

Preliminary Report on the Excavation of the 17th-Century Anglo-Dutch East-Indiaman *Avondster* in Bay of Galle, Sri Lanka

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The *Avondster* was a 17th century British ship captured by the Dutch and used by the United Dutch East India Company (VOC) trading with Asia until it was wrecked in Galle Harbour, Sri Lanka in 1659. The shipwreck was found in 1997 to be in very good condition but under threat from development in the harbour. From 2001–2004 an archaeological project was implemented by the Dutch/Sri Lankan Mutual Heritage Centre. The aims were to record and recover important cultural material as well as to build up the capacity of a Sri Lankan Maritime Archaeology Unit for implementing future work.

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Sri Lanka, formerly Ceylon (until 1972), is strategically located between Arabia and East Asia, at a natural crossroads of navigational routes, and has been a centre of trade and cultural exchange since ancient times. Sri Lanka's seafaring history, and the archaeological riches of its land sites, suggests that its underwater sites may prove comparably fascinating. In 2001 a Maritime Archaeology Unit (MAU) was formed under the Mutual Heritage Centre, managed by the Sri Lankan government agency, the Central Cultural Fund, in co-operation with the Amsterdam Historical Museum, the University of Amsterdam, the James Cook University, the Western Australian Maritime Museum and the Mexican National Institute of Anthropology and History (INAH), and sponsored by the Netherlands Cultural Fund (Fig. 1).

Their first major project was the excavation of the *Avondster*, one of five Dutch East-Indiamen wrecked in and outside the harbour at Galle.

Galle Harbour has an impressive number of heritage sites. Underwater surveys carried out there since 1992 have revealed 26 archaeological sites dating from the 13th century, through the arrival of Europeans in the 16th century, to modern times (Fig. 2). Several stone anchors of Indo-Arabian pattern have been discovered, including one from Oman weighing almost a ton, and an anchor of Mediterranean pattern (Souter, 1998). A celadon bowl of the Southern Song dynasty (13th century) is one of the few relics of early trade with China; the later blue-and-white Chinese trade ware is abundant (Prickett-Fernando, 1990). While Sri Lankan archaeology is rich in cultural treasures



Figure 1. The Maritime Archaeological Unit (centre left) located on a jetty of the old harbour. The building, housing the dive station, a artefact storage area, a conservation laboratory and the office, was destroyed in the tsunami of 2004. (Avondster-Project)



Figure 2. Map of Galle Harbour showing located archaeological sites. (Avondster-Project)

from much earlier periods, it is the combination of several United Dutch East India Company (*Verenigde Oost Indische Compagnie*, or VOC) wrecks with the VOC's extensive historical archives that makes Galle Harbour so interesting. The Dutch administrative records and maps helped to identify the shipwrecks and to understand their historical context. This preliminary report presents the first results of the excavation of the VOC ship *Avondster* and related historical and archaeological research in the context of a broader field of research relating to Galle's importance as a port city in the Indian Ocean region.

The *Avondster* project had a number of aims in addition to the survey, excavation and conservation of the site and artefacts. One of the primary goals was, through the involvement of Sri Lankan archaeologists and conservators, to build up local capacity and infrastructure so that a maritime archaeology programme in Sri Lanka could continue. Another important goal was in the development of a Maritime Museum, based to some extent on the material recovered from the *Avondster*, but also incorporating Sri Lanka's broader maritime history, its sites, and the people involved. The capacity-building essentially started

in 1992 as a maritime archaeology training project in Galle for Sri Lankan archaeologists. This was initiated by the Post Graduate Institute for Archaeological Research (PGIAR), the Central Cultural Fund (CCF) and the Archaeological Department in Sri Lanka, and assisted by the Western Australian Maritime Museum. After two years of training, the project moved to the survey and rescue excavation of a number of shipwrecks and other underwater cultural heritage sites in Galle Harbour because of the potential impact of a proposed development. From 1997 the focus again centred on training, and from 2001, with the acquisition of Dutch funding, an extensive training program was developed in association with the excavation of the shipwreck.

Galle, an important port city

The choice of Galle as the initial focus for maritime archaeology in Sri Lanka was with good reason. The port city of Galle in the south-west of the island had a splendid natural harbour in the days of sail. In use from pre-Christian times, the port gained importance after the 12th century. By the 14th century it was arguably the most important port in the country, and retained this pre-eminence until 1873 when an artificial harbour was built at

Colombo. The great Chinese admiral Zheng He commemorated his visit in 1411 by leaving a trilingual inscription in Chinese, Tamil, and Persian (incised in Arabic script), implying a cosmopolitan trading community. The Portuguese arrived in 1505, and later built a small fort, but it was after Galle was captured by the Dutch in 1640 that the city rose to its greatest prosperity (for local traders as well as from the Dutch viewpoint). The Dutch rebuilt the town and strengthened the fortifications. The English took over in 1796 but made few changes to the infrastructure, since British commercial and imperial interests led to Colombo steadily gaining at the cost of Galle. Hence it is the surviving Dutch architecture of the 17th and 18th centuries which adds to the unique character and charm of the city (Fig. 3). Among the VOC's Asian trading ports, Galle was second only in importance to Batavia (now Jakarta).

Fleets of ships came to Galle each year for trade, supplies, and repairs (Fig. 4). Although the inner harbour was considered safe during most of the year, the harbour entrance was not. Reefs and submerged rock pinnacles were a danger, and to enter the bay safely, skippers needed a local pilot. Galle also had a small shipyard and skilled craftsmen who could carry out necessary repairs. Important trade items included textiles, pepper



Figure 3. The VOC warehouse, built in the 1660s, played an important role in the logistics of the shipping and the trade. After restoration it will house the New Maritime Museum. (Avondster-Project)



Figure 4. View of Galle fort and part of the Bay. Behind the Black Fort on the left is the anchorage from which *Avondster* drifted to shore. (Baldeus, 1672, Amsterdams Historisch Museum)

and yarn from South India, cinnamon, cardamom, pearls, gems and elephants from Sri Lanka. Some of the local products were exported only a short distance (for example, elephants from Sri Lanka to India), while others went further afield. Textiles were important in trade with other parts of Asia, while most of the cinnamon was exported to Europe. The VOC was active in handling all of these goods, using a variety of ship-types for specific routes and cargoes. This is represented in the wrecks found in Galle Harbour. The wreck of the *Avondster* (1659) therefore reflects the organisation of trade and shipping in this important period of European expansion in Asia.

When the Dutch first traded with Asia, all their ships made the long and dangerous voyage from Europe and back, but this was soon replaced by a 'hub-and-spoke' system. The Dutch captured Jakarta (Java) in 1619, renamed it Batavia, and made it the hub of their Asian trade. Small ships were dispatched to trading ports all over Asia, and the cargo they brought to the central storehouse was conveyed to Europe by large 'return-ships' (*retourschepen*), specifically designed for the lengthy voyage and usually of 500–1100 tons. During the VOC's first 50 years it developed different ship-types depending on the type of cargo, the distance to be travelled, the ports involved and the sea-conditions expected.

A class of 'yachts' was designed for Asia (Parthesius, 1993). Two of the ships specially built for the Asian trade were wrecked in Galle: the *Hercules* in 1661 as it departed with a cargo for Batavia, and the *Dolfijn* two years later on arrival from Surat. The *Avondster*, in contrast, was a modified English ship, and had made several trips between Europe and Asia before being 'retired' to the Asian routes. Two return-ships, the *Barbesteyn* (1735) and the *Geinwens* (1775), were also wrecked in the bay of Galle (Parthesius, 1997).

