

Maritime Archaeology in Sri Lanka

The Galle Harbour Project—1993

Interim Report

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Introduction

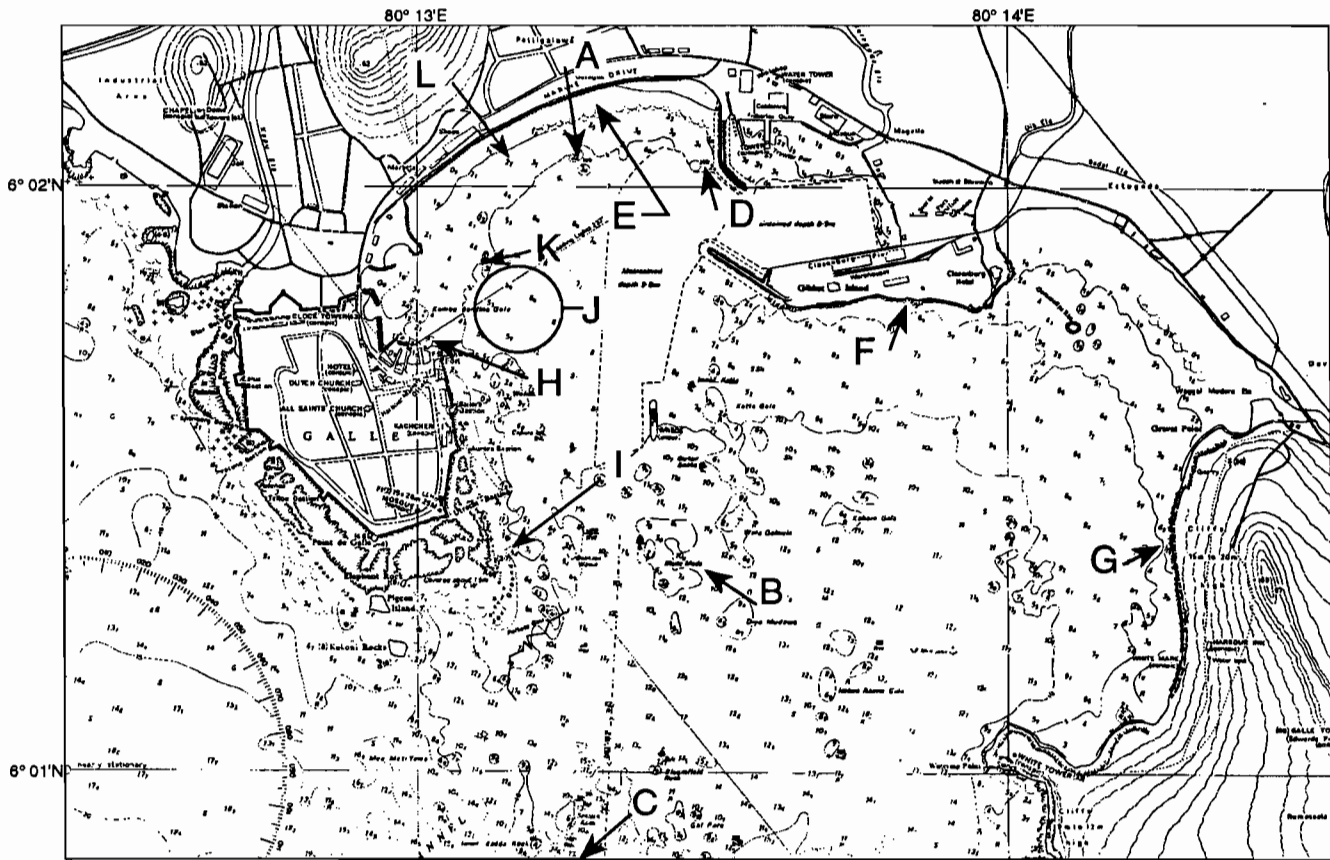


Figure 1. Chart of Galle Harbour indicating site locations.

The 1993 programme was the second undertaken in Sri Lanka with the objective to provide maritime archaeological and conservation training for Sri Lankan archaeologists and conservators. The 1992 programme, which was based in Galle, identified the need for a research component to be incorporated in the training programme. The project was sponsored by: the Archaeological Department of Sri Lanka; the Central Cultural Fund (CCF); the Postgraduate Department of Archaeology (PGIAR); the Australian Research Council; the Department of Foreign Affairs and Trade; and the Western Australian Maritime Museum. The project is recognized as an Associated Project to UNESCO's Integral Study of the Silk Roads: Roads of Dialogue.

Following the 1992 recommendations, a group of ten students were selected to be trained in basic scuba diving techniques at the start of the 1993 programme. This was coordinated by Karen Millar with the training undertaken by Lotti Beichert.

Work continued on the shipwreck database begun in 1992; that is the collection of information from sites in and around Galle Harbour and a more detailed investigation on selected sites. A report on the 1992 work is to be published by the CCF (Green & Devendra, 1993).

During the 1993 programme, three new wreck sites were located: Site I (which was searched for in 1992, but not found); Site K; and Site L. In addition, and at the invitation of the Archaeological Department of Sri Lanka, a brief investigation was undertaken of the wreck site at the Great Basses, discovered and investigated by Arthur C. Clarke and Mike Wilson in 1963.

CONSERVATION

Conservators, Jon Carpenter and Vicki Richards, from the Materials Conservation Department of the Western Australian Museum continued the formal instruction of Sri Lankan conservators and students. This involved theoretic-

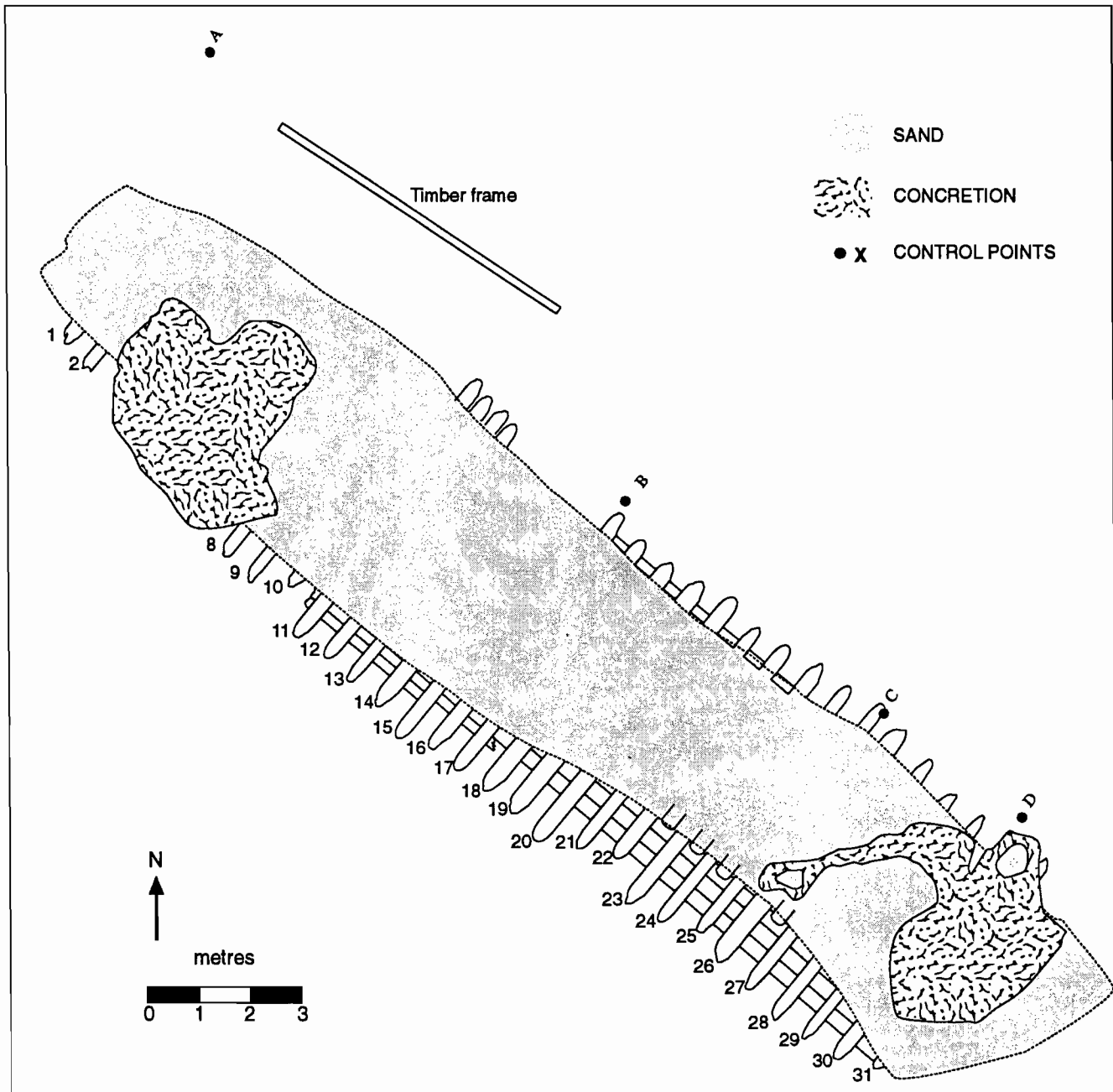


Figure 3. Plan of Site E drawn by Paul Clark.

Site E

GPS Position $6^{\circ} 02.1129' N$, $80^{\circ} 13.3045' E$

The site is partially buried in very fine siliceous sand at a water depth of 3 m and lies in a north west to south east orientation in aerobic open water. This wooden wreck was much more extensively uncovered than when first surveyed in 1992. In all, just over 24 m of the site was visible.

The central part of the site was covered in sand, while the edges were uncovered allowing a detailed survey of the site to be undertaken. Control points were established in various places along both sides of the vessel and surveyed in using trilateration. This formed the basis of the site plan allowing the details of the hull structure to be filled in. Paul Clark undertook the survey of this site (Fig. 3).

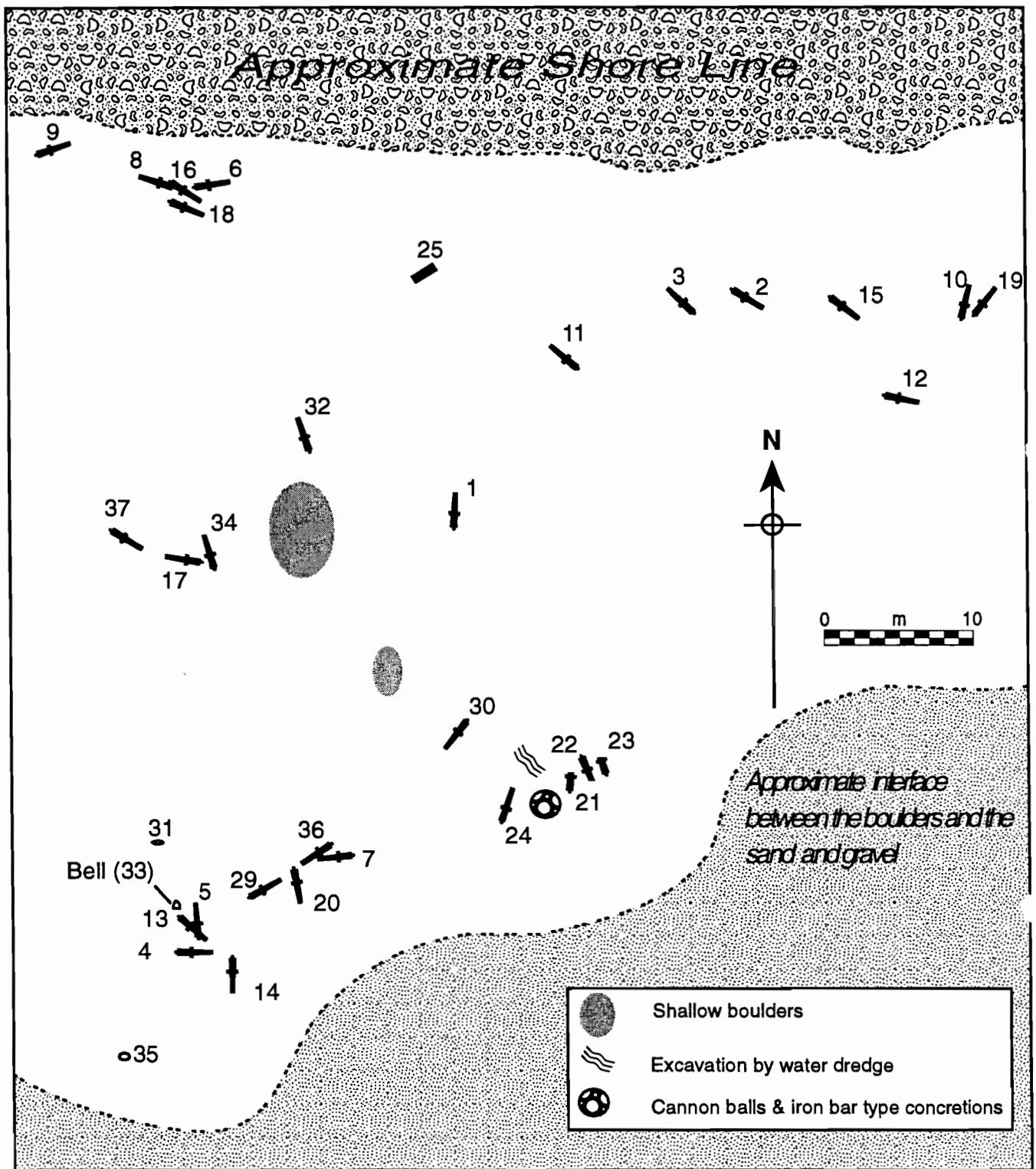


Figure 4. Plan of the *Hercules* wreck site, Site F.

