's viability as a maritime archaeology museum.

The Parliamentary Select Committee wants to answer four questions:

Firstly: Whether the Western Australian Museum in the 1960s made commitments to Geraldton that it would send some or all of the *Batavia* relics to Geraldton (an ex-Museum Director wrote to one of the finders in 1964 that **all the *Batavia* material** would be returned to Geraldton).

Secondly: Whether the Museum has honoured any such commitment.

Thirdly: What, if any, further displays should be developed in Geraldton.

Fourthly: What sort of environment should such displays be given.

In their attempt to find an equitable solution the Committee has taken public submissions and questioned witnesses about the legal, professional-ethics, and personal-ethics dimensions of the four terms of reference.

I will deal with the legal side first. Legally, the situation of the relics was unclear in 1963 when the *Batavia* wreck was found. The *Navigation Act* and vague notions about rights to treasure trove were all we had to go on. The first State Act dealing with maritime archaeology was passed in 1964. Then an arrangement was made between the Dutch Government, the Commonwealth Government and the State Government whereby the Dutch Government passed any rights it might have as the inheritor of the VOC on to Australia, in return for a small representative collection. The Commonwealth claimed the right to legislate over

the sea-bed in the 1970s, and the *Batavia* (and its relics) came under the *Historic Shipwrecks Act* in 1976. The *Historic Shipwrecks Act* claims jurisdiction over all relics from the *Batavia* whether retrieved before or after the passing of the legislation. The responsible Minister has powers over disposition.

Now I will deal with the professional ethics. Various documents have been produced by relevant professional organisations as guide-lines for consistent approaches to the disposition, preservation, and researching of relics from old shipwrecks. So in regard to disposition, for example, the Charter of the International Council on Monuments and Sites states that relics should not be moved out of their context unless there are very strong reasons for doing so. The Ethics Document of the International Council of Museums states that museums with overlapping regions of acquisition should ensure that they communicate effectively with one another before collecting. The Australian Institute for Maritime Archaeology has a policy that the bulk of any archaeological collection should stay in its State or Territory of origin.

We can of course debate the question of context. If the appropriate context is the sea-bed off the Abrolhos, it is too late for that - the material has been raised. And the Abrolhos Islands terrestrial environment is too delicate for the site of a popular museum. Geraldton, some 80 km away, is the closest mainland city, but it did not exist at the time of the wreck, and the survivors did not go there, so the only 'context' is the modern identification, for tourist purposes, as the 'Batavia Coast', and the identification of the finders with the relics. Fremantle, some 480 km from the wreck site, is the place where the relics were initially taken for treatment, research and exhibition 15–30 years ago, and the place where succeeding governments provided further housing facilities. Here I will mention Sydney also. Peter Doyle once put it to me that great exhibits, like the *Batavia* timbers, should be in great museums. It takes a great city to make a great museum. Sydney is a great city…and so the logic goes.

On this question of context the Maritime Museum in Fremantle lies somewhere between the devil and the deep blue sea. There is a need for a good museum in Sydney, but Fremantle , and Geraldton also have their needs.

The preservation and research aspects however strongly point to the retention of the material (or particular elements of it) in Fremantle. Transporting the timbers would place them in jeopardy, as would separating them from the conservators in Fremantle.

Now I deal with the personal ethics question. Did the Museum Director of the time make a personal commitment that all *Batavia* relics would be sent to Geraldton? During the taking of evidence it became clear that the letter written in 1964 related to a small collection of relics raised by a private expedition to the *Batavia* site in July 1963. It did not relate to material still on the wreck site in 1964, including the timbers and the portico façade now in the Maritime Museum in Fremantle. It is clear that the Museum fulfilled its commitment of 1964.

I should mention here that the Geraldton Region Museum is, like the Maritime Museum in Fremantle, a branch of the Western Australian Museum, and like the Maritime Museum, Geraldton is likely to become autonomous in the future, a factor which could pose a threat to its funding sources. The acquisition of the total collections from the *Batavia,* the *Zeewijk*, and the *Zuytdorp* could in such circumstances be an invaluable asset. On the other hand, the loss of those entire collections could sound the death knell for the Maritime Museum in Fremantle in its present form.

The Select Committee has now completed its taking of evidence. It is due to report by the second week of December. During their evidence witnesses from the Maritime Museum argued for the most effective utilisation of the shipwreck relics resource through sharing, and the planning of different themes – different types of exhibitions—at the two venues, such that they would maintain different identities. We feel reasonably confident that the Committee will reach a conclusion that will be pleasing both to the people of Geraldton and the people of Fremantle.

This is not the first time that there has been debate over the disposition of shipwreck material between Australian museums, and I am sure it won't be the last. The debate itself is a healthy indication of the growing community interest in, and the value attributed to, maritime archaeology and its various products, and as such is to be welcomed, provided that the care and integrity of the collections is not lost sight of in the process.

Postscript

The Select Committee recommended that the portico façade be exhibited in Geraldton and this has been a matter of some considerable controversy.

References

Pendal, P., Hon., 1992, Report of the Select Committee on the *Batavia* relics. Legislative Council, Western Australia.

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Jones, C.W., 1986, Water in the transport system. *Bulletin of the Australian Institute for Maritime Archaeology,* **6**(1): 44-86.

Adams, C.F., 1984, *Restaurant at the end of the Universe*. Penguin, London.

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