Smaller ships were required to transport goods from production centres to trading hubs, including those using the Dutch-built network of canals in Sri Lanka. The range of vessels included local *dhoni* and sloops. The use of the *dhonis* as pilot vessels can be seen in an 18th-century print of Galle Bay (Fig. 5). This also shows the use of Dutch ship-types which must have been built locally or shipped to Asia because of their small size (VOC, 1169 folio 123 and 159). It is known that in the 1660s boats were built in Galle ranging in size from 36 to 68 tons (SLNA 1/5973 folio 24 and 288, NA VOC 887).

Historical background of *Avondster*

Avondster was wrecked on 2 July 1659. The ship had been anchored near the Black Fort and

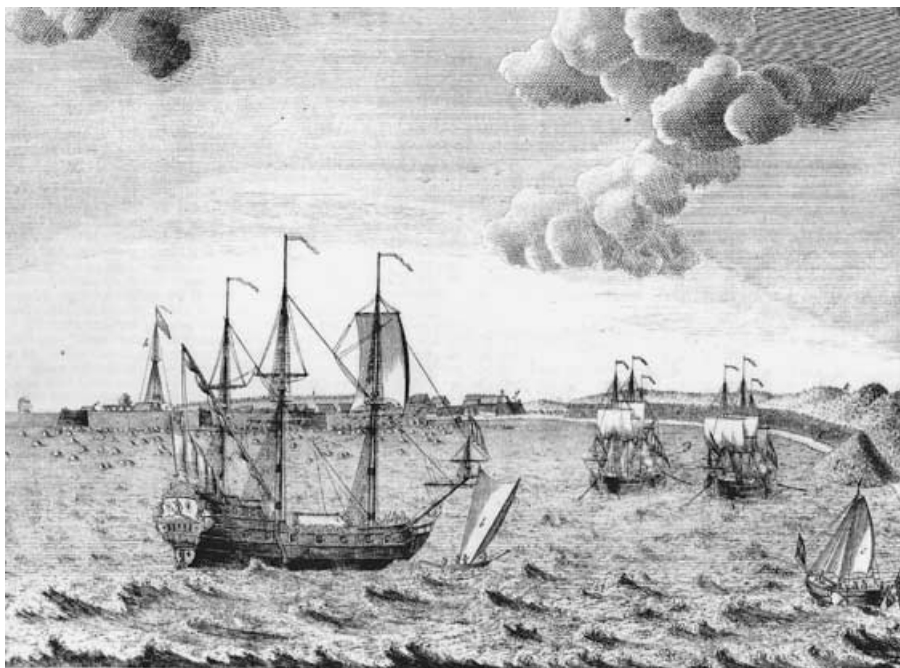


Figure 5. Sailing into the Bay of Galle. Local *dhoni* were used to ferry pilots out to ships and then guide ships into the harbour. (Heydt, 1735, Amsterdams Historisch Museum)

during the night, although the weather was fine, slipped its anchor and hit the shore north-east of the anchorage. It broke in two, and was soon submerged in the soft sand. An eye-witness account, found in Dutch records within the National Archives in Colombo, tells how a sailor on deck discovered the vessel drifting and tried to wake the skipper. He, however, was slow to appear and by the time he ordered the warp anchor to be thrown out it was already too late. After the disaster, the skipper and the first mate were arrested, convicted, and ordered to pay for the losses (SLNA, 1/9 80–09–1659; NA VOC 1230 fol. 159–66).

Blessing, an English East-Indiaman

When it sank, *Avondster* was in the service of the Dutch East India Company, but it was originally built and used by the English. The vessel's exact age is unknown: first recorded as the *John and Thomas*, it was bought by the English East India Company in 1641 (Sainsbury, 1906: ii, 69). Renamed *Blessing*, it was dispatched to Java. In English records the vessel is listed as 250–260 tons, with a crew of about 65 for major voyages (Sainsbury, 1906: iii, 27). Reflecting the general fortunes of the East India Company, the *Blessing* made two relatively straightforward out-and-

back voyages (to Bantam in 1642–43, and to Surat and Bantam in 1644–45) but was then deployed increasingly in regional trade, making only one more voyage to England in 1650. The deployment of a vessel in the Asian regional trade can be a reflection of weak markets and intensifying trade competition, but the *Blessing* may have been showing signs of age. In 1645–6 the Company proceeded with repairs after determining that its career could be economically extended for a further seven or eight years (Sainsbury, 1906: iii, 457). The *Blessing* survived for another 13 years, and at the time of its loss was described by VOC officials as an 'old yacht'.

In 1652 the First Anglo-Dutch War broke out, and although this conflict was ostensibly about local trade issues in Europe, it gave the VOC an excuse to attack its major competitor. It promptly captured five English ships, the *Duyf* near Batavia and *Roebuck*, *Leonoret*, *Supply* and *Blessing* in the waters around Persia—where the Dutch lay in wait from February 1653 for unsuspecting English ships arriving from India. After a month the *Supply* arrived from Surat and the *Blessing* from Coromandel. The English at Gombroon¹ were looking out for these ships to warn them, but they failed to spot them and a battle ensued (Foster, 1915: 175). After its capture the *Blessing* was sent to Java. The name

Avondster first appears in a letter from Batavia reporting the prizes to the VOC's directors; the new name means 'Evening Star' and may refer to the vessel's age, as ships were often given names appropriate to their function or qualities (NA VOC 1201; f. 821).

Avondster a Dutch East-Indiaman

Avondster was sent to the Netherlands in 1654 where it stayed for a few months, probably receiving some refitting and modification. The galley of Dutch bricks found on the wreck-site is evidence of refitting; there is also evidence that the VOC added extra layers of hull-planking. Also found on the wreck-site were hanging knees—bracing timbers for the decks—which show the ship's English origin, as they were not used by Dutch shipbuilders. In 1655 *Avondster* returned to Batavia. On a voyage the following year to Japan, it carried two large globes and an expert to explain geographical data to the emperor. The departing VOC chief official in Japan returned on the *Avondster* to Batavia (NA VOC 880; f. 278). No records have been found suggesting the ship was unseaworthy, and indeed it was employed to carry valuable cargo and important people. In 1657 the vessel departed for the Netherlands but returned to Batavia due to severe leaking. The cargo was transferred to another ship and *Avondster* never sailed to Europe again (Diary Batavia 1656/57: 105). *Avondster* was soon reassigned to escort duties at Craowan (bay of Batavia) and then to command a blockade of Bantam (Diary Batavia 1656/57: 139).

Avondster continued active service in Asian waters, being despatched to southern India, where Commissar Rijckloff van Goens was campaigning against the Portuguese, but decided that the Dutch were too weak to attack the Portuguese immediately. Defeat would have left Ceylon just partly-captured and unprotected, and he wanted first to assemble a larger fleet. He left several ships near Goa under the command of Adrian Roothaens. The guns of *Avondster* and three other ships were transferred to bolster their firepower, and the fleet which stayed behind for the blockade of Goa comprised nine ships with 352 heavy guns and 1100 soldiers (NA VOC-1227; f. 319ev). *Avondster* was sent to Ceylon to inform Governor Van der Meijden about plans to attack the north coast, but could not reach her destination due to unfavourable weather, and waited off Cape Comorin for the arrival of Van Goens and further instructions.

Eventually in early 1658 Van Goens and a small fleet reached Colombo.