CONSERVATION

Iron knees, remnants of the composite wooden hull, iron chain concretions, copper-alloy fastenings, treenails and a variety of small artefacts (fragments of ceramic, glass, pipe bowls, stems and ballast) were lying on the site. Some sheets of copper alloy sheathing were seen between floors 29 and 30 (Fig. 3). Marine borers are active on the site.

The iron artefacts on this site are encrusted with a very dense, uniform concretion layer, without the usual secondary colonization by barnacles, corals, seaweeds, etc. The dense concretion layer is typical of surface accretions formed on iron artefacts under anaerobic conditions and the corrosion rate of the iron would be correspondingly low. However, during inspection it appears that the iron objects have recently been subjected to aerobic conditions.

The extent of surface accretion, the presence of corrosion product layers and corrosion rates of the copper alloy fastenings varied depending on the position of individual fastenings. Fastenings in intimate contact with floor timbers (1), 11, 15, 17 and 19 were very corroded and possessed a banded layer of corrosion products, indicating alternate aerobic and anaerobic corrosion mechanisms. However, the corrosion rates of these fastenings was relatively low. Active aerobic corrosion was occurring on the bare metal of the fastenings embedded in the wooden floor timbers (1), 8, 20 and 29 and the metal shaft adjacent to the wood of fastening 20. The fastenings in floors 11, 19, 21 and 22 were immune to corrosion, indicating that iron knees must be in direct electrical contact with these copper alloy fastenings (galvanic protection).

The exposed wood floors were extensively degraded showing evidence of active marine borer attack while wood buried more than 15 cm had the usual anaerobic black appearance and were in relatively good condition.

Analysis and interpretation of the results obtained from the hull structure of Site E indicates that the site has been subjected to periodic burial and exposure with water and sandblasting also occurring. The metal artefacts appear to be in relatively good condition dependent upon the immediate micro-environment. Aerobic corrosion was predominant on this site, however, there is evidence of anaerobic corrosion mechanisms occurring. In addition, cathodic protection appears to be occurring on the site suggesting there may be considerable composite hull structure remaining under the sediment. The depth to stable sediment is approximately 20 cm verified by the presence of anaerobic wood at this depth.

Site F (the *Hercules*)

GPS Position 6° 01.7357' N, 80° 13.7791' E

The site lies diagonally across the east–west, seaward facing boulder strewn slope that rises from the sandy sea bed to form the shore of Gibbet Island. The site is characterised by a mass of large boulders, mostly encrusted with marine growth, occasionally interspersed with coarse grain sand. Scattered amongst these boulders are approximately thirty large, concreted, cast iron cannon. Depths of the cannon on the site range from almost awash to about 8 m.

The two main objectives of this years programme was to make a detailed plan of the site, (recording the location of all the cannon) and to conduct a limited excavation in the sand, at the sand–rock interface, to determine if any material from the site was buried under the sand.

Measurements were taken between the main groups of cannon using a tape measure and an underwater compass. Where possible, trilateration was used to increase the accuracy of the survey. Because of the undulating nature of the site, obtaining straight-line measurements was difficult and therefore the overall accuracy of the site plan is limited. In addition, major features of each cannon were recorded together with their orientation. A survey of the position of the rock–sand sea-bed interface was also carried out along the longitudinal extent of the site (Fig. 4).

A water dredge was used around the group of three cannon (21–24), close to the sand–rock interface. Excavation showed that there were a number of concreted iron shot (round and bar) and a number of unidentified concretions. The test excavation was limited to a depth of about 500 mm and area requires further investigation. While there is evidence of iron artefacts concreted to the rocks around the cannon, excavation in the sand area produced only sterile and uniform sand-shell material.

During the survey, two sounding leads were found, similar in style to sounding leads from other VOC ships of the period. It is interesting that few artefacts have survived on this site, only the heavy iron guns, the sounding leads and the bell. Obviously much of the material would have been salvaged or destroyed at the time of the vessel's loss, or in the subsequent years through erosion, (this area being particularly exposed to the swells during the South-West Monsoon). In addition, because of the nature of the site, it is possible that some material may be hidden in the rock crevices, however a great deal of material is not expected to have survived.

CONSERVATION

The most distinctive feature of the iron cannon is the presence of a variety of marine organisms that form typical aerobic concretions (average depth of these is approximately 10–15 mm). Amongst the more open spread of boulders, towards the north-western end of the site, three cannon have been severely eroded, possessing almost no or very thin concretion layers. The cast iron cannon measured on-site (4, 5, 7, 8, 9, 13, 14, 17, 20, 29 and 34) are all actively corroding with an average corrosion rate of 0.196 mm.y^{-1} , almost double the standard corrosion rate for iron in a marine environment. These results indicate that aggressive and aerobic corrosion mechanisms predominate on the *Hercules* site.

Taking this information into account, it is obvious that the cast iron cannon measured are extremely corroded and extensively graphitized and the mechanical strength of the cannon is likely to be markedly reduced. The partially buried cannons, 21 to 24, lying in the deeper water, may be the best examples. However, the stability and corrosion rate of these cannons would need to be determined to accurately assess the expediency of this choice.

Site G

GPS Position $6^{\circ} 01.4121' \text{ N}$, $80^{\circ} 14.2374' \text{ E}$

The site consists of the remains of a wooden ship lying in a NE-SW direction, almost perpendicular to a large granite rock face. The wreck site lies on a siliceous sand sea bed with a gentle seaward slope, interspersed with large granite boulders concentrated at the base of the rock face. The site lies at a depth of about 3 m; it is almost totally buried and is subjected to aerobic open sea water.

Following the initial survey of this site in 1992, it was decided to conduct an exploratory excavation to determine if any hull structure survives. It was hoped that this information could be used to assist in the identification of the vessel. A base line was placed down the centre of the site and a two meter wide trench was delineated across the site. The ballast stones within the trench were first removed and

placed on the ballast mound on either side. A water dredge was then used to remove the sand, silt, shells and ballast fragments. Excavation was continued down to sterile layers. On the south side of the trench, the ballast lay on top of the boulder strewn sea-bed up to a depth of not more than 100–200 mm. In this area some sheathing tacks and shattered bolt fragments were found. At the northern end of the trench the site is adjacent to a sandy area. In this part, excavation was continued down to about 300 mm where the sterile shell-sand layer began. It is obvious that the site has been heavily salvaged. Only two very degraded pieces of timber were found and there was no evidence of hull structure below the ballast. In view of the previous evidence of blasting; the shattered copper alloy bolts, fractured ballast stones, ceramic fragments and the lack of any large quantities of copper alloy sheathing, it is thought that this site has been the target of salvage operations to recover non-ferrous metal. One artefact of interest was a fragment of a measuring device, possibly a Gunter's Rule, inscribed with the words ...LIGONES. In view of the copper alloy sheathing with the word NANTES found in 1992, this present find again strongly indicates a French origin for the vessel.

CONSERVATION

The wreck site is characterised by the presence of a ballast mound, less than 500 mm proud of the sea bed and some timbers projecting from underneath. There are smaller artefacts scattered over the site interspersed amongst the ballast stones, such as pieces of coal, ceramic sherds and copper alloy fastenings and sheathing. There were very few iron artefacts present on the site.

Assorted copper alloy fastenings exposed on site are devoid of concretion and covered with the typical blue-green aerobic copper corrosion products. Buried fastenings, at a depth of approximately 200 mm under the ballast mound exhibit the typical black anaerobic corrosion products. Timbers are very degraded, being very soft and blackened with minimal evidence of *Teredo* worm attack.

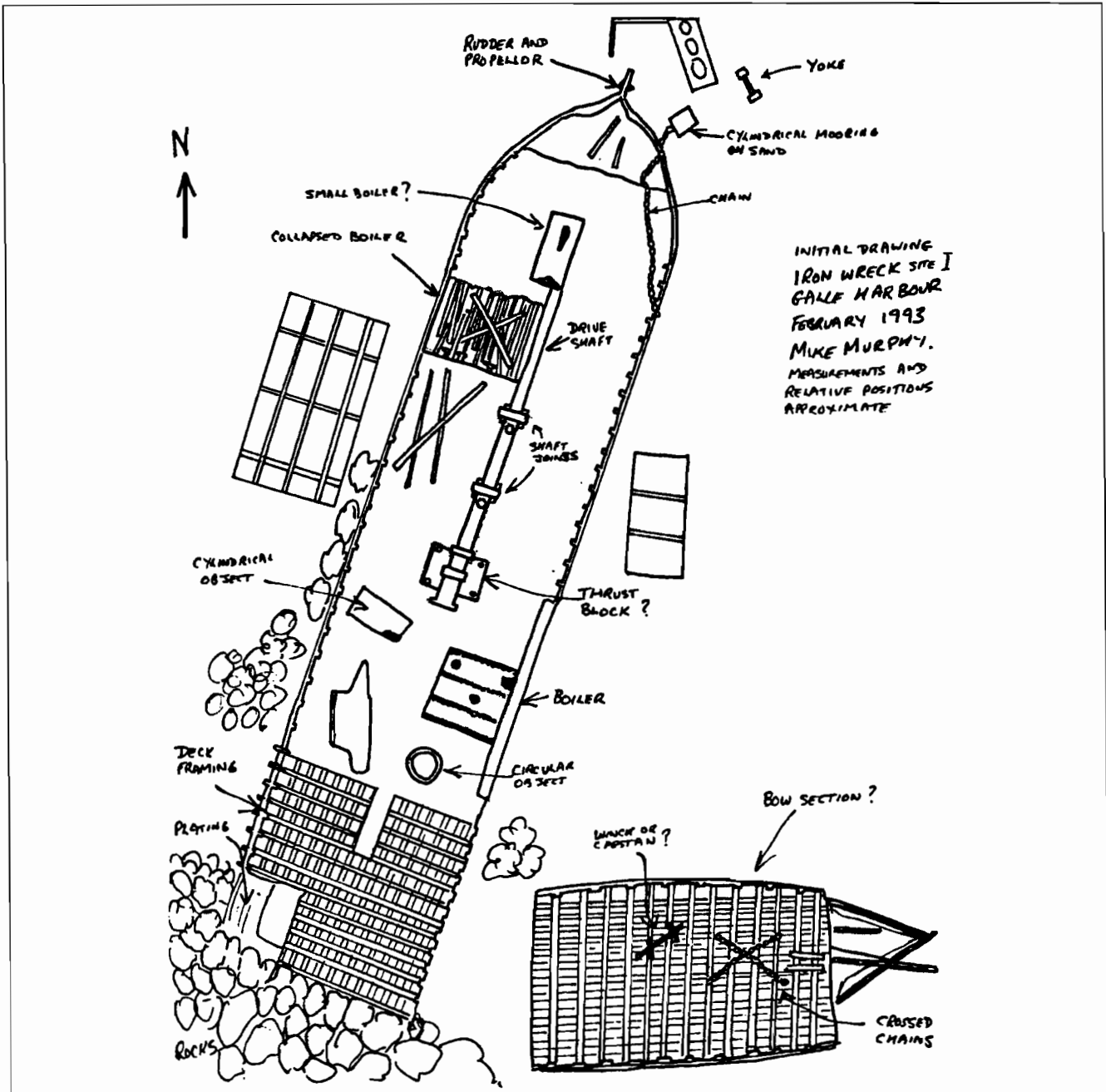


Figure 5. Sketch plan of Site I drawn by Mike Murphy.

