Report to the Australian Bicentennial Authority on the February - March 1985 Bicentennial Project Expedition to the Wreck of HMS Sirius (1790) at Norfolk Island

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with contributions from Ian MacLeod, Paul Clark,
Mark Staniforth and Paul Brown.

September 1985

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Introduction

This report describes the archaeological activities carried out in the field during February - March 1985 by an expedition funded by the Australian Bicentennial Authority to conduct investigations into the Wreck of HMS Sirius at Norfolk Island.

A previous report (Henderson 1984) assembled some background about the ship and the findings of a preliminary examination of the site.

This report assembles information collected by Ian MacLeod, Myra Stanbury, Mark Staniforth, Paul Clark, Paul Brown and myself. It is intended that subsequent to further field work and archival work, a more considered final report will be produced.

Graeme Henderson
Archaeological Director

Acknowledgements

The expedition was funded by the Australian Bicentennial Authority.

Mrs Jennifer Amess of the Department of Arts, Heritage and Environment (the Commonweath Department responsible for administering the Commonwealth's Historic Shipwreck Act) arranged many aspects of the expedition, including discussions with Island officials, some of the transport and accommodation.

The well balanced expedition team consisted of Ian MacLeod, Myra Stanbury, Pat Baker, David Millar, Paul Brown, Paul Clark, Tom Van Leeuwen, Mark Staniforth, Terry Arnott, Karen Atkison, Jennifer Amess and myself.

On Norfolk Island the Administrator, Air Vice Marshall Trebilco; his Official Secretary, Mr John Nicholson; the Chief Minister, Hon. David Buffett; and historians Mrs Merval Hoare and Mr Les Brown all made time for useful discussions about the project. Mr Gill Hitch and his family, and Neil and Jim Tavener displayed warm hospitality to the expedition. Archaeologist Mr Robert Varman and his restoration team led by Mr Puss Anderson, were a constant source of assistance and advice. Mr Peter Ely, Mr Kerry Coop, Mr Mike Simpson and the staff of Borrys helped greatly with diving issues. The staff of the Paradise Hotel were particularly hospitable, and assisted with transport and tools. Colin (Bunny) Buffett of the Public Works undertook to carry out the conservation treatment of artefacts raised. Among the others who assisted us on Norfolk Island were Byron Adams, Richard Swansborough, Margaret Buffett, Gordon Duval, Mike Johnson, Ken Jackson, Morgan Evans, Steve Richards, Steve Nobbs, Barley Christian and jeweller.

En route from Perth to Norfolk Island invaluable assistance was given by Mr Eric van Leeuwen.

The expedition would not have been successful without the valuable support given by the Heritage Conservation Branch of the Department of Environment and Planning in Adelaide. I have to thank Mr J.C. Womersley and Mr Bill Jeffery for their generosity and patience.

Mr John Bannister and the Trustees of the Western Australian Museum kindly made four staff members (including myself) available for the expedition.

Graeme Henderson