Avondster transported soldiers from Colombo and Negombo to Tuticorin on the Coromandel coast. By the summer, Van Goens had captured all the most important settlements on the north-west coast of Ceylon, and his biggest problem was the large number of Portuguese prisoners. Several hundred were transported on *Avondster* from Jaffnapatnam (Jaffna: on the north tip of Ceylon), and from Tegenapatnam in southern India, to Bengal—along with money and valuable cargo from Pulicat, so the ship was evidently still seaworthy (NA VOC 1231; f. 155). It returned to Ceylon with a cargo including cloth, rice, oil and butter, opium and gunpowder. There was now a food shortage in Ceylon due to the disruption of agriculture and the number of foreign troops. In early 1659 *Avondster* was sent to Ballasore on the Malabar Coast to fetch another cargo of rice, carrying four elephants as a present for the local rulers—who deemed them inferior (NA VOC 1231; f. 346, 362). Gathering the rice went slowly, and *Avondster* headed back towards Colombo only in the last week of April. The vessel was then assigned as one of nine ships carrying areca nuts from Sri Lanka to the Coromandel coast. Areca nuts were deemed by Van Goens to be the second most important commercial product of Ceylon (after cinnamon but ahead of elephants). The Dutch had decreed that areca nuts should be carried only in Dutch ships and were enforcing their monopoly by blocking the harbours of Raja Sinha of Kandy. Troops had been despatched to Kalpitya and ships were sent to blockade Trincomalee. The last nuts of the harvest were slow to arrive, *Avondster* had been ordered to wait, during which time the vessel sank in Galle Harbour (NA VOC 1230; f. 129–58; SLNA 1/9 Pt.I ff. 142, 177).

The *Avondster* project

During the 1993, 1996 and 1997 expeditions to Galle Harbour the wreck of the *Avondster* was discovered and identified. A survey and test-excavation in 1998 and 1999 revealed a site in an excellent state of preservation; a rich source of material finds and historical knowledge was anticipated. The wreck-site is situated about 80 m off the beach and in a water-depth of about 4 m. From a diving safety perspective it was deemed suitable for training, although visibility was often poor. The site was relatively easy to interpret underwater, enabling the archaeologists to

understand the construction techniques used on a 17th-century East-Indiaman. The *Avondster* was also historically well-documented which allowed the Sri Lankan archaeologists to be introduced to historical-archaeological research.

The *Avondster* site was also selected because it was under threat. Due to changes on land caused by the building of a sea-wall and channeling from storm drains, the *Avondster* had become increasingly exposed throughout the 1990s. The 1993 inspections of the site found progressively more of the wreck exposed. Once exposed, wooden structure can quickly deteriorate and degradation was observed. For example, the prominent iron anchor originally had an intact wooden stock but this steadily degraded and by 1997 had disintegrated completely. The proposal to develop a new small harbour to the east of the *Avondster* site was also seen as an additional threat to its preservation. The development might cause changes in the marine environment of the area such as patterns of silting and erosion. Additionally, a new harbour would attract more traffic in the shallow bay that might impact the *Avondster*. Despite an official ban on diving in Galle Harbour, the site was also vulnerable to looting.

The opportunity to conduct a professional archaeological excavation on *Avondster* using the highest possible standards was seen as an appropriate step to take in protecting the site. It would also demonstrate how important archaeological information can be obtained and disseminated to the community. The *Avondster* project involved the survey of the whole exposed part of the site, excavation of trenches in the bow, midships and stern areas, and the recovery of c.3000 artefacts, an iron cannon and a large iron anchor. In addition to the archaeological requirements, the development of a conservation infrastructure, training, and implementation of conservation techniques were deemed to be of equal importance. In co-operation with the Conservation Department of the Western Australian Maritime Museum, the Amsterdam Historical Museum and INAH in Mexico, a well-equipped conservation laboratory was built. Beginning in 1992, a small team of conservators have been trained in many of the techniques required to conserve maritime archaeological objects. Each year a permit has been required from the Department of Archaeology to implement the project. Under the impetus of Cdr Somasiri Devendra, the Sri Lankan government agencies have used guidelines from the yet-to-be-ratified 2001 UNESCO Convention on the

Protection of Underwater Cultural Heritage in determining conditions for the permit.

Survey and excavation

Survey and excavation seasons were implemented in the calmer months of November/December and February/March from 2001 to 2004. At other times of the year the weather is dominated by the south-west monsoons, making it difficult or even impossible to work the site. An extensive training program was developed by Millar and Parthesius (Green *et al.*, 1998: 41–9; Parthesius and Millar, 1999; Parthesius *et al.*, 2003) and implemented in association with the excavation of the wreck-site. A number of foreign specialists in maritime archaeology, conservation and photography who took part in the fieldwork assisted in the training of the Sri Lankan team to a point where they were leading aspects of the fieldwork and were part of the team that produced many of the outcomes (Parthesius *et al.*, 2003; www.hum.uva.nl/galle). It was known from archival sources that the ship broke into two pieces, a section of the stern (including the sternpost) separating from the main hull structure. No records of any attempts to save the ship, cargo or equipment have been found. The ship remains cover an area about 40 m × 10 m, with a clear outline of the hull, lying on its starboard side and roughly parallel to the shoreline. Six cannon, a large wooden-stocked anchor, a brick galley (Fig. 6) and a 2-m-high sternpost were the other major visible features.

A swell constantly moves over the site creating a highly-dynamic environment where visibility is often less than 50 cm and rarely more than 2 m. Large quantities of sand can be washed onto or scoured from the shipwreck in just a few days. Between 1993 and 1999 a large quantity of artefacts was found exposed on the sea-bed in context with the hull structure. These observations on how changeable the site is were crucial in designing the survey and excavation approach and the logistics of implementing it over a 3 to 4 year period. A pre-disturbance survey was conducted in 1998 to record the visible details. Given the time constraints (the work had to be conducted during a 2-week workshop), small team-size, limited visibility, and generally difficult underwater conditions, it was decided to aim for a 'measured sketch' of the site. This identified the relative positions of objects and construction details over the entire site as opposed to a more



Figure 6. The remains of the galley. (Avondster-Project)

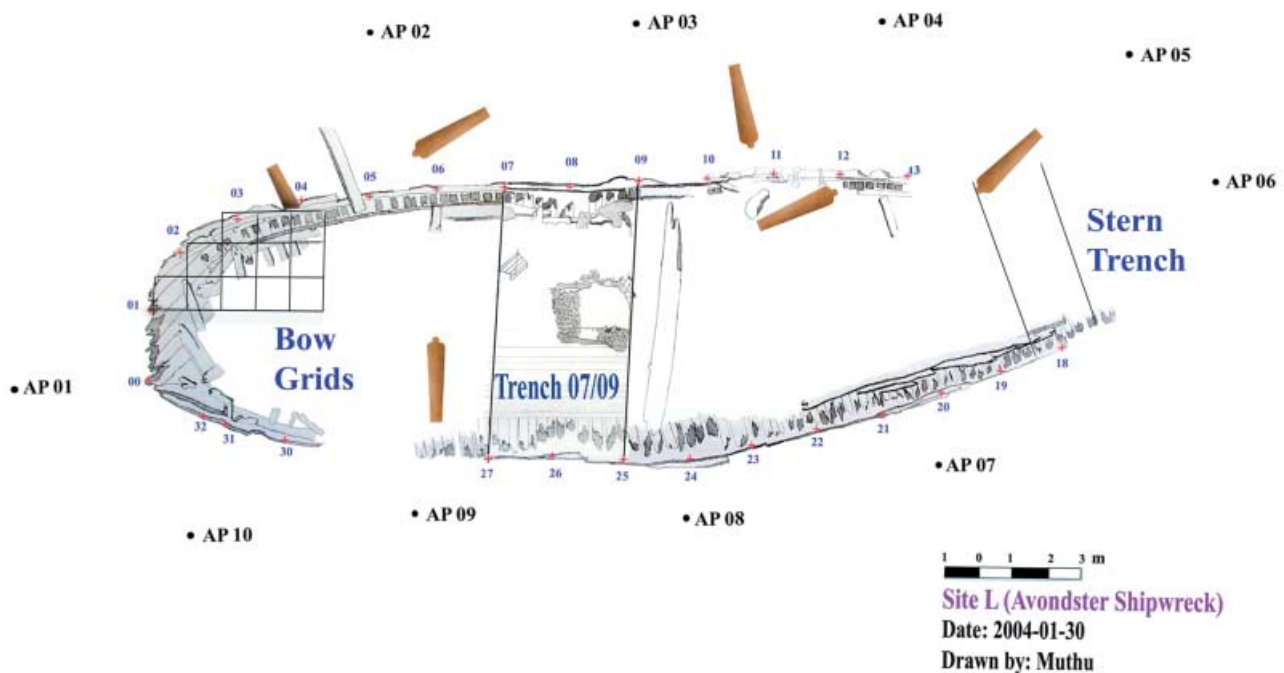


Figure 7. Layout of the site showing hull outline, cannons and 32 survey points on hull and the 10 survey points around the site. (Avondster-Project)