Site I

This site was searched for during the 1992 season, but not located. During the 1993 season the site was successfully located and is now plotted on the chart. The site (Fig. 5) is a large iron ship with the bow broken off and lying to one side. There are two boilers, a single screw propeller, rudder and drive shaft. The engine appears to have been salvaged.

CONSERVATION

An electro-chemical survey of the site needs to be conducted. However, it appears that the vessel's components are in reasonably sound condition. They retain sufficient strength to maintain the structural integrity of the remains, including detached parts of the vessel. Concretion formation is minimal.

Site J

GPS Position 6° 01.8390' N, 80° 13.1524' E

This site was reported in 1992 as an area where the local divers recover ceramic material after the SW monsoon. The site is very interesting; there appears to be a general area about 100 m in diameter, located to the south of the rock named Diyamba Lihini. The sea-bed surrounding this area consists of fine slit and sand, however, within the area the sea bed is coarse shell and sand. At a depth of about 100 mm ceramic shards can be found. It was decided to carry out an experimental test excavation to investigate this area. A four metre grid square was laid out on the sea-bed in the area. Initially, because the water dredge was not available, the site was excavated by hand down to a depth of 200 mm. All the artefacts found within the square were then raised and registered. Then using a water dredge, the spoil that had been left on the site by the hand excavation was removed, so that the level was lowered uniformly to 200 mm. The excavation continued down to a dark layer at 250 mm. Below this layer artefacts were encountered up to about 450 mm. Test sondage were made in three places within the grid square down to 750 mm, in all cases the levels below 450 mm were sterile. It seems, therefore, that the site is disturbed down to the dark layer of stable sea bed. This could either be due to the effects of the churning action during the monsoon, or the activities of the local divers, or both. It is evident that this site warrants a more detailed survey and careful recording of the stratigraphic levels.

Most of the artefact material at Site J is completely buried. Visible artefacts are partly buried and not obviously mobile. Most of the artefacts recovered from Site J were broken pieces of ceramic containers and glass bottles. Coal, firebox slag from the boiler of steam ships and some iron concretions were also present. Most of the broken ceramic pieces retained reasonably sharp profiles and did not exhibit much wear from abrasion and/or artefact mobility. Generally, the condition of the artefact materials was very good.

A bronze statue reported to have come from Site J exhibited very little abrasion damage and this was confined to one side of the figure (see front cover).

Site K

GPS Position 6° 01.8644' N, 80° 13.1409' E

This site was discovered accidentally during survey work on Site J. It consists of badly broken up iron wreckage lying against Diyamba Lihini to the NNE of Site J. The site appears to be the wreck of a ship that struck the SW side of the rock and then broke up.

Site L

This site was shown to the expedition in the last week of work. It is located on a gently shelving sea bed composed of sand and finer sediment. The site lies at a depth of approximately 2 metres, orientated approximately E-W, parallel to and about 100 m from the shore, opposite the Galle Market. The wreck consists of an outline of timber frames and planking averaging 500 mm above the sea bed. The wooden hull is extremely well preserved and the vessel is possibly, although not certainly Dutch. The site is approximately 37 m long, the centre section is covered by sand, whereas the perimeter is heavily scoured. The west end of the site is uncovered and was clearly either the bow or the stern. Just to the east, on the shore-ward side of the site was a large iron anchor resting at an angle of about 45° to the sea bed on the remains of a wooden stock (the upper part of the stock was missing). Adjacent to the anchor was the muzzle of an iron cannon. Three other iron cannon were noted on the northern side of the site. At the east end of the site, the two sides of the hull disappear into the sand, so that the extent of the site was uncertain, however, probing indicated that the site extended at least a further 7 m to a total length of 37 m. In the centre of the site is a large (5 m x 1.5 m) mass of *Overijselsteen* (small and distinctive Dutch bricks) cemented together. It is possible that this may be the remains of the fireplace of the galley. The most interesting aspect of the site is the highly complex hull structure. The vessel is clearly sheathed in thin soft-wood boards with iron sheathing nails. Between the boards and the planking was hair and *harpuis* again suggesting a Dutch construction. In some cases the planking was double planked in other places there was a single layer of planking. In most cases the planking was about 80 mm thick. On the shoreward side of the site, around the middle of the site, a thick, soft-wood 'plank', possibly a whale 180 mm thick was noted attached to the outer planking. On the seaward side of the site the frame sizes alternated 230 mm and 180 mm. The evidence for the identification of which end of the

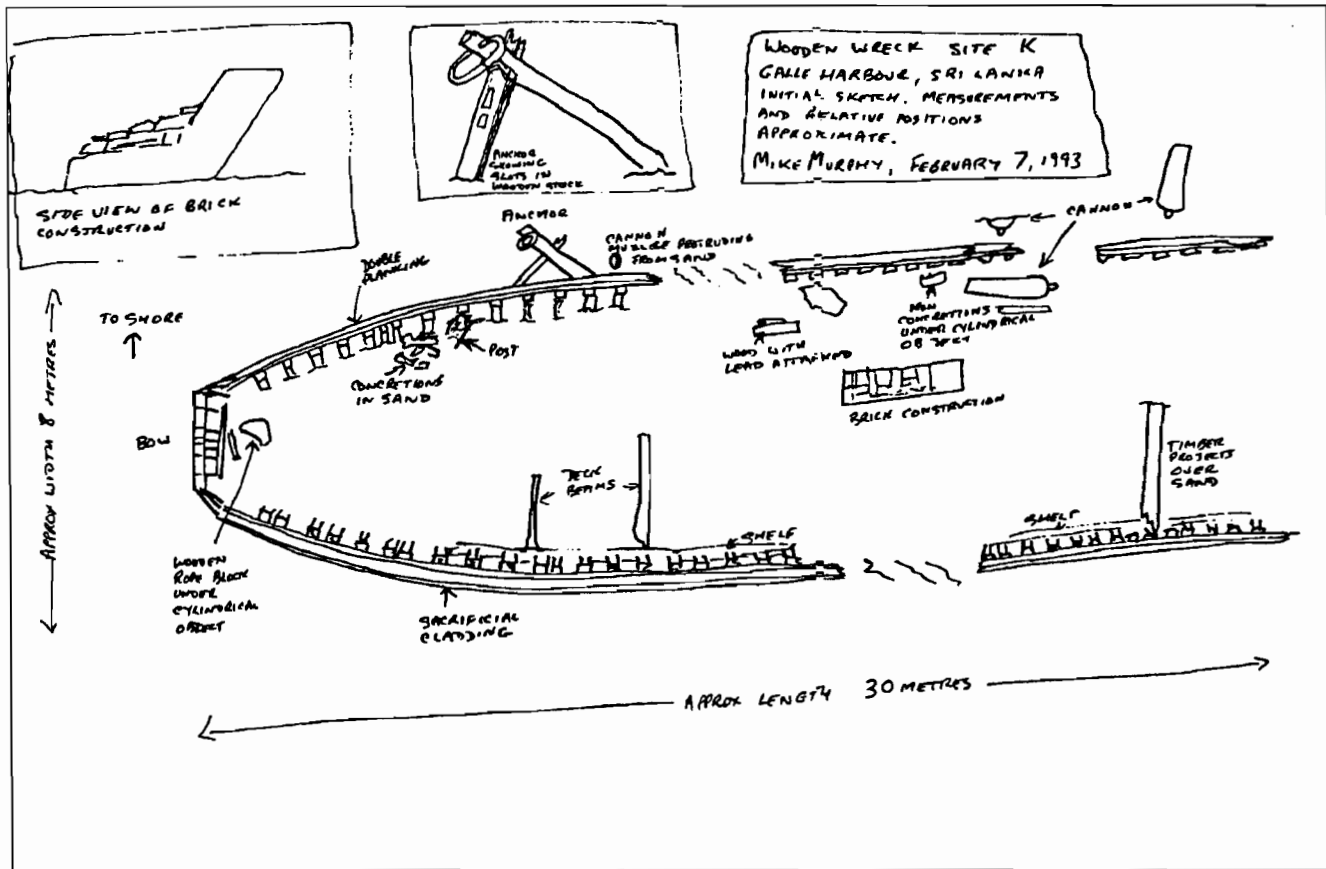


Figure 6. Sketch plan of Site L drawn by Mike Murphy.

site is exposed is complex. In general, the evidence suggests that this is the bow. It seems that the stem post has completely rotted away on the outside, but the general impression is that the planking sweeps upward in this area at an angle of less than 45° . If this was the stern, one would expect that there would be deadwood in this area with the planking rising from the keel at an almost vertical angle and then flaring out to meet the transom. Since there is a gradual longitudinal sweep, this suggests the rise to the bow. However, if the vessel is either a *fluit* or a English built vessel of the latter part of the 17th century or later, then this could be the stern. Other evidence suggesting that this is the bow is: the location of the anchor; the fact that blocks and equipment associated with boatswain is normally associated with the bow; and the location of the possible galley area which corresponds with the bow interpretation.

CONSERVATION

The structural features of Site L are almost free of marine encrustation and algal growth. The excellent condition of the timbers and the apparently limited damage by marine worms indicate that the site is buried for extended periods of time. Interestingly, those examined on the seaward side of the vessel seem to be less degraded than those on the shoreward side. The comparative softness of the inshore timbers may be due to some prevailing difference in the micro environment between both sides of the vessel. Lead sheathing is also evident, attached to some timber structure and animal hair and a pitch-like substance is sandwiched between the layers of sacrificial planking.

Of the four cast iron cannon seen on the wreck site the two buried examples are likely to be in the best condition. They are encapsulated in a thin, but very hard and smooth concretion. The two exposed cannon, although concreted,

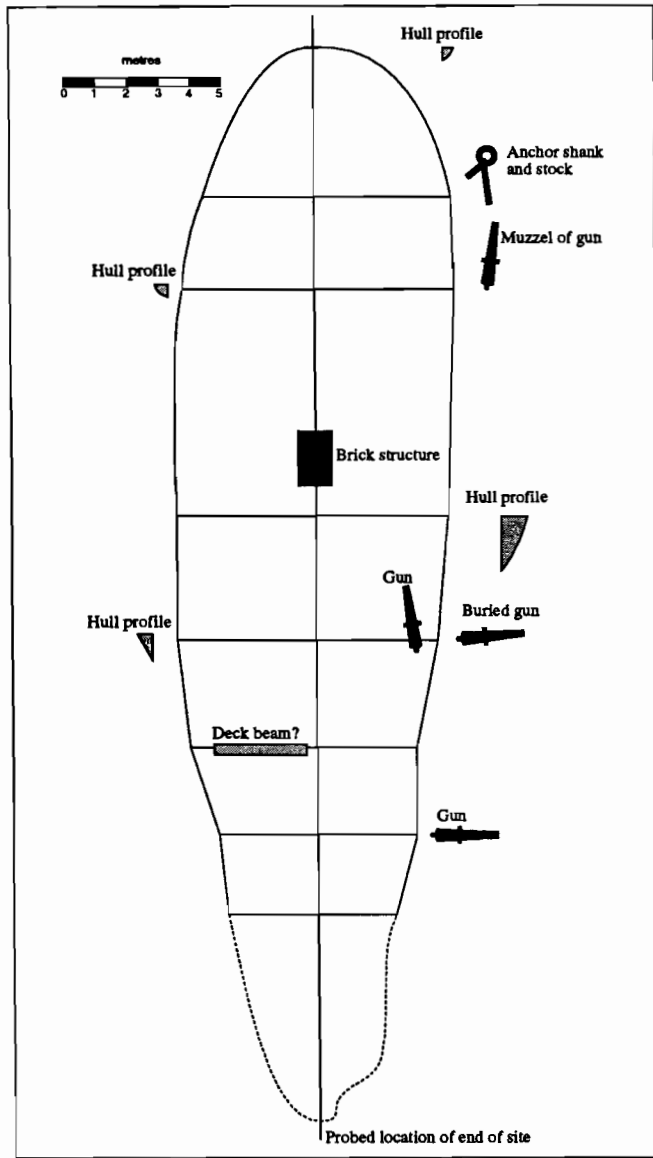


Figure 7. Interim plan of Site L.