accurate survey of only a small section. The resulting site-plan assisted in determining the general rate of degradation, in developing a project plan, and provided the starting point for the 2001 fieldwork (Parthesius *et al.*, 2003) (Fig. 7). After an assessment of the quality of the ship's

timber by the conservation consultants, it was decided to attach survey points to the timbers to facilitate an accurate survey and delineation of the hull. In November 2001 stainless-steel nails were fixed at 2-m intervals on the exposed parts of the wooden hull, providing a total of 32 points

defining the outline of the hull and the dislodged section of the stern.

Excavation of the bow

It was decided that the first area to be excavated was the bow. This area was well-defined and confined by the shape of the bow, which provided good conditions to test excavation techniques and offer a training area for the Sri Lankan team. Excavation was carried out over a 7-week period (21 November 2001 to 9 January 2002), after a preparatory phase of logistics and a dive refresher course for the Sri Lankan team. The excavation and recording method chosen was a base-line from the bow to the galley with 2×1 m excavation grids at set positions along it. This system was in keeping with the experience of the Sri Lankan team as land-based archaeologists. The grids were related to the fixed site survey-points by trilateration, and allowed three-dimensional measurements of the bow timbers and artefacts to be achieved.

Directly underneath a protective layer of sandbags that had been placed in the bow on a previous occasion, a coil of rope was located in between thin standing layers of planking. In addition, a collection of pulley-blocks, wheels, deadeyes, more rope and cannonballs were found. The quantity and fragile nature of the rope caused the early termination of excavation in this area, but it proved a success in that a section of the bow was recorded and the Sri Lankan team had gained considerable experience in implementing all the requirements of a competent underwater archaeological excavation in difficult conditions.

The midships trench

In the second season, in March 2002, excavation began in a 4-m-wide midship trench athwartships from the permanent survey points 07 and 09 on starboard to 25 and 27 on the port side and including the brick galley. This midship excavation continued to April 2004, in addition to a number of other activities. One of the ship's cannons and an anchor located outside the ship on the starboard side were recovered during this period. In the later part of 2002, ten permanent aluminium poles were installed around the entire site. These were used as survey points from which to measure the ship's hull, other features, and secondary control points, which were plotted in the *Site Surveyor* computer programme. The midship trench used an aluminium pole placed horizontally just forward of the galley as a control for measuring the depths of the deposits, finds and structure (Figs 8–9). It was decided to excavate this trench layer by layer, six in total (Table 1).

At the stern side of the trench near survey point 9, the depth of excavation was reduced due to the difficulty of preventing the sides of the trench from collapsing. Apart from the sterile top layer of sand, the excavated area was very complex to work because of the confused nature of the material encountered, such as fragile sections of timber barrels, collapsed structural timbers, and tightly-packed dunnage used for stowing the ship's cargo. Progress was also slowed by the difficulties caused by very low visibility and swell. To reach the bottom of the trench to take a cross-section, the remaining sand of layer 6 was removed completely. When this was done in the narrow strip at the western border of the trench another barrel was revealed. The excellent condition of

Table 1. *Excavation layers of the midships trench*

Layer	Thickness	Nature of Sediments	Description of cultural material
1	Variable	Very mobile fine soft sediments and modern objects	Modern
2	20 cm	Slightly older, less disturbed, including coarser sand and crab shells	Modern material similar to layer 1
3	55 cm	Dark grey fine compacted sediments, generally undisturbed	Possibly containing canal (river) deposits. Decayed wooden objects, contemporary with site. Exposure of ship's structural timbers, lead under brick galley
4	45 cm	Grey compacted sediments similar to layer above, undisturbed	Ship's timbers, deck beam under galley, dunnage, galley-related artefacts
5	30 cm	As above	Decking, ceiling planking, dunnage
6	20 cm	As above	Bottom of ship's structure, futtock riders, intact barrel (left on-site)

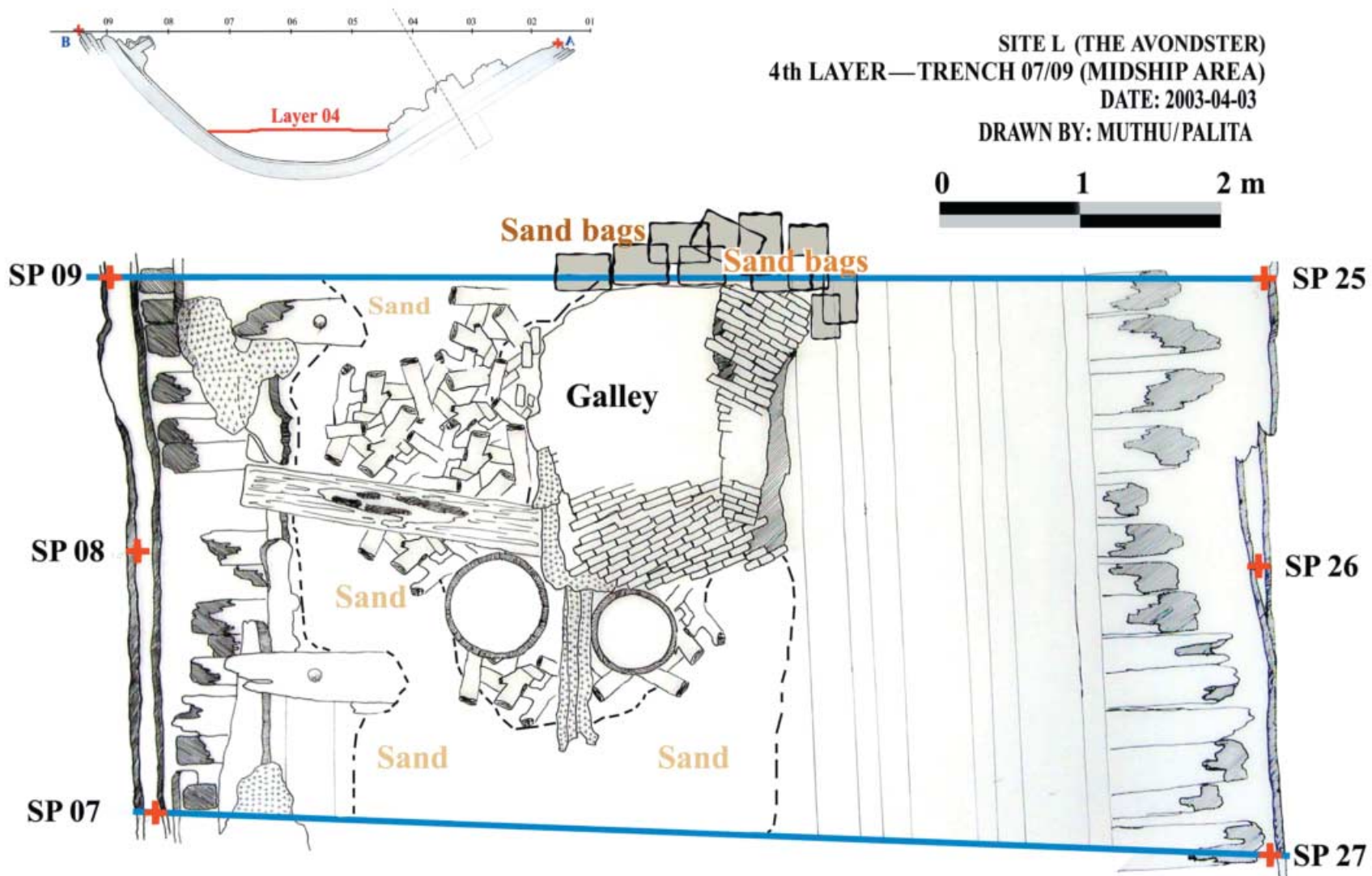


Figure 8. Plan of the mid-ship trench. (Avondster-Project)

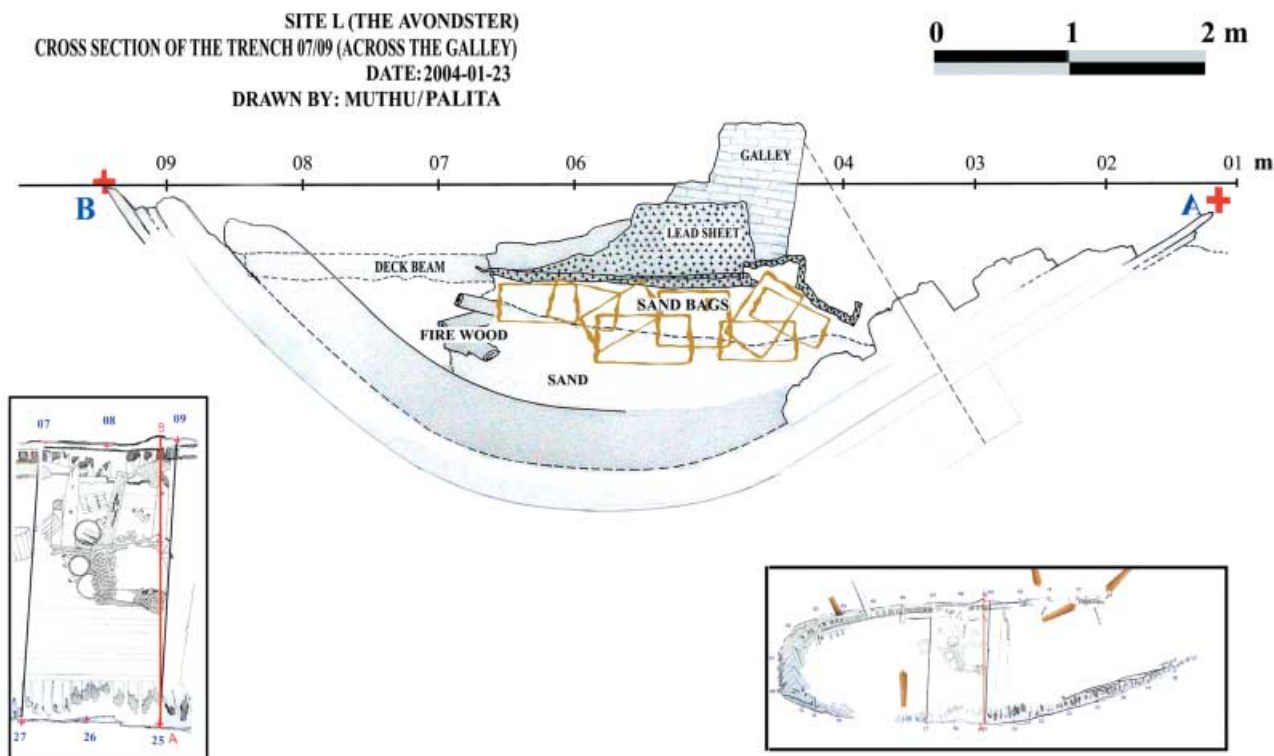


Figure 9. Cross-section of the mid-ship trench. (Avondster-Project)

this barrel suggested that the original contents might be preserved. It was left *in situ* for future excavation.

As in the bow excavation, on the completion of the midship excavation the trench was backfilled. A layer of green shade-cloth was placed over the excavation area to delineate the boundaries for future work on the site. A quantity of dunnage that had been removed from the trench was reburied and the excavated spoil redirected over the trench using the water dredge. A number of sandbags were then placed back over the area to prevent scouring.

In 2003 Martijn Manders developed a method for *in-situ* preservation of the *Avondster*. From November 2003 the wreck was covered with shade-cloth/mesh with a density of 40–50%, the theory being that this open mesh structure would allow additional sediment to build up and eventually recreate the anaerobic environment that has been responsible in preserving the site till recently. Although the tests were promising and the mesh attracted a layer of fine sediment in a short time, the system did not work in the rough sea conditions in Galle Harbour. Most of the mesh was ripped off during the south-west monsoon. (Manders, 2004).

The stern section

The excavation of a stern trench was carried out in November/December 2004 after an assessment the previous year of the most appropriate area. A bulkhead and part of an upper deck on the starboard side, and what looked like a keelson on the port side, had been observed and the trench was laid out to include these features. In November 2004 it was found that up to 1 m of sand had moved onto the site, making the exact definition of the trench in relation to the permanent survey points difficult. A 2-m-wide trench athwartships was established which ran approximately from the starboard side hull survey points 14 and 15 to 18 and 19 on the port side. The trench was delineated with two horizontal aluminium poles, one being used as the datum for measuring depths from using *Site Surveyor/Recorder* software. This last season was also plagued with poor visibility and continual swells, but much of what was planned was achieved. Cristian Murray (from the HMS *Swift* project, Argentina) recorded much of the ship's structure (including the separate sternpost structure) and this will be included in the final report in association with Kevin Camidge's work on the development of a site-plan using *Site Surveyor/Recorder*.



Figure 10. A training exercise on the NAS course in 2003. (Avondster-Project)

While the foreign team left the site on 18 December 2004, the Sri Lankan team continued with survey work in the stern trench until 26 December when the tsunami swept into Galle Harbour. However, the destruction so evident on shore close to the wreck-site was not seen underwater when it was revisited for the first time on 14 March 2005. The site appeared untouched. The mooring and site buoys were still in place as were all the survey poles, trench frame, guide-ropes and an additional 1–1.5 m of sediment covering the whole site. The higher parts of the site, the brick galley and stern post section, also appeared intact and unaffected.

The survey and excavation produced much information on the construction and shape of the ship, and its material culture, which will be the subject of future reports and papers. Significant progress was also made in the practical training of the Sri Lankan team in both archaeological and conservation systems and practices (Fig. 10). The team (under supervision till the end of 2004 from a chief archaeologist—Michael Nash, Cultural Heritage Branch, Tasmania, March to November 2002; Martijn Manders, NISA, Netherlands, November 2002 to November 2003; Bill Jeffery,

James Cook University, Australia, to date) assumed responsibility for the organisation of the practical excavation tasks and were stimulated to record the results of their work. The core Sri Lankan teams were: archaeology, Rasika Muthucumarana (Muthu), Wijamunige Chandaratne (Chandre), K. D. Palitha Weerasinghe (Palitha), Abesin Mallawa Arachachchige Dayananda (Daya), S. M. Nandadasa (Nande) (Officer in charge for the MAU); conservation, Anusha Kasturi (Head of Conservation), Gamini Saman, Kamal de Soyza, and Janaka Warusawithana. The excavation drawings in this article are from the team's hands (see <http://cf.hum.uva.nl/galle/avondster/excavation.html>).

Some initial research results

The analysis of the data collected on the ship's construction is still in progress. At the end of 2003 and in the last fieldwork season in 2004, Cristian Murray was invited, as a specialist in English ship construction, to record the ship in detail. In the coming year, the results of the research on this interesting ship (which comprises aspects of two shipbuilding traditions plus a long history of maintenance in Asian waters) will be published. However, it is worth making some brief comments in this report on some of these aspects.