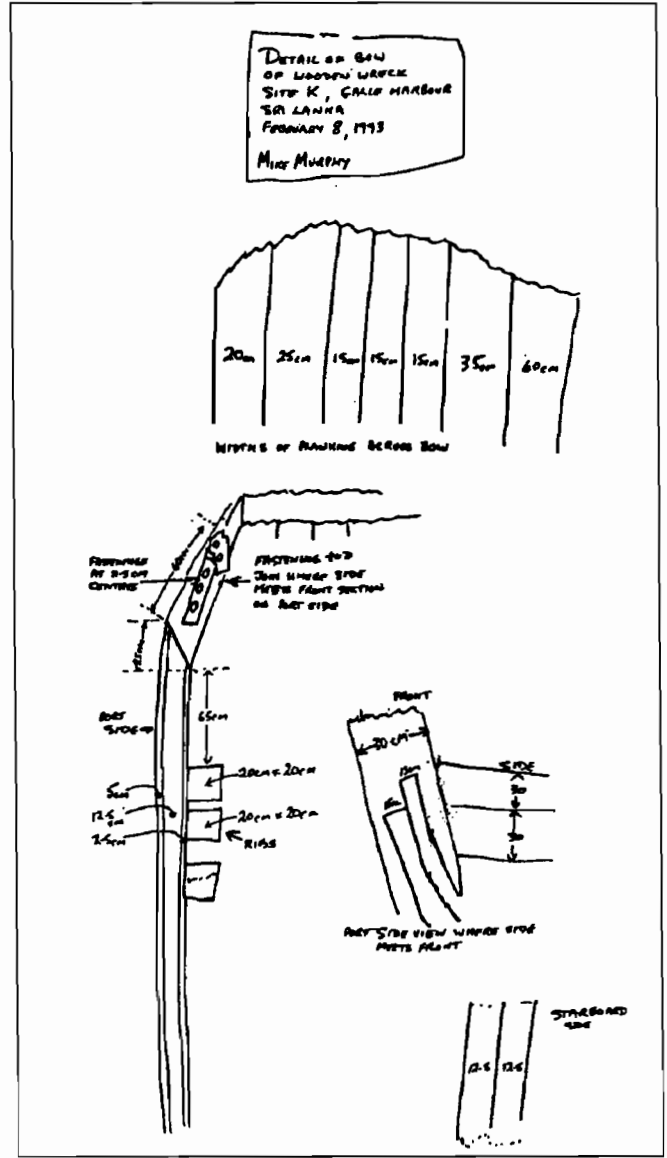


Figure 8. Details of what is thought to be the bow section of Site L drawn by Mike Murphy.

appear to have suffered from erosion. The concretion is the typical aerobic encrustation of exposed cannon seen on site F. The anchor does not appear to be extensively corroded. Surprisingly, the wood of the stock is still present, and although penetrated by teredo, is still resilient. The bricks, pipe bowls and broken examples of ceramics and glass are in sound condition. A complete electro-chemical survey of the organic and inorganic materials on this site is essential.

The Great Basses wreck site survey

INTRODUCTION

The main source of information about the Great Basses site (the coin wreck) is Arthur C. Clarke (1974) *Treasure of the Great Reef*, Ballantine Books. The site was discovered on 22 March 1961 by Mike Wilson, Bobby Kriegel and Mark Smith (Clarke, 1974: 45). A second expedition, lead by Arthur Clarke took place in 1963. On 30 January 1993, at the invitation of the Department of Archaeology, a brief inspection of the site was made by the Joint Sri Lankan–Australian Project team with the objective of making recommendations about the future management of the site.

THE 1960S EXPEDITIONS

Included in the finds were two small bronze cannon (2.5 ft, 762.0 mm), coins (115 lb, 52.21 kg), some copper bars and 20 musket balls (see photograph Clarke, 1974: 58). Coins dated 1113 (Arabic) or 1702 AD. All coins found on both expeditions were dated 1702 except for one dated 1685 (Clarke, 1974: 64).

The 1963 expedition included Arthur C. Clarke, Mike Wilson, Rodney Jonklaas and Peter Throckmorton. Throckmorton describes the site as follows:

At one end there are two large iron anchors—that is at the east end. Then about twenty to thirty feet to the west—that channel between the two ridges in which the wreck lies runs almost due east and west—is a series of cannons. These cannon are jumbled like matchsticks... About twenty or thirty feet to the west of the cannons is a smaller brass cannon, about four feet long and a foot in diameter—perhaps smaller... That brass cannon lies across the channel.

The gully is quite wide. It's about thirty or forty feet wide, or perhaps less, and where the brass cannon lies, the bottom is a mass of concreted corrosion products of iron, bits of silver coins, musket balls and so forth, and lying just above the muzzle of the cannon—which lies in a north and south direction with its muzzle disappearing into the overgrowth of coral—lying above it are two or three pieces of iron, and a mass of generalized corroded mess. I picked out of it the wooden stock of a pistol—still in fairly good condition although just broken off. I tagged the brass cannon. Its got the number 3 on it now [1 in the photograph Clarke, 1974: 166].

I tagged a couple of the others also (Clarke, 1974: 151).

Throckmorton refers to pistol handle, fragment of silver bowl, musket balls, and hollow iron shot. On the first dive the boat was anchored on the northern (landward) side of the reef over the 19th century bottle wreck. Later mentions

two pistol stocks and floral engraved butt-plates. Throckmorton describes guns:

The measured length is eight to eight and a half feet.

Wilson states:

...I began to search away, way out from the main site, and I found scattered coins, as far away to the north east as a hundred feet, and still parts of the gunroom equipment. Up on the side of the wall where we thought we had seen silver, I came across a big plate, piles of cannon balls, and scattered silver coins once more. I went right over the reef, down the other side into a small pothole, looking for silver, though I didn't find any on that side (Clarke, 1974: 174).

Throckmorton (Clarke, 1974:180):

...the brass cannon that we removed today... Yesterday, I began chipping through a concreted mass of hardened tar, gunpowder, the corrosion products of iron... included in the mess were musket barrels, the stock of a pistol, bits of iron and hand grenades...

The bronze cannon was raised and found to have the numbers: 2 3 23 8. Clarke weighed the gun at 332 pounds, so the weight marks are 2 hundredweight, 3 quarters and 23 pounds $((2 \times 28 \times 4) + (3 \times 28) + 23) = 331$ pounds. Clarke concludes that the 8 is a serial number (Clarke, 1974: 223)

Throckmorton states (Clarke, 1974: 191)

...the latest count is that there are four cannon around the two anchors in the bow part of the wreck, there are two cannon in between the bow part of the wreck and the heap of cannons, and there are now fourteen cannons... in the heap of cannons—two of which are long guns and the rest of which are cannonades. So what we thought was a ten-gun ship now turns out to be at least a twenty-two-gun ship, because the twenty guns actually on the wreck and the one gun over the reef, that is to the north of the wreck, which was probably on the poop when it broke loose, makes twenty-one... With all these guns it is interesting that we've only found about three cannon balls and about seven or eight grenades.

Throckmorton (writing after the expedition while in Colombo) describes the site (Clarke, 1974: 260–70):

The valley between the two ridges, where the ship lies is twenty-five to thirty-five feet (7.62 to 10.67 m) deep to the bottom, and roughly twenty-five to forty feet (7.62 to 12.19 m) wide in the wreck area... The distance from the eastern end of the shank of the outermost anchor to the furthest extension of material found in Group E is approximately 150 feet (45.72 m).

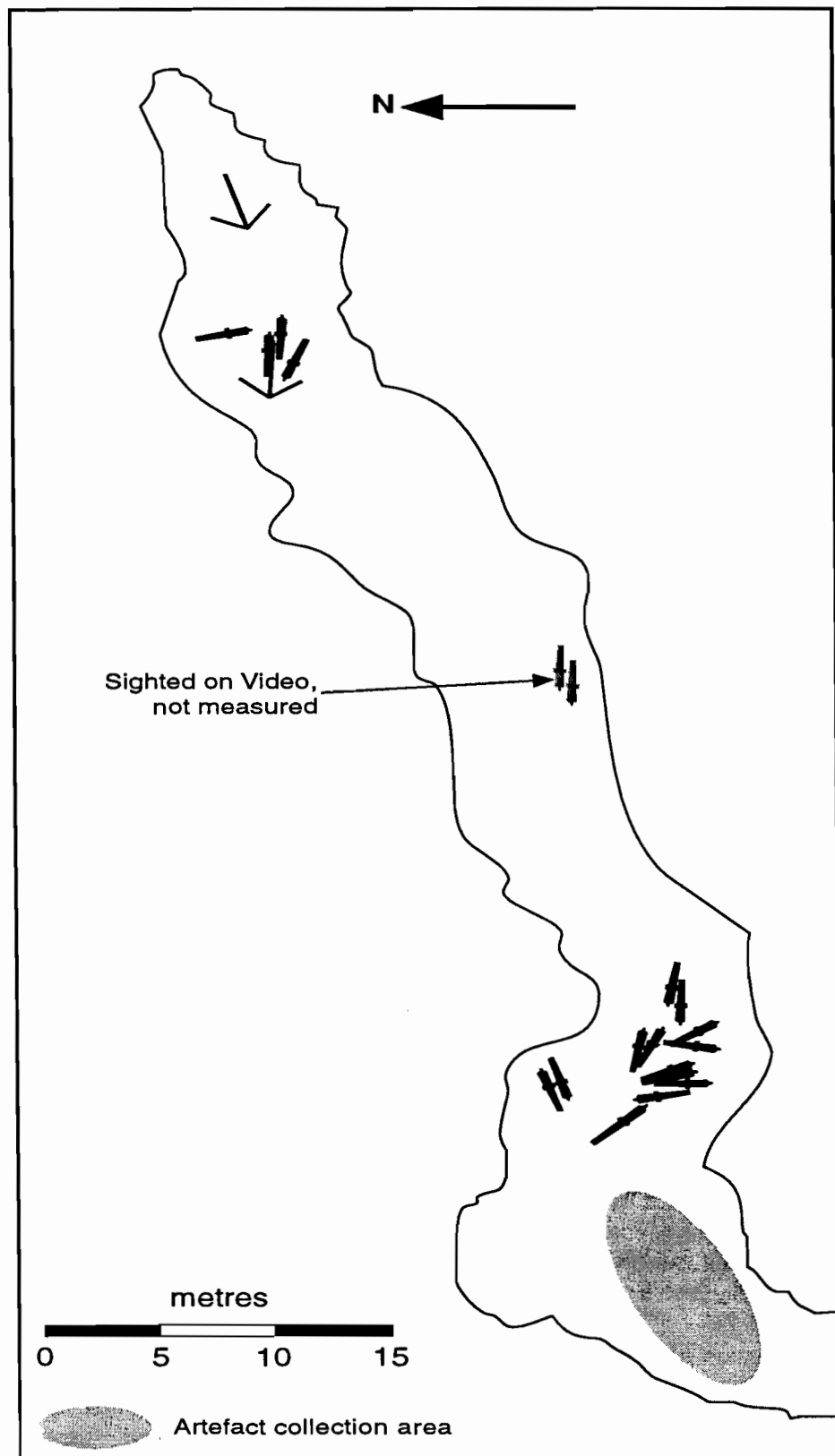


Figure 9. Plan of the Great Basses site drawn by Paul Clark

GROUP A

Four anchors and four cannon. This can be presumed to be what remains of the ship's bow. The broken anchor 4 was likely so heavily corroded that it broke under the weight of anchors 2 and 3 pressing down on it.

Four cannon, each eight feet (2.44 m) long, are associated with the anchors, three of them with their cascabels facing east, one with cascabel facing west.

GROUP B

Three cannon, all heavily overgrown. Their cascabels all seem to be pointing west.

GROUP C

Thirteen cannon 8 feet (2.44 m) long, plus a larger cannon 10½ feet (3.20 m) long.

GROUP D

The shallow water on top of the second reef to the north of the wreck where the two smaller cannon were found in 1961.

GROUP E

... It is an area approximately 20 feet (6.10 m) long by 10 feet (3.05 m) wide. The bottom is sand at the eastern end; from there a ridge of rock extends 20 feet (6.10 m) to the westward end of the wreck area... All the material raised came from this area. The lumps, some of them as much as two feet (610 mm) long by a foot (305 mm) thick... The ship was iron fastened... ships nails 20 mm square... Other nails, round, were 40 mm diameter. Mixed with the blackish mass of iron corrosion products in some of the lumps were pitch and/or tar... and what appeared to be quantities of gunpowder.

Throckmorton lists objects recovered from wreck (Clarke, 1974: 265–70):

1. Pistol stock
2. Fragments of musket or pistol barrels (5)
3. Pistol barrel and balls
4. Pestle, bronze (234 mm)
5. Grenade with plug intact (several raised) wall thickness 12 mm
6. Cannon balls (many) 78.5, 80, 87, 103 mm
7. Iron object
8. Tampon from bronze gun
9. Brass or bronze ferrule of pistol (off no. 1)
10. Tang part of butt of No. 9
11. Coins, part of wooden chest and coir bag
12. Rifle or musket butt plate
13. Shell plug
14. Cannon tampon
15. Grenade plug

16. Pistol butt piece

17. Pistol butt piece

18. Grenade plug

19. Coir bag

20. Potsherds. White glazed pottery with blue lines, coarse red brick or terracotta, coarse reddish clay pot with silvery black lead glaze

21. Neck of glass bottle

22. Ear-ring, copper or brass with gold plate. Green glass beads

23. Cannon ball and cemented coin

24. Mould of musket stock, ramrod ferrule

25. Concreted pottery

26. Unidentified pewter

27. Unidentified iron

28. Three pieces black glazed coarse pottery

29. Fragments of canvas bag outside coir bag

30. Copper plate 400 mm diameter

ANCHORS

Four anchors, three in east–west alignment. No. 4 (broken) at right angles to Nos 2 & 3. Shank 13 feet, (3.96 m) fluke to fluke 12 feet (3.66 m). All appear to have a square hold [*sic*] at end of shank.

CANNON

All cannon were measured. All were 8 feet (2.44 m) long (allowing for sea growth). Twenty-one guns in three groups. Group A contains four guns, Group B contains three guns and Group C has 14 (approximately), the westernmost is 10½ feet (3.20 m). The bronze gun muzzle diameter 51 mm, overall length 4 ft 7⅛ ins 2.13 m. Touch-hole has a threaded hole 20 mm deep next to it.

THE 1993 SURVEY

At the invitation of the Department of Archaeology an inspection of the Great Bases (coin wreck) was conducted on 30 January 1993. The team consisted of Jeremy Green, Paul Clark, Pat Baker, Robert Parthesius, Jon Carpenter, Vicky Richards, Mike Murphy and Peter Worsley from the Australian group and Professor Senake Bandaranayake, Senerath Disanayake*, Raj Somdeva*, Indrajith Kuruppu, Jagath Weersinghe, Driyantha Karunarathne, Navarathna Karaugahanga, Gihan Jayatilleka, SriLal Perera from the Sri Lankan group (* not on the boat). Overnight accommodation was at a rest house at Kataragama. Arrangements

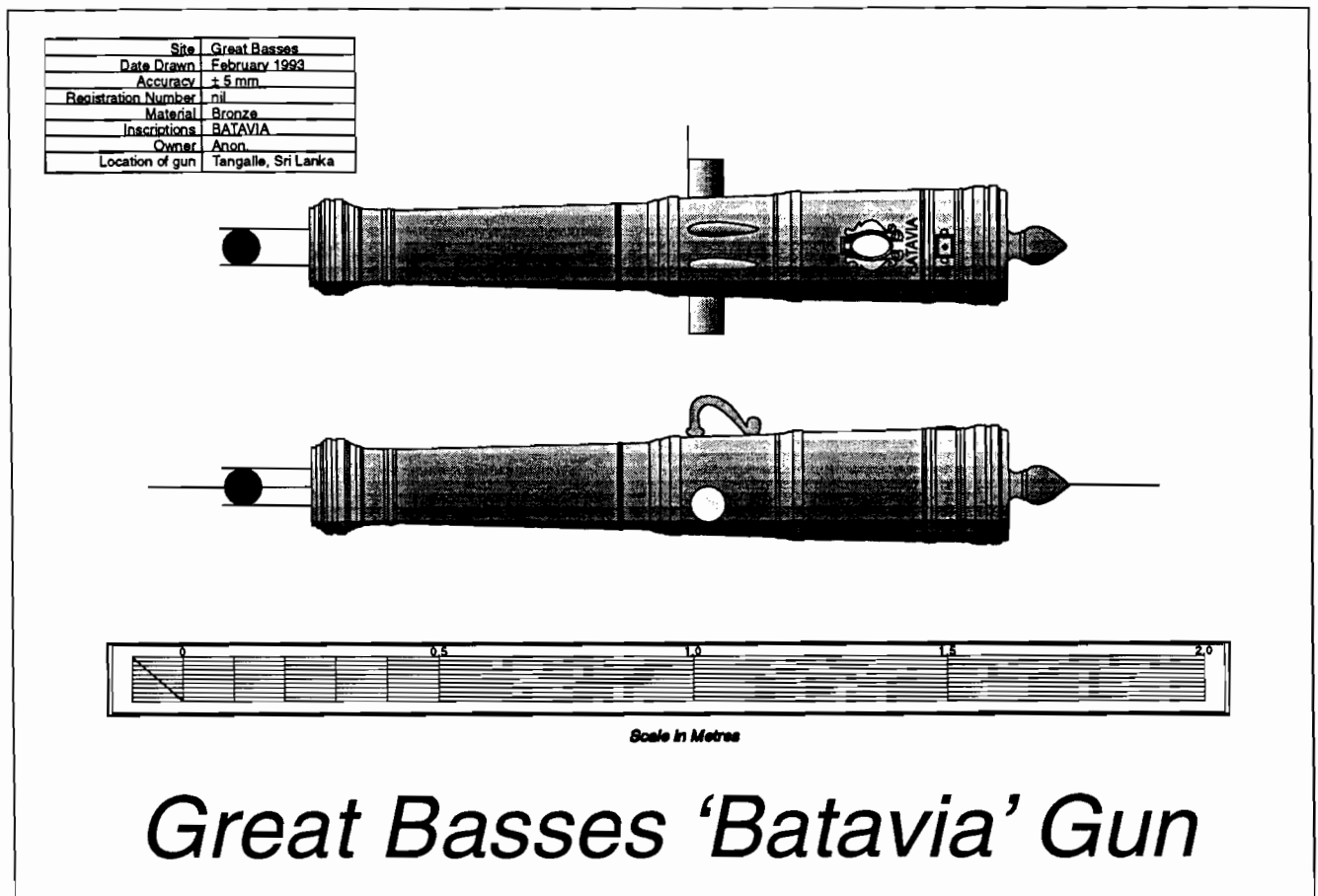


Figure 10. Detailed drawing of bronze gun from the Great Basses.

were made on the Saturday morning for the charter of a 8 m fishing boat and a small 5 m dingy from the fishing village of Kirinde. The trip to the Great Basses took 90 minutes. The boat anchored on the southern side of the reef to the west of the lighthouse ($6^{\circ} 10.7N$, $81^{\circ} 28.9E$). The reef runs from the lighthouse at a bearing approximately 250° almost WSW. The site is located against the southern side of the reef between the 'Shark's Tooth' Rock and the large flat rock closer to the lighthouse. There is a slightly deeper reef line to the south of the site and the main site lies in a gully. The site is essentially as it was described by Clarke and Throckmorton, although there are some discrepancies in their description of the number of guns (see below). The obvious difference is that there appears to be two anchors missing from the site. Throckmorton clearly describes four anchors, there are now only two. It is assumed that two have

been salvaged from the site. The main coin area, described by Clarke, is now unrecognisable. The 1993 team raised total of 613 coins from this general area together with 56 concretions containing an indeterminate number of coins (see artefact catalogue below).

A brief tape survey was made of the site in order that a sketch plan could be constructed (see Figure 9).

THE BRONZE GUNS

A number of bronze guns have been reported on the Great Basses wreck. We know from Clarke that two very small swivel guns, possibly Asian, were recovered by Mike Wilson on the first expedition. One bronze gun was recovered on the second expedition. At least two other bronze guns have been reported to have come from the site. On the return from the Great Basses a bronze gun inscribed with

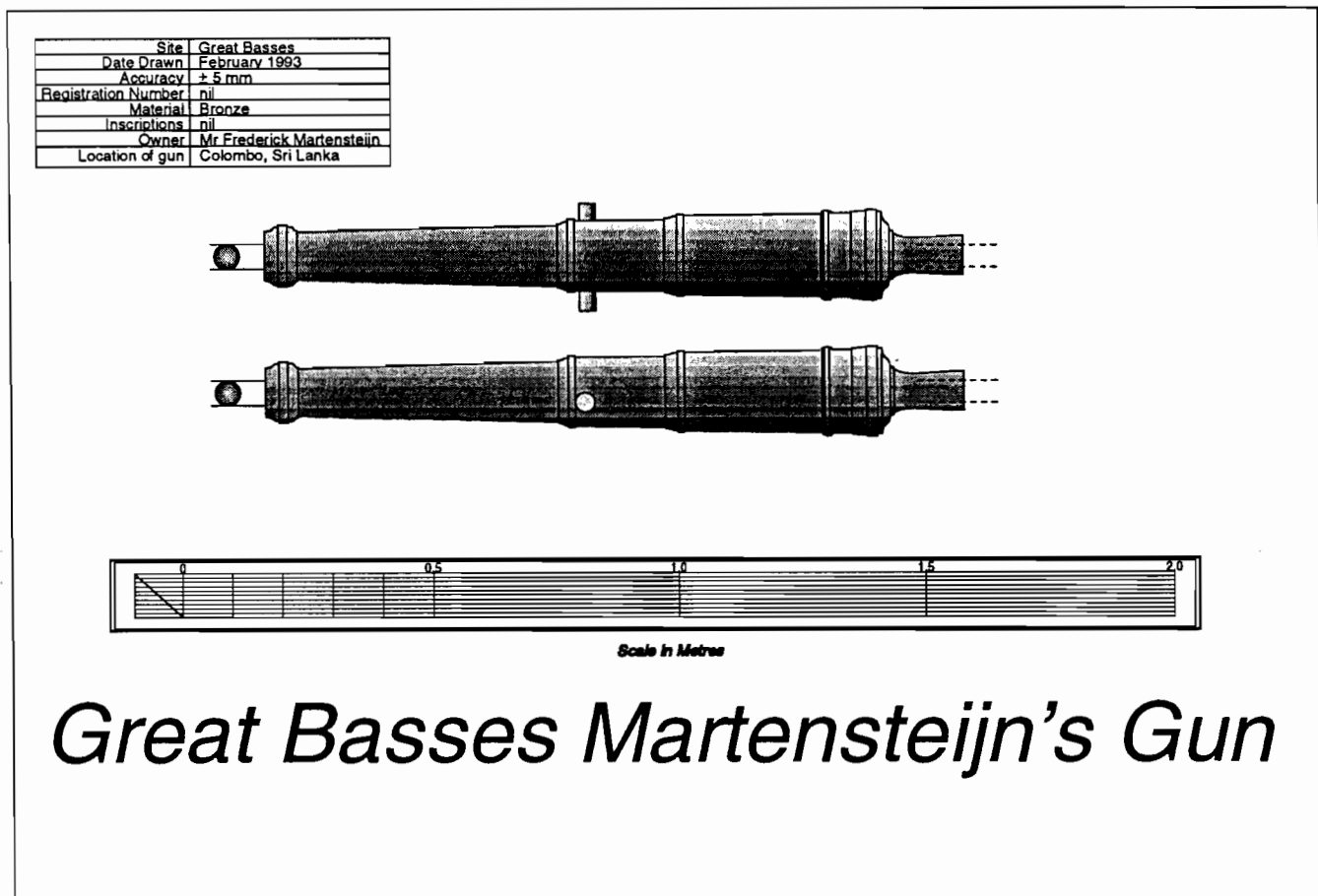


Figure 11. Bronze gun recovered from the Great Basses Site by Mr Frederick Martensteijn.

the word "BATAVIA" was examined. It is said to have come from the Great Basses 'coin' wreck and raised in approximately 1967. The gun was photographed and drawn (see Fig.10). The gun is very interesting as it is a land service gun, with dolphins (the left hand one is broken off), a shield which, unfortunately, is very eroded. The cascabel is flat with a lotus-shaped button. The bore diameter is about 80–85 mm. The word "BATAVIA" incised on the second reinforce just below the escutcheon suggests that the gun was at some point in its career at Batavia and thus almost certainly in the hands of the VOC. Because the word is inscribed rather than cast in relief it is unlikely that it was cast for the Company. The gun looks to be 17th century, possibly mid-17th century. The design is unusual and it may not be Dutch. The normal weight marks on the gun are missing possibly due to erosion.