It was found that the external hull planking contains at least three layers of planks. These layers have different thicknesses—between 2 and 6 cm—that vary according to the section surveyed and the condition of the wood. The most acceptable hypothesis is that the internal layer belongs to the original construction, while the others were added later, presumably during Dutch ownership. Another possible explanation, still to be explored further, is related to the modification of European-designed ships to operate far away from where they were built, in tropical waters. Maintenance was one of the main issues for European ships operating for extended periods in Asia. Since *Avondster* remained in Asia for many years without returning to Europe for major repairs, this vessel could provide information on repair methods in Asia, possibly revealing the integration of local materials and building techniques. Evidence of this has already been found with the surviving stock of one of the anchors being made from an Asian wood species (Richards, 1998: 52). The possible presence of workshops and stores on board could also provide information about the

organisational practice of the VOC to keep its ships sailing.

From a historical-technical perspective, the visible use of double hull-planking and sheathing is an example of a building technique in practice during the late 16th and early 17th centuries, similar to that of the VOC ships *Mauritius* (1609) (L'Hour, 1989) and *Batavia* (1629) (Green, 1989), and the merchant ship *Scheurraek SOI* (Netherlands, c.1585) (Maarleveld, 1998). From historical references we know that, in the case of VOC ships, this construction is an adaptation for the specific conditions encountered in sailing between Europe and Asia, and within Asia. The application of pine sheathing as a protection against teredo worm in tropical waters is common knowledge, but the addition of more layers of hull-planking is less known. In 1615 a ship acquired from the Dutch admiralty was made fit for Asian waters by constructing an extra layer of oak planking and a sheathing of hair and pine. Experiments with reinforcement and protection of ships' hulls can be seen right from the start of Dutch ships travelling to Asia. In 1603 and 1606, descriptions have been found on the use of extra layers of planking—apart from the sheathing—of various wood species and even with layers of lead in-between (NA VOC: 225, f. 26 and NA 227, f. 245). Both *Mauritius* and *Batavia* have minimal hull-remains to work with. *Avondster*, with its extensive structure, could reveal the overall concept of this building technique (Parthesius, 1991; Maarleveld, 1998).

Other observations have been made on the general building technique employed and the disposition of the decks. There seems to be a pattern in the disposition of the frames, which are arranged in pairs. This supports the hypothesis that the ship was built using the 'frame-first' method, since in 'shell-first' construction the frames do not have a predetermined distribution pattern. On the starboard side, between survey points 8 and 9, a lead tube was found, running through the side of the ship. It has a square cross-section of 9 cm, and a lip at the upper edge. This would appear to be a scupper, through which the seawater from the deck ran off. In spite of the square section (they were usually round) the position is absolutely coherent; it is placed just over the horizontal plane formed by the lodging knees and the beams that supported the deck. The location of this element proves that the deck to which it is associated was above the waterline.

One of the most important finds was a longitudinal timber, found in both the midship and stern trenches which, because of its dimensions and location, could be the keelson. The scantlings are 32 cm sided and 27 cm moulded, and the concreted head of an iron bolt through it could be seen. The upper edges of the timber are rounded. Near the keelson to the port side four other longitudinal timbers of different moulded dimensions (between 6 and 18 cm) were observed. They could be the limber board, stringers and/or ceiling planking, all of which are in excellent condition, as were a number of iron nails found with this structure. A thin piece of wood (of a different type) could also be seen inserted between two of these timber. This might be a repair done some time after the construction of the ship. A sample of this wood was taken for identification (Table 2). In the starboard end of the midships trench copper sheathing was found, although it was not possible to identify its function. One of the frames in the port side end of the trench had metallic sheathing on one side for an unknown purpose. Also some other traces of repairs were found and recorded. On the starboard side—the internal structure between survey points 7 and 9—at least two lead sheets with perforations on the outer edges were seen. These could be patches to stop leaks, which would represent evidence of a repair done to the ship during its long life.

The artefacts in their historical context

In this preliminary report a general overview of the types of artefacts and their context is provided. At the bow one would expect to find artefacts relating to rigging and ship maintenance since this was where the riggers had their workshops and store. During the site survey of 1998–99, exposed ring-bolts and rope provided evidence of this function. During the excavation of this area in 2001–02 more items related to activities of the boatswain and the sail-maker were found, including a larger quantity of rope, much of it neatly coiled below decks, its normal place for storage. The rope is of varying diameters; some is 'sheeted' (bound with a smaller rope for protection). A variety of pulley-blocks, deadeyes and other rigging elements were also recovered from the bow.

The midship section was generally used for crew accommodation and food preparation and this was confirmed by the brick galley located in

Table 2. Wood identification, December 2004 by Dr Ian Godfrey (Department of Conservation Western Australian Maritime Museum)

Sample	Species
Wood from the port side external planking (outer layer) near SP7	Pine of the red deal type (typical examples include Scots pine (<i>Pinus sylvestris</i> L.), red pine (<i>P. resinosa</i> Ait.) and Austrian and Corsican pines (<i>P. nigra</i> 'Arnold')). The first and last types are European while red pine is North American. It is very difficult to separate these types microscopically, particularly in degraded samples.
Wood from the port side external planking (middle layer) near SP7	Elm (<i>Ulmus</i> sp.) (again this wood-type is native to both Europe, English elm (<i>Ulmus procera</i>), European elm (<i>U. carpinifolia</i> 'Gleditsch') and North America (e.g. white elm (<i>Ulmus americana</i> L.) but also to Western Asia (e.g. wych elm (<i>U. glabra</i> 'Huds. non Mill')). This latter species is also native to Europe.
Wood from the port side external planking (inner layer) near SP7	Elm (<i>Ulmus</i> sp.)
Wood from: Sternpost, Deadwood, Frame (starboard stern trench), Deck plank (stern trench), Deck beam	All of these samples are white oak (<i>Quercus</i> sp.)—again this wood type is native to both Europe and North America and cannot be distinguished microscopically
Treenail	White oak
Repair of hull planking SP24	Pine of the red deal type (see top sample)

Note: even though the identified timbers could have a North American origin, the provenance of *Avondster* would obviously point to European timbers being used in the ship's construction.

this area. In addition, various objects were found relating to food production: in 1998–99 stoneware, pewter, a grinder, and a large broken martaban; in 2002–04 an iron cooking pot and a large collection of Asian earthenware cooking pots.² Being located together, the European and Asian stoneware storage jars provide an interesting indication of a mixed Asian-European material culture. Storage jars are always found on ships of this period. They were used as containers for sugar, salt, tea, salt fish, candied fruit, butter, oil, wine, spirits, opium, and even holy water and mud from the Ganges. More prosaically, they were used to store drinking water. There are two identifiable types of stoneware jars among the *Avondster* sherds; storage jars from Asia (martabans) and beardman jugs from Europe. The term 'martaban' has been used generally for strong storage jars. However, the term can be misleading, as it has also been associated specifically with jars made in the vicinity of Martaban, a port in Burma. In the VOC archives there are numerous references to this port. The first is as follows:

In this city large earthenware pots are made, which are called martavanas in Indian; they are transported in large numbers through the whole of India; the reason that so many are transported is that in

India they are used in houses and ships instead of jars: because there are none of such from Portugal; these come in their place to preserve oil, water and wine and such things, and it stays very well in them and it is a great comfort to the travelling man; because they also appear in Portugal; as they are used on ships from India, for water and oil etc. (Kern, 1910: 69).

These were locally-made jars, which are still being produced, of unglazed high-fired earthenware. Stoneware jars from the Thai kilns were also transported overland (or transported by ship) to Martaban for export.