A second gun, in the possession of Cedric Martenstyn, Colombo, appears to be a duplicate of the gun raised by Clarke, although there are no weight marks. This is also a land service swivel gun, with very simple astragals and fillets. The cascabel is quite long, with a cylindrical hole in the end for a wooden (?) traversing lever. Throckmorton suggested a British origin of the gun, however, the traversing lever socket of this type is commonly found on South-east Asian and Indian swivel guns and has not been noted (to my knowledge) on European guns. The original location of these two guns was suggested by Swami Siva Kalki (Mike Wilson) who indicated in conversation with the authors that there were two bronze guns near the lighthouse on the seaward side.

Reg. No	No	Mat.	Description
93GB 1	8	13	Ballast stones large
93GB 2	11	13	Ballast stones small
93GB 3	4	44	Glass beads, yellow, twisted decoration with hole through centre
93GB 4	2	2	Two fragments of ceramic, unidentified
93GB 5	4	44	Fragments of green glass
93GB 6	1	22	Base fragment of very fine earthenware round base
93GB 7	4	44	Fragments of very eroded clear glass
93GB 8	4	86	Sample of copper concretion from around the cannon impression
93GB 9	5	34	Eroded lead sheeting
93GB 10	4	34	Lead shot with sprue in good condition
93GB 11	11	34	Lead shot with sprue in medium condition
93GB 12	4	34	Lead shot with sprue in medium condition
93GB 13	3	34	Lead shot cannot tell if sprue present, in medium condition
93GB 14	9	34	Lead shot possible sprue present, in poor condition
93GB 15	1	44	Fragment of clear glass, possibly from wine glass, the lower stand, looks like bottle neck, but unlikely
93GB 16	2	44	Fragment of clear glass, possibly from wine glass, possible the solid stem, very badly eroded
93GB 17	49	51	Fragments of silver coins
93GB 18	555	51	Silver coins
93GB 19	14	51	Silver coins
93GB 20	29	51	Silver coins
93GB 21	15	51	Silver coins
93GB 22	56	51	Concretions, these concretions contain silver coins

Figure 12. Great Basses artefact catalogue.

ARTEFACT CATALOGUE

All the artefacts were registered at Galle on the return from the survey. The artefacts were entered in the standard artefact database used for the Galle Project, except that the items were given a prefix 93GB. Figure 12 gives the basic registration information.

CONSERVATION

Both anchors appear to be in good condition, although the shank of one anchor is broken. Concretion has formed on the anchors and barnacles encrust the surface. The wooden stocks are absent. Like the anchors the cannon are encapsulated in concretion and encrusted with barnacles. One of two cannon alongside the main cluster has a smoother and apparently thinner layer of concretion. This may be due to scouring or indicate that the cannon was stripped of its

concretion in the past. In general, the exposed position of the cannon in the aerated waters of the gully would imply that corrosion could be quite extensive. Small artefact material has accumulated around an outcrop of the cora' rock substrate, particularly in a sand and coral rock filled depression at its base. Small artefacts consist of silver coins, lead shot, glass beads, glass container fragments and a sherd of earthenware. A sample of wood, probably from the side of a box, was collected for identification. All recovered artefacts were found loose in the sand except for the wood sample.

The silver coins exhibit varying degrees of corrosion. Some of the better preserved coins have iron corrosion deposits indicating that cathodic protection influenced their condition. The lead shot was found in an excellent state of preservation. With the exception of the beads, the



Figure 13. Coins from the Great Basses Site.

glass had suffered from severe sand abrasion. An earthenware sherd and ballast stones were found in excellent condition.

A complete electro-chemical survey should be conducted and acquisition of quantitative data for the metal artefacts on the site, especially the anchors and cannon, is essential prior to any excavation.

CONCLUSIONS

The wreck on the Great Basses has still a great deal of archaeological potential, although there is now only a small proportion of what was originally on the site. The priority of any future project would be to try and locate and record as many of the artefacts, other than coin, that are held in

private collections. A further archaeological excavation would serve two purposes: to remove the remaining coins from the site and thus make the site reasonably secure; and to recover the remaining artefacts that may help to identify the site. It would be possible (although difficult) to raise one or two of the iron guns. The difficulty is not so much in the recovery operation as in the logistic and management problems in conservation process. The iron guns may help to identify the site. A synthesis of the archaeological information could then be used in conjunction with a thorough archival research project in the British, Dutch and Sri Lankan archives. The loss of a vessel of this size, carrying such a large cargo of silver is unlikely to have passed without comment by the colonial administrators.



Figure 14. Anchor on the Great Basses Site.

The present indications from the artefacts, is that the vessel is possibly European. It is thought not to be a VOC ship since there were no VOC markings, it carried stone ballast rather than the usual brick; the only positive suggestion is the word Batavia on the bronze gun at Tangalle. The vessel could possibly be British from the evidence of guns and ballast. The clustering of the guns strongly suggests that these were in the hold as ballast. This is reinforced by the lack of solid shot on the site. Thus the iron guns could either have been old guns used permanently as ballast, or the guns were temporarily placed in the hold as ballast for this trip and the ship was supplied with a small number of solid iron shot. It is interesting that there more grenades found than solid shot.

RECOMMENDATIONS

The site is obviously of considerable importance and is in danger of further looting by sport divers and tourists. As a site for a commercial enterprise, the financial gain would be inadequate to justify the resources of a hypothetical commercial treasure hunting exercise. There are obviously a number of options to work on the site, however, the main priority must be to remove the remaining coins. Once this has been achieved, the site will be relatively 'safe', but will make a good recreational diving site. It is very hard to estimate how long it would take to clear the site of coins, but given that +600 coins were recovered in two hours, I would estimate that about seven days diving on the site would be adequate to complete the work. This work would not require dredge equipment since the current along the site is adequate for hand fanning and manual removal of spoil. The two options would be to:

Site	Lat	Long	Ht	Date	Time	No. fixes	S.dev	Sat1	Sat2	Sat3	pDOP
Site G	06°01.4121	080°14.2374	0	17/01/93	10:55:12	100	19.5	17/9	21/9	28/9	1.4
Site F	06°01.7357	080°13.7791	0	17/01/93	10:24:42	100	12.4	17/9	21/9	28/9	1.4
Site E	06°02.1129	080.13.3045	0	17/01/93	12:11:04	100	17.2	15/6	20/9	28/8	1.3
Site J	06°01.8390	080°13.1524	0	17/01/93	13:29:19	100	12.1	14/6	28/9	32/5	1.3
Site K	06°01.8644	080°13.1409	0	23/01/93	10:57:43	1	—	20/9	28/9	32/9	1.4
1	06°01.2556	080°13.2761	0	23/01/93	09:42:50	1	—	03/1	11/9	12/9	1.3
2	06°01.2558	080°13.2746	0	23/01/93	09:43:32	1	—	03/3	11/8	12/8	1.3
3	06°01.2578	080°13.2770	0	23/01/93	09:44:28	1	—	03/4	11/7	12/9	1.3
4	06°01.2555	080°13.2711	0	23/01/93	09:45:40	1	—	03/7	11/1	12/5	1.3
5	06°01.2477	080°13.2685	0	23/01/93	09:46:21	1	—	03/9	11/3	12/2	1.3
6	06°01.2302	080°13.2570	0	23/01/93	09:47:45	1	—	03/9	11/7	12/2	1.3
7	06°01.2190	080°13.2564	0	23/01/93	09:48:23	1	—	03/8	11/7	12/6	1.3
8	06°01.2242	080°13.2539	0	23/01/93	09:49:50	1	—	03/9	11/6	12/4	1.3
9	06°01.2157	080°13.2344	0	23/01/93	10:03:20	1	—	20/8	21/9	28/9	1.4
10	06°01.1857	080°13.2300	0	23/01/93	10:07:16	1	—	20/6	21/9	28/9	1.4
11	06°01.1941	080°13.2072	0	23/01/93	10:09:46	1	—	20/9	21/9	28/9	1.4
12	06°01.1811	080°13.2202	0	23/01/93	10:13:06	1	—	20/2	21/9	28/9	1.4
13	06°01.1792	080°13.2050	0	23/01/93	10:15:54	1	—	20/9	21/9	28/5	1.5
14	06°01.1569	080°13.1935	0	23/01/93	10:17:23	1	—	20/8	21/9	28/9	1.5
15	06°01.1589	080°13.1835	0	23/01/93	10:19:19	1	—	20/9	21/9	28/7	1.5
16	06°01.1532	080°13.1387	0	23/01/93	10:21:23	1	—	20/9	21/9	28/9	1.5
17	06°01.1675	080°13.1201	0	23/01/93	10:25:13	1	—	20/7	21/9	28/9	1.6

Figure 15. Table of GPS positions and associated measurements.

1. Operate from a large vessel at the Great Basses
 2. Operate from Karinde in a fishing vessel
 Of the two options, I believe that option two would be best, unless one was doing a large-scale survey of the Basses. There is a small rest house at Karinde, fishing vessels are readily available for hire and it gives the option of having alternative projects based from land. This operation would then be a lot cheaper and logistically simpler. If one was going to do a large-scale survey of the wreck sites in the Great and Little Basses, the large boat would give greater mobility, although one would need a small boat to work from in order to get to the sites close to the reefs. However, one would still require guides to show where the sites were and this means that it would still require a land-based support group, which to some extent negates the need for a large vessel.

Global positioning system (GPS) locations

A Magellan 1000 GPS was used to locate a number of the sites. The Sri Lanka ellipsoid was used and positions were in all but one case averaged for 100 readings. The GPS has a selective availability that can be either switched on or off by NASA, giving either high accuracy or low accuracy. During the period that the GPS was used, selective availability was off and high level accuracy was available. It will be noted that most of the sites were located to an accuracy of around 15 m standard deviation. Unfortunately, the system developed a fault in the early phase of the project and as a result only five sites were accurately positioned. It is proposed that as part of next years programme all the sites should be located and their positions determined using GPS.



Figure 16. Lotte Beichert instructing trainees.

Diver training

DIVE TRAINING REPORT - 1993

Karen Millar

The project began with ten participants who had been trained by Gihan Jayatilaka (Chairman of the Sri Lankan Sub Aqua Club) from 28 December 1992 to 8 January 1993. These trainees had reached the minimum standard of swimming required to proceed with snorkel diver training.

The 10 trainees were as follows:

- | | |
|------------------------------|-------------------------------------|
| Mr Indrajith Kuruppu | PGIAR |
| Mr Kumarasinghe Thannegedara | University of Kelaniya |
| Mr Asoka Perera | PGIAR |
| Mr K.D. Palitha Weerasinghe | University of Kelaniya |
| Mr M.W. Kapila Priyantha | University of Ruhunu |
| Mr T. Kamal Kumara de Soysa | PGIAR (Conservation trainees group) |
| Mr Gamini Kumara | PGIAR |
| Mr W.M. Chandrarathna | University of Kelaniya |
| Mr Chana Jayasinghe | University of Kelaniya |
| Mr Chandana Weerasena | CCF |

Since the trainees came to the project with no scuba diving training or experience, they were not able to participate in the on-site work or to undergo specific advanced training in underwater archaeological skills. The decision was made to organise a basic snorkelling and scuba training programme for the trainees to enable them to at least observe the underwater work.

Lotti Beichert (a PADI Dive Master), assisted by Cherie Cobbon, instructed the trainees in snorkelling skills for two weeks. The students were then introduced to the basics of scuba diving to allow them to safely dive on site at least once under Lotti's direct supervision. Only the most basic practical scuba skills were covered with minimal theory content, just sufficient to give the participants the experience of diving on a wreck site. It was reiterated that this would be an introduction rather than a complete course in scuba diving and that the students would need to complete an accredited course at a later date.

Further activities planned for the trainees are listed below. Some of these were not undertaken due to a lack of time.