Two types of stoneware storage jars from Asia were found:

1. Chinese stoneware storage jars. Characteristics are a pale beige or yellow stoneware body covered in a dark-brown glaze, which stops short of the base. The neck is short and the mouth not very wide with a short rolled lip. Usually four small horizontal handles rest on the shoulder. Earthenware lids could be placed on the mouth and tied down with string using these 'handles'. These jars were produced for hundreds of years in South China and commonly traded over maritime



Figure 11. Thai stoneware storage jar. This find was lost in the tsunami. (Avondster-Project)

routes. They were not only used for food and water but also as containers for goods, even porcelain. When filled with alcohol they bore a seal stamp near the mouth, they are still used for this purpose today.

2. Thai stoneware storage jars. Characteristics are a hard stoneware body in many different colors, but usually dark grey, black, purple or mixed (because of different clay types and firing). Most are covered with a glossy dark-brown or black glaze; sometimes drips can be seen on the lower half where it is unglazed. The neck is high and the mouth flared with a pronounced rolled lip. Again four handles are positioned on the shoulder of the jar to tie down a cover (Fig. 11). These jars were made at Maenam Noi, in the Bang Rachan area of Singburi province in Thailand (Vilaikew, 1990: 36–40). There was an enormous market for these storage jars throughout Asia. In the Kota Batu excavation in Brunei they accounted for more than 60% of jars found (Harrison, 1986), and they are commonly found on the numerous shipwrecks of Southeast Asia.

European stoneware jars

These characteristic jars, more accurately called jugs as they all have a narrow neck, originate from the Rhine area in Germany. The body is of white, buff or grey clay with a rich content of silica acid, which vitrifies at a high temperature. For this reason a lead glaze could not be applied. Instead common salt was thrown into the kiln during firing and the soda formed during this process combined with the silica and alumina in the body leaving a thin, colourless glassy film on the surface. Colour is added by thin washes of slip stained brown by iron (usually), blue by cobalt, or purple by manganese. Most remains of the beardman jars on board *Avondster* were found around the galley and would have been used for storing special liquids such as oils or alcohol. They were a common part of a Dutch ship's inventory, as can be seen by the numbers found on VOC shipwrecks such as the *Batavia* (1629) (Green, 1989), *Vergulde Draak* (1656) (Green, 1977) and *Witte Leeuw* (1613) (Pijl-Ketel, 1982).

In the hold of the *Avondster* the remains of cargo have been found. Areca nuts were an important part of the merchandise which the *Avondster* was loading for India, according to the historical records. These nuts come from the areca palm, the most graceful and delicate of Sri Lankan palms. Chopped areca nuts, often incorrectly known as betel nuts, are mixed with betel leaf and lime for chewing. The resultant mixture is a mild stimulant, popular in many Asian countries (NA VOC 1231, f. 535). Chank shells found on the wreck site are of the species *Turbinella pyrum* (old generic name *Xancus*; the Dutch called them *chianco*). These shells are used in Hindu and Buddhist rituals, and can be bored for use as musical instruments in religious ceremonies. Left-handed specimens are particularly rare and valuable but the 36 found were right-handed. Chank shells are found in Sri Lankan waters, but have not been recorded around Galle. It is probable that the shells came from the ship, especially as chank shells had formed part of the *Avondster's* cargo nine months before she sank (NA VOC, 1231 ff. 177–9) (Fig. 12).

Many wooden barrels (and the iron concretions left by barrel hoops) have been found near the galley. Most are broken, but some are intact and have been left on the site. One barrel which was lifted (Fig. 13) contained a pine resin: pines are not found in Sri Lanka, but pine resin was mixed with sulphur and fibres such as animal hair for caulking joints and also used between layers of



Figure 12. Chank shells on the wreck site. These shells are used in Hindu and Buddhist rituals. (Avondster-Project)



Figure 13. Preparing the barrel for raising by wrapping it with bandages. (Avondster-Project)

planking for protection against marine organisms. Planks caulked with hair or a sticky mix containing hair may be seen in this area. Some timbers show traces of matting or sackcloth. Many of the barrels were surrounded with wooden branches and off-cuts, believed to be dunnage for packing the spaces between barrels to prevent movement. There was also firewood found near the galley, identified from its impractical shapes and traces of burning. Coal was also found on the site. This was brought from Europe, as the Dutch had found no satisfactory sources in Asia and it was usually in short supply.

The stern section functioned as the officers' quarters and the constables' workshop. Artefacts

such as navigation instruments, personal belongings, trade-related items and objects related to the maintenance of guns and weapons were expected to be found there. During the 1998–99 survey lead shot, a barber's plate and other artefacts (ointment jars and leech combs) related to the ship's surgeon were found in this area and additional surgeon's items were excavated in 2004. The contents of one ointment jar were identified as mercury. Mercury was used in different concoctions, for genital diseases but also for instance to remove surplus flesh from ulcerations. The healing qualities of mercury are very doubtful. It was applied in several forms, depending on the surgeon, including pills, blisters, ointments and mercury fumes. It was believed that relieving a person of his fluids through sweating and administering laxatives for instance, was beneficial, and mercury did this. A person treated with mercury would start to produce an enormous amount of saliva, sometimes a couple of litres per day. This was seen as a favourable omen, whereas in fact this is one of the first signs of mercury poisoning (Leuftink, 1991: 109). Another interesting artefact was a cupping device. The mouth of this pewter cup was heated and pressed against the skin, creating a vacuum which caused blood or other bodily fluids to rise to the surface. A similar device was found on the *Hollandia* (1743), and they are still commonly used in some parts of Asia (Gawronski *et al.*, 1992). Also found in the stern during an earlier season was the remains of a human skull which is still being analysed to assess its association with the *Avondster*, since archival documents indicate that there were no casualties during the wrecking.

The more comfortable circumstances for the officers in this part of the ship were reflected in items like a candlesnuffer (Figs 14–15), candlestick and some porcelain that were clearly personal belongings and not official trade items. Around 1659, when the *Avondster* sank, most of the trade in ceramics and porcelain was concentrated between Japan and Formosa to Batavia and from there to Holland, with another flourishing trade between VOC posts in Asia. Galle was one of the most important VOC trade posts, but its role in the ceramics trade was mainly transshipment. Chinese porcelain arrived there via Formosa or Batavia, and was shipped mostly to Surat in India and to the Mocha and Gamron in the Middle East. Only occasionally was porcelain ordered for consumption in Galle: 'On April 23rd (1645) the Governor of Ceylon had the rest of the cargo



Figure 14. Candle-snuffer and part of a candlestick on the site. (Avondster-Project)

not in demand on the Malabar Coast, including some 1400 pieces of porcelain, taken from the *Arent* for the use of the garrison at Gale' (Volkert, 1954: 97). Such luxury items would not have been restricted to the officers, as wealthy local people would also have used Chinese porcelain. Their preferences were different from those in Holland and can be seen in sherds from Galle Harbour and antiques in the local shops. The few pieces of porcelain from the *Avondster* site are clearly personal belongings as they are individual pieces and not 'sets' such as dinner services. Most



Figure 15. The candle-snuffer. (Avondster-Project)

sherds belong to small teacups and simple bowls. Only a few sherds of plates have been found.

The following types of porcelain were found on the *Avondster* site: Coarse porcelain from kilns in the Swatow area of South China (bowls of various sizes); Porcelain from provincial kilns, also in South China (bowls and shallow plates); Fine porcelain from Jingdezhen (tea bowls).