Figure 17. Trainee divers undergoing basic scuba training.

Morning

(Training with Lotti and Cherie - dive masters)

- Snorkel Training.
- Finning, duck diving, snorkel clearing, mask clearing on snorkel, neutral buoyancy.
- Introduction to Scuba to enable the trainees to observe the underwater work on the inshore sites, using scuba, once or twice under supervision. This will require at least six mornings of training and only the most proficient will progress to this stage. (Approximately 1–2 weeks, 2–3 hours per day)

It was found to be beneficial for the trainees to help with the loading (8.30 am) and unloading (± 1 pm) of the dive boat each day. This helped to familiarise them with the equipment and its handling.

Three students participated in this activity each day, with a different group of three each day in rotation.

Afternoon

- For the first two–three weeks, skills taught at the morning's snorkelling session were practised at Unawatuna Beach.
- Trainees assisted the divers with preparation of equipment (slates, marking tags etc.) where needed.
- Archaeologists were given assistance with site plans, drawings etc. where appropriate.
- Tutorials were held on underwater surveying skills, practical sessions simulated triangulation on an underwater site. Site relocation using transit sketches was taught on land.
- Assistance with artefact handling was given to the conservation team when needed.
- Trainees attended conservation lectures/slide presentations when appropriate.
- Moira was given assistance with the finds when needed.
- Trainees attended other lectures where appropriate e.g.,

Pat's photography lectures, Moira's lectures on the 1992 finds and their distribution, Jeremy's lectures on underwater archaeology

- Underwater video footage was used as a training tool.

Evening

- The archaeological team ran underwater video footage of the days' dive. The trainees become familiar with the different sites in Galle harbour, the objectives of the work on each site and the techniques used.

DIVE TRAINING RECOMMENDATIONS

It was understood that the dive training undertaken in Galle would be an introduction and not a complete course in scuba diving and that the students would need to complete an accredited course at a later date.

It should be noted that Lotti has extensive experience as a diver and also in assisting novices, however, her qualification level (that of Dive master rather than Instructor) does not allow her to assess and give accreditation to students. The trainees have yet to be assessed, given additional training if necessary, tested and then certified as open water scuba divers by a qualified Dive Instructor. This additional training will need to include both the theoretical and practical components of scuba diving.

1. A short list from the ten trainees should be chosen to complete the scuba qualification training and who would be committed and available to participate in the programme.
2. The chosen trainees will need to undergo scuba training and to qualify as scuba divers with a recognised dive instructor training organisation (e.g. PADI, BSAC, NAUI, Sri Lanka Sub Aqua Club etc.) This should be completed as soon as possible to allow the successful divers to gain general diving experience in the months leading up to the 1994 programme.
3. It is anticipated that the chosen divers will participate in the 1994 programme where they will undertake training in underwater archaeological skills. They will need to be committed to the project for the full four weeks and will work with the Australian archaeologists on-site.
4. It is anticipated that these chosen divers will provide continued assistance and work jointly with the Australian team on future maritime archaeological projects. This will enable these divers to become proficient in underwater work and will provide Sri Lanka with a team of experienced archaeological divers.

Dive Training Report

Lotti Beichert (PADI Dive Master 29780)

To start the dive training the students were required to demonstrate their abilities in using fins, snorkel and mask. This first assessment was conducted at the Light House Bay of Fort Galle. Most of the students were using fins, snorkel and masks for the first time.

SNORKELLING PROGRAMME

(Conducted with trainer, Lotti Beichert and an assistant, Cheri Cobbon, over 10 days in Unawatuna Bay.)

Skills taught:

1. Correct fit and use of mask, fins and snorkel.
2. How to clear the snorkel and mask.
3. Finning technique, body and arm positioning
4. Compensating the ears and duck diving
5. Free diving to 5 metres

The trainees were organised into two groups according to ability. One group of four were more advanced than the other group of six trainees. The group of advanced students participated in long distance swims and snorkelled in deeper water while the beginners were slowly introduced to these skills.

Scuba Programme

(Conducted with trainer, Lotti Beichert and an assistant, Parakrama Thomas over 11 days)

Practical aspects covered:

- Explanation of scuba equipment (tank, regulator, gauges, stabilising jacket)
- Pool lessons in Bona Vista Bay (Assembly and disassembly of scuba unit, regulator clearing, mask clearing, buoyancy control, buddy pairs)
- Open water lessons using a boat

Theoretical aspects:

Lessons were given according to *PADI Open Water Manual* (Modules 1-5)

- Basic theory lessons
- Identifying marine life

With the assistance of Mr Parakrama Thomas, this course was held in an efficient and safe manner. All of the ten students were trained in the basics of scuba diving which will allow them to dive to a maximum of 15 meters under the supervision of an Instructor.

We finished the course with a pleasure dive and a nice bar-b-que at Bona Vista Bay.

Archival research 1993

Robert Parthesius

The *Dolfijn*

In preparation of the 1993 Galle Harbour Programme, further research was undertaken in the Netherlands to seek information on other shipwrecks in the Bay of Galle. The main objective was to locate further information on the wreck of the *Dolfijn*. The *Dolfijn* was lost on 15 May 1663 near the Bay of Galle. In the *Overgekomen Brieven en papieren* a report was found about the events that took place during the wreckage.

Aanteekening van't voornaamste gepasseerde van't verongeluckte jaght den Dolfijn Zedert 27 april dat uijt Suarlijs compt geseijlt en op 29 daeraen de wijze om naer Batavia te vertrecken hebben aengenomen te weten (ARA VOC 1244 folio 881: 'Aentekening en hoedanich 't jacht den Dolfijn gebleven is').

The ship sailed from Sualijs (Surat) on 27 April 1663 destined for Batavia. On 28 April they loaded packets of yarn and letters for Batavia. Shortly after their departure (after the high tide of 29 April) they found that the ship was leaking badly; even with two pumps they were not able to keep the ship dry. So they returned and examined the ship. After sending the skipper, the high boatswain and the constable's mate below they found the leak in the powder magazine on port side of the ship. The powder was unloaded and the carpenter was able to repair the leak.

The 30 April the *Dolfijn* sailed for the second time. When they were passing 'het Hoogelant van St. Jan' the ship was strained by heavy sea conditions. Again the crew had to pump day and night to keep it dry. On 3 May the skipper discussed their difficult situation in the *scheepsraad* (the council of officers) [Possibly they arrived at a VOC-post because the merchant Zandtvliet asked for assistance]. They asked for 20 to 25 locals for the purpose of pumping the vessel in case of emergency. This request was unsuccessful because the locals were asking too high a price: one *pagood* a month, free water, fire-wood and rice. They even asked for a galley and six month pay in advance.

So they left without assistance but with 32 packets of amphiaen for Coetegin [Cochin]. The *Dolfijn* arrived there on 10 May 'lek maar behouden' (leaking but safe). Once again a request for assistance was turned down. They were told to sail on to Galle. It was on this part of the voyage things went really wrong. On 14 May the ship was at 6' 10"

North in bad weather, the leak became worse. The skipper decided to anchor in 13 fathoms of water in order not to miss the Bay of Galle. In order to keep the ship dry they had to install a 4th and an 5th pump. The crew was so exhausted after constant pumping that they were not able to lift the anchor. After cutting the anchor rope the *Dolfijn* sailed along the coast to the Bay of Galle. In the entrance of the bay they anchored and fired several guns as distress signals. The situation became untenable, since even five pumps were not enough to keep the ship afloat and buckets were also needed. The only sensible thing to do was to sail the ship in the bay as quickly as possible in order to save the money and cargo.

Again the problem was to lift the anchor because the crew were either fully occupied with pumping or were completely exhausted. Another problem arose when the pilot came on board. He explained that it was impossible to enter the bay because the ship was laying directly in front of a shallow reef and the wind was not favourable:

ten aansien ons een drooghte recht in 't vaerwater in de weg lagh kregen cort daerna contrarie wint dat ons noodsaeckte voor ancker te blijven leggen.

Aware of the seriousness of the situation the VOC sent assistance from the shore but by the evening this help turned out to be useless because the galleries were striking the water and they had to abandon the ship.

This information was available during the expedition of 1993 and as a result a search for the site was made. According to the documents the *Dolfijn* sunk in the face of the bay but behind a reef. Of course this description could indicate several places outside the bay. Nevertheless it was decided to search in what was thought to be the most likely area. The area that was selected was at the west of the entrance to the Bay where there are several reefs which the *Dolfijn* could have laid at anchor. The search line covered 30 m. with a diver every 5 m. A GPS in a boat on the surface was used to record the position and the track can be seen in Figure 1 running SSW from Polkote Gala reef. Nothing of interest was found during this search and it was decided await further historical information before continuing the visual search.

More information about the wreck of the *Dolfijn* was found in the Dutch records in National Archive, Colombo. In the dairy of Adriaan van der Meijden a report of the events of 15 May 1663 is given (SLNA, Dutch Records: 1/ 2712. Dairy kept during the government of Adriaen vander

Meijden and superintendent Rijckloff Goens 21 Oct. 1662–30 Nov. 1663. Authentic copy by the secretary Martinus Huijsman 20 Dec. 1663). At the time he was in Galle and was witness of the disaster:

Shortly after the afternoon a ship came sailing in the direction of the bay. Because it was shooting its guns constantly we assumed it was in distress. Originally we thought that it was the *Archilles* sailing from Persia. We gave the pilot Bastiaen the order to go to the ship so far possible because the wind was strong and showery. After a several attempts the skipper and former pilot of this Bay Daniel Harthouwer succeeded on getting aboard. Eventually the costly ship the *Dolfijn* was pitifully wrecked in the dark evening [...]

About one and a half hour after the sinking of the ship the weather became so silent that we could not tell from which direction the wind was coming. But around midnight the wind again got up, with heavy rain and squally winds. The ship *Thonij* brought the under merchant Meijndert Janssen ashore. He went back on board after handing over the letters from Surat [...]

According to the letters the *Dolfijn* carried a rich cargo. To protect the cargo in expectation of salvage the guards on the *klip bij d' vlaggespil en aen't nieuwe puntje* [...] received the order to stop ships nearing the place of the wreck.

16 May 1663

In the morning we saw not without sadness the topmasts of the *Dolfijn* sticking a bit out of the water. Because he heard of the reward for the salvaging of the money, a corporal reported himself with idea of an iron drill with a capstan on top. With this device he claimed to be able to open the money chests outside the ship and salvage the money. Although we think it will not work because of the depth and the swell, we allowed him to show his skills.

To day 2 or 3 'little offices' washed on the beach near Sabradoel. They were brought to the house of the Commandeur and the Superintendent. In the draws of the 'little offices' were several letters. Also a few sailor's chests (according to the goods inside) and one from the skipper washed ashore. The skipper's chest was smashed by the sea or by the natives.

To prevent the salvage of the flotsam the stealing of goods was made a capital offence. The Superintendent placed guards on the beach. Because the amount of goods was insignificant he withdrew the guards and replaced them by an daily inspection.

18 May 1663

The Superintendent ordered the two merchants and the three helmsmen of the *Dolfijn* to write a declaration of the last journey and the loss (see above). [in the diary is the same text included as in the OBP in the VOC archive in Den Haag]

21 May 1663

A note in the diary concerning the financial situation of the VOC in Ceylon tells us more about the salvaged cargo of the *Dolfijn*.

Because in Colombo there was no money to pay the wages and the normal expenses, it was decided to send the six of the *Dolfijn*'s salvaged chests of *ropias* to Colombo and to keep for Galle the three chests with *abasjes* from Pegugelicht.

23 May 1663

An attempt to salvage the other chests from the sea bottom was undertaken by the inventor of the 'drill' under supervision of Mr Roothaes and Skipper Symonsen. The salvage was impossible not only because of the swell and the depth but also because the mast was broken and the sails and the ropes were in the way. They could not see if the ship itself was broken.

ORIGIN OF THE *DOLFJIN*

The *Dolfijn* was a so-called *jacht* of 520 tonne, sent to the Indies in 1655 by the *Kamer Amsterdam*. In the index of ships names in the VOC archive the *Dolfijn* was mentioned only once. In 1654 the *Dolfijn* was confiscated by the English Navy (ARA VOC 11517). It is not certain if this *Dolfijn* is the same ship as the *Dolfijn* of 1663.

Further information concerning the *Hercules*

HISTORICAL COMMENT ON THE PRESENCE OF 31 GUNS ON THE *HERCULES*

Some questions have been raised about the presence of 31 iron guns on the *Hercules* site. Compared with other finds of VOC ships the number is high. Historically there are two explanations:

1. Some of the guns were part of the cargo or ballast of the ship. It was common to use old and broken guns as ballast. Although some guns are clearly broken in the present state there is no clear evidence for these guns being ballast.

2. The ships were more heavily armed because of the dangers in sailing in this area. The VOC followed a flexible policy of arming ships. Ships that were sent to areas where their enemies were also operating were equipped with more guns (F.W. Stapel (ed) *Pieter van Dam: Beschrijving van de Oostindische Compagnie* 1.1, s' Gravenhage 1927. p. 507.). Ceylon was considered a dangerous area because of the war on the coast of India. All ships sailing in these waters carried more guns. The evidence for this be found in the Dutch Records in Colombo. In the council minutes (SLNA 1/9 Council Minutes 1657–63. 29 Nov. 1657) a list was included giving the numbers of guns on ships in Ceylon. The numbers were much higher than usual:

Ship	Guns	Tonnage	Type
<i>Phenix:</i>	49	900	
<i>Citroen?</i>	39		
<i>Terschelling</i>	39	520	<i>Jacht</i>
<i>Vlieland</i>	36	360	<i>Jacht</i>
<i>Zierikzee</i>	36	400	<i>Jacht</i>
<i>Goudsbloem</i>	38	540	<i>Jacht</i>
<i>Weesp</i>	38	560	<i>Jacht</i>
<i>Worcum</i>	36		
<i>Leeuwin</i>	26	400	<i>Jacht</i>
<i>Ter Goes</i>	30	460	<i>Jacht</i>

THE LAST INTERROGATION

Even three years after the loss, the *Hercules* was still subject of an interrogation by the government of the VOC in Galle (ARA VOC OBP nr ? folio 958). Occasion to this investigation was the letter Adriaen van der Meijde addressed to the Governor General a year before (see 1992 report). The personal view of Van der Meijde on the event of the loss of the *Hercules* forced the VOC to question the pilot Bastiaan Andriesz. who was on duty that day. The point of the interrogation was the question why the pilot did not sail the ship outside since there was enough space for it and the wind was not blowing in the wrong direction. The pilot admitted that under normal circumstances he would have sailed the ship out of the bay without problems. During the panic of trying to weigh the anchor, the rope of the anchor stuck between the ship and the rudder, with a catastrophic result.

THE CARGO

At the end of the interrogation a list was included of the lost cargo:

The *Hercules* 1700 packets of fine cinnamon and a cargo of Canarase rice destined for Batavia.

The complete cargo was lost because after the ship struck the rocks it broke into pieces. To collect the goods, soldiers were placed on the beach.

Some comments on the survey of site L

In view of the presence of three layers of planking on the wreck on Site L, the question of its use 16th and early 17th century shipbuilding is of interest (Parthesius, R., 1991, *De dubbele huid van Oostindiëvaarders aan het begin van de 17de eeuw. Batavia Cahier* 3, Lelystad: 25–9):

At the end of the 16th and the beginning of the 17th century many technical problems concerning the growth of the ship's size arose. The development of the rigging is the most noticeable indication of that process. Less clear are the changes in the ship's construction and the building practice. During the building of the *Batavia*-reconstruction in Lelystad, much more known about the constructional problems involved in making the bigger ships suitably strong. It is also possible that the practical construction method needed to be changed, because it was not possible to handle the correspondingly bigger strakes in the shell-first method. A strake on the *Batavia* reconstruction in Lelystad was 11 cm thick and about 350 kg in weight. To keep these in place without the frames, they had to be connected to each using wooden clamps, chains and hand spike and rested on temporary poles. Questions already have been raised as to whether or not this was the reason for the change during the 17th century from the shell-first to frame-first construction method. These questions became even more relevant when it became clear that the two East Indiamen, *Mauritius* (L'Hour, Michel, *Le Mauritius, la memoire engloutie*, Grenoble 1989) and *Batavia* were not built in the in traditions shown by Witsen and Van Yk of one thick layer of planking covered with a thinner layer of protective sheathing, but with two thinner layers of planking and a third layer of protective planking as well. The East Indiamen in this period represented the largest group of ships built in Europe and it is possible that this triple planking method was the shipbuilders' solution to the problem of building bigger ships shell-first. They simply made the hull out of two thinner strakes instead of a thick

one, and instead of wooden clamps, they could use a complete strake to connect the strakes with each other. It should be noted that this is speculation at present and it is possible that shipbuilders used both frame-first and shell-first methods.

Archival references make the problem even more complicated because the VOC used an extra layer of planking between the existing two (ARA VOC 307). Possibly this was an adaptation for the VOC to avoid maintenance during their life as a *retourschip* vessels, in the first decades of the 17th century, had to last for more than two years without proper repair facilities. For the vessels that remained in the Indies this was an even greater problem, since the Company did not have a proper shipyard at Batavia. Was the extra skin between the hull planking (strakes) and the pinewood sheathing (which was protection against the *Teredo*) some kind of adaptation comparable to other measures taken to insure against the long voyage (double the normal amount of stays and extra gear and equipment taken for the long journey), or was it a solution for building bigger ships along the traditional shell-first method? To make matters even more complicated, recently an extra skin was also found on a ship from about 1585 in the Waddenzee (Maarleveld, T., "Schiffsarchäologie im Wattenmeer". in: *Das Logbuch*. 26. Jg., 1990 H.3. p.103-107). Further research, historical, archaeological but also experimental archaeological must bring more light on these questions.

THE REMAINS OF THE GALLEY.

On the wreck site a brick construction was found. It has been suggested that it is part of the ship's galley. Although the first impression was that the construction is too heavy for a galley on the orlopdeck, there is evidence for a heavy constructed galley in the hold of the ship: see the galley of the *Wasa*.

Historical research in the Netherlands and Sri Lanka

The start of the archival research in the Netherlands last year showed the potential of the information available in the Dutch archives for the 17th and 18th century. By interrogating both the historical and archaeological record, additional information can be gained from each of the sources (Parthesius, R., Fusion between two disciplines: The historical-archaeological research of the *Amsterdam*. in: Gawronski, J.H.G., Annual report of the VOC-ship *Amsterdam* foundation 1986, Amsterdam 1987 p. 31-36).

INVESTIGATION IN THE SRI LANKAN NATIONAL ARCHIVE (SLNA)
After the successful use of historical sources in the Dutch Archives for the identification of the *Hercules*, a start was made during the 1993 expedition to investigate the information potential of the Sri Lanka National Archives in relation to the shipwrecks in Galle Harbour.

The aim was twofold:

1. The specific aim was to find more information about the loss of the *Dolfijn*.
2. The general aim was to determine if the archive has enough material to start an archaeologically-linked historical research.

The information about the *Dolfijn* is given above. Since it is the objective of the Gall Harbour Project to train Sri Lankan students and scientists in maritime archaeological research, the same starting point can be used for the linked historical research. On advise of Dr Roland Silva, I have spoken with Prof. P.V.J Jayasekera, Head of the Department of History, University of Peradeniya. He sees possibilities for the start of a research project in which his department may be involved. Within this department are a number of people who can read Dutch. To start the process he requires an official request from the Gall Harbour Project.

We have to realise that the project has two parts: The Dutch period (17th–18th century) and the English period (19th–20th century).

The Dutch Period

Only relatively few documents survived from the 17th century compared with the 18th century.

The Ordinary *Minutes* of the government exists from 1640. These documents are, however, of limited use for the subject, because they contains little information concerning individual ships.

The best source for this research is the correspondence, often with detailed information about the events relating to a ship disaster and information concerning the cargo and loss of equipment. However, almost all the correspondence is from the 18th century. This includes not only the correspondence from Ceylon to the Netherlands, but also the correspondence between the cities in Ceylon.

Another unique source is the so-called *Compendia*. These documents give a detailed summery of all the activities in Galle were money was involved. They survive for the years 1740–94.

NEW LIST OF SHIPS WRECKED NEAR CEYLON

DATE	SHIP	SIZE	ORIGIN	LOCATION
2/7/1659	<i>Avondster</i>	<i>jacht</i> (360)	captured English	Bay of Gale
20/12/1710	<i>Sloten</i>	<i>flute</i> (610)	Amsterdam	lost after departure
idem	<i>Zandhorst</i>	<i>flute</i> (520)		idem
1710	<i>Huis ter Nieuwburg</i>	(810)	Amsterdam	idem
15/11/1721	<i>Gamron</i>	(848)	Amsterdam	Burnt off the coast
23/10/1735	<i>Barbestein</i>	(1100)	Zeeland	Gale
1756	<i>Elswoud</i>	(850)	Amsterdam	wrecked at Ceylon
27/03/1762	<i>Mariënbos</i>	(1150)	Amsterdam	wrecked in heavy storm near Ceylon
idem	<i>Sparenrijk</i>	(850)	Amsterdam	idem
idem	<i>Rhoon</i>	(1150)	Zeeland	idem
9/11/1772	<i>Scholtenburg</i>	(880)	Amsterdam	wrecked sailing to Ceylon
1776	<i>Geinwens</i>	(1100)	Amsterdam	Punto Gale
?	<i>Compagnies Welvare</i>	(1150)	Amsterdam	wrecked sailing to Ceylon
4/1/1783	<i>Botland</i>	(1150)	Zeeland	In the roads of Colombo

For the Dutch period there is enough material available for a complete historical research project. In the first phase, this work could supply direct information for the archaeological research. In a later phase, the research could provide information about the historical context of the shipwrecks and their cargo. In particular, the role of Ceylon in the inter-Asiatic trade and the changes of trade and shipping could be integrated with the detailed material information the shipwrecks.

For the coming year a list with ships and dates can be extracted from the *uitleopboek* that can be used as a starting point for the research in the 18th century documents.

Further research in the Netherlands after the 1993 expedition.

The English period

For the 19th century, the complete English Archive still exists. During my visit to the National Archive the time available was too short to obtain a good overview. However, for a student project it appears that there is more than enough material available. After a list of shipwrecks and dates from the *Harbourmasters records*, newspapers can give further information concerning the events of shipwrecks. From 1832 onward, several newspapers survive. In an later stage the correspondence between the authorities could be examined.

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Conservation Recommendations

The following recommendations have been formulated as an outcome of the 1993 programme of instruction for the maritime archaeological conservation section of the Second Joint Sri Lankan - Australian Maritime Archaeology Training and Research Programme.

Conservators and conservation students will be instructed in advanced maritime archaeological conservation of marine artefacts. A relatively small number of conservation students (approximately six) would be suitable as the instruction could then be on a more personal basis, with the students receiving, essentially private attention and guidance.

In 1994, assuming the conservators and conservation trainees have been previously instructed in basic maritime archaeological conservation, the training programme will have more emphasis toward practical treatments on a wider range of artefacts and material types, based on excavation. That is, the information disseminated in the 1992 and 1993 training programmes would be reinforced with practical workshops. Formal lectures would be kept to an absolute minimum, however more tutorials would be a useful adjunct to the practical sessions.

Conservators and conservation trainees that are to be directly involved in the quantitative on-site data acquisition training must complete a diving course before the next programme.

A formal examination would be conducted at the end of the 1994 conservation training programme, primarily to

ascertain the level of understanding and knowledge that the students had attained throughout the duration of the course.

Funding should be sought to enable an exchange programme to be established whereby Sri Lankan and Australian conservators can co-operate on specific projects in both countries. In this way exposure to new techniques and equipment will be maximised.

Any maritime archaeology trainees that did not attend the 1993 programme should have a basic maritime archaeological conservation overview before the commencement of the programme in 1994.

Steps should be taken as soon as possible to obtain essential and appropriate chemicals and equipment in preparation for the proposed 1994 conservation programme.

It is essential that proper conservation treatment of the material recovered in the 1993 programme be continued. With a greater emphasis being placed on maritime archaeological conservation, the purchase of a chloridometer for chloride analyses of desalination solutions would be highly recommended.

The acquisition of quantitative on-site data of the wreck sites located in the Galle harbour area should continue if an effective conservation management programme is to be developed for the protection of the underwater cultural heritage sites in Sri Lanka.

If large iron artefacts, such as cannons or anchors, are to be raised then suitable storage and treatment facilities need to be established in Galle.