Notable pieces include sherds from a 'kraak' type of plate (Fig. 16). The type and design corresponds exactly to the dishes salvaged from the 'Hatcher junk' sunk in 1643–46. An even more remarkable piece was a spout and part of the neck of a small ewer which is identical to one found in the *Witte Leeuw* sunk in 1613, 46 years before the wrecking of the *Avondster* (Pijl-Ketel, 1982: 1.9.1; Sheaf and Kilburn, 1988: 33). Another sherd belongs to a covered box identical to one from the *Witte Leeuw* (1613). At the time of *Avondster*'s sinking these ceramics were certainly no longer in production. They may have been in use for some time, passed down as heirlooms, or bought as antiques. Another 'antique' piece was the large sherd of a blue-and-white pot of a design dated to 1610–20. These



Figure 16. Sherds from a 'kraak' type of plate. This find was lost in the tsunami. (Avondster-Project)



Figure 17. The remains of a wooden work-box, possibly belonging to the constable or first gunner. This find was lost in the tsunami. (Avondster-Project)

ceramics were Portuguese favorites, many can be seen in Lisbon museums and they are imitated in Portuguese faience (delftware) (Pinto de Matos, 1996: 100–01). There are ceramics of differing quality, just as there were people of various classes on board. Cooks and sailors were unlikely to own fine Chinese porcelain but might have owned coarseware porcelain bowls. Officers would have been able to buy special pieces during their voyages to Batavia or other parts of Asia. The ceramics illustrate the historical network of contacts between Galle and the rest of Asia.

The excavation in the lower section of the stern revealed the location of the constable's workshop. The remains of a wooden work-box with leather straps suggest that it may have belonged to the constable, who was responsible for all firearms and ammunition on board. Visible in the concretion are a priming-pin, used to probe and clean the touchhole of a firearm and to pierce cartridges, the handles of some tongs or scissors, the wooden handle of another tool, a musket ball, and some copper wire. The remains of leather straps and buckles of different sizes were found in the same area, and may have belonged to a cartridge belt or similar item (Fig. 17).

The cannons represent the military function of the ship. One has been raised and is currently in

conservation (Fig. 18). When deconcreting the canon, the shot and remains of the wadding and powder-bag were found inside. A collection of cannon balls and a grenade was also found in the bow. In the stern section a reasonable quantity of shot was found. Lead shot could have been used for a hand-held firearm such as pistol, carbine or musket. It could also have been packed in a bag or wooden canister and fired from a cannon. Two canisters of shot have been found on the *Avondster*, as well as quantities of loose shot. Shot connected with a copper wire has also been found, both loose and in the canisters which were very effective in cutting rigging and wounding people. The trade function of the ship was symbolised by the finding of a container and some small weights. This container is similar to one found on the *Batavia* (1629).

The Maritime Archaeological Unit (MAU) and the tsunami

Following the intensive training program, the staff of the MAU prepared a schedule for the survey and management of the other maritime heritage sites in and around the Bay of Galle. They were very much looking forward to implementing this program in January 2005. On



Figure 18. Cleaning the bore of the gun before conservation. (Avondster-Project)

26 December 2004, however, in the final stages of the 2004 excavation season, the MAU premises and the National Maritime Museum in Galle were destroyed in the tsunami (Fig. 19). Luckily

all members of the team survived the killer-wave, but substantial parts of the historical collections and equipment were lost. It is ironic to realize that all the efforts to safeguard an important historical collection have eventually contributed to the opposite; the loss of a substantial part of the excavated collection while the remaining artefacts on the wreck are possibly now better conserved due to a thick layer of tsunami sediment.

Despite the unfathomable humanitarian disaster that is taking place around them and the loss of their facilities, the spirit of this group of young professionals is unbroken. They are determined that the future for this new discipline, and thus their own future, should not be washed away by the tsunami. Immediately after the disaster an international network was activated to bring together the necessary equipment and funds. Nearly three months after the tsunami destroyed the facilities, the team were in a position to resume their activities (Fig. 20). On 24 March 2005 the new MAU building was officially opened. With the support of the Cultural Emergency Response Fund, the Netherlands Cultural Fund, and various international institutions, the basic infrastructure was restored and the remaining artefacts catalogued and cared for. A team of experts in the field of maritime archaeology, conservation, museology and monuments assisted the Sri Lankan team in assessing the damage caused by the tsunami and helping with this first



Figure 19. The MAU headquarters destroyed by the tsunami on 26 December 2004. (Avondster-Project)



Figure 20. Symbolic restart of the MAU on 26 January 2005. On 24 March 2005 the new building for the MAU was opened inside the fort. (Avondster-Project)

phase of rehabilitation. Culture will play a prominent role in the rehabilitation of Galle. It is foreseen that as early as 2006 a first maritime heritage display will be opened pending the restoration of the Dutch warehouse and the establishment of the New Maritime Museum.

Conclusions

From a scientific perspective the 17th-century European East-Indiaman *Avondster*, which can be linked to extensive historical documentation and is connected with an important development stage of Galle as an important emporium in the Asian shipping network, is an eminent subject of historical and archaeological research. The *Avondster* took part in a complex VOC/European/Asian trading network that had developed from the late 16th century. The vessel served two European East-India companies, participated in various functional roles on all important trading routes and it is therefore an important representative of this complex system. The research and analysis of the ship remains and the artefacts recovered during this first stage of the excavation has only just begun. This study will include placing the *Avondster* in its wider context of the role of the VOC in Asia. It is intended to develop a network

of researchers and specialists to investigate other aspects of this broader theme, tentatively under the title 'Silk Route by Sea'.

Research can also be a good tool for further capacity-building for the young professionals in Sri Lanka. By working together in an academic research framework new fields of research and publications can be stimulated. In this preliminary report, a brief outline of work in progress is all that has been possible, but in the coming years the *Avondster*-project report for 2001–2005 and other relevant papers will be prepared and published. Since the inception of the *Avondster* project in 1998, the primary aim of the work carried out by the foreign consultants has been to train members of the MAU as conservators and maritime archaeologists, so that they would have the skills to function autonomously. This aspect has been emphasised during every field season. As part of this training, many foreign consultants with various skills have worked with the MAU team. Use of different consultants has broadened the MAU team's exposure to different experiences, thereby giving them the benefit of alternative approaches and many years of accumulated experience and knowledge. To accompany the training provided by specialist consultants to the Sri Lankan team,

a detailed system of assessment was designed by Karen Millar. Currently, the MAU comprises five archaeologists, with qualifications relating to Sri Lankan terrestrial archaeology. Four of the five have postgraduate degrees or are studying at this level. Between them they have over 40 years experience in terrestrial archaeology, site management and conservation. Two of the archaeologists became involved in maritime archaeology work in Galle in 1992, two others in 2001 and the last in 2004. Three archaeologists have completed the NAS Part 1 training programme, but none has any formal qualifications in maritime archaeology. Terrestrial archaeologists working under water is not an unusual situation for those employed by governments in a number of countries.

From a conservation perspective, training pathways were focused in three main directions: the application of correct treatment procedures to the variety of material types encountered on shipwreck sites; the development of the appropriate administrative procedures needed to facili-

tate efficient and effective artefact processing and documentation; and finally the development of the organizational skills and structures that would allow conservators to deal simultaneously with a large collection of diverse material types rather than concentrating on the conservation of a small group of artefacts.

In regard to future capacity-building, the MAU team should be able to develop further professionally in their current positions, and therefore it is important that an academic framework be developed with an appropriate university(s). This is currently being investigated by the Post Graduate Institute for Archaeological Research in Sri Lanka and James Cook University in Australia. In addition, through a UNESCO initiative, it is likely that the Galle MAU will be established as a regional training centre in maritime archaeology for the Asia/Pacific region. These two initiatives go hand-in-hand very nicely, not only for the Sri Lankan team but for the many other practitioners throughout the region.

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Notes

1. Gombroon, the English name, was Gamron to the Dutch, and is today Bandar Abbas, in Iran.
2. This part is an abstract of the paper about the ceramics by Christine van der Pijl Ketel, Ranjith and Nayana Bandara. A separate paper will describe the various local earthenwares in detail.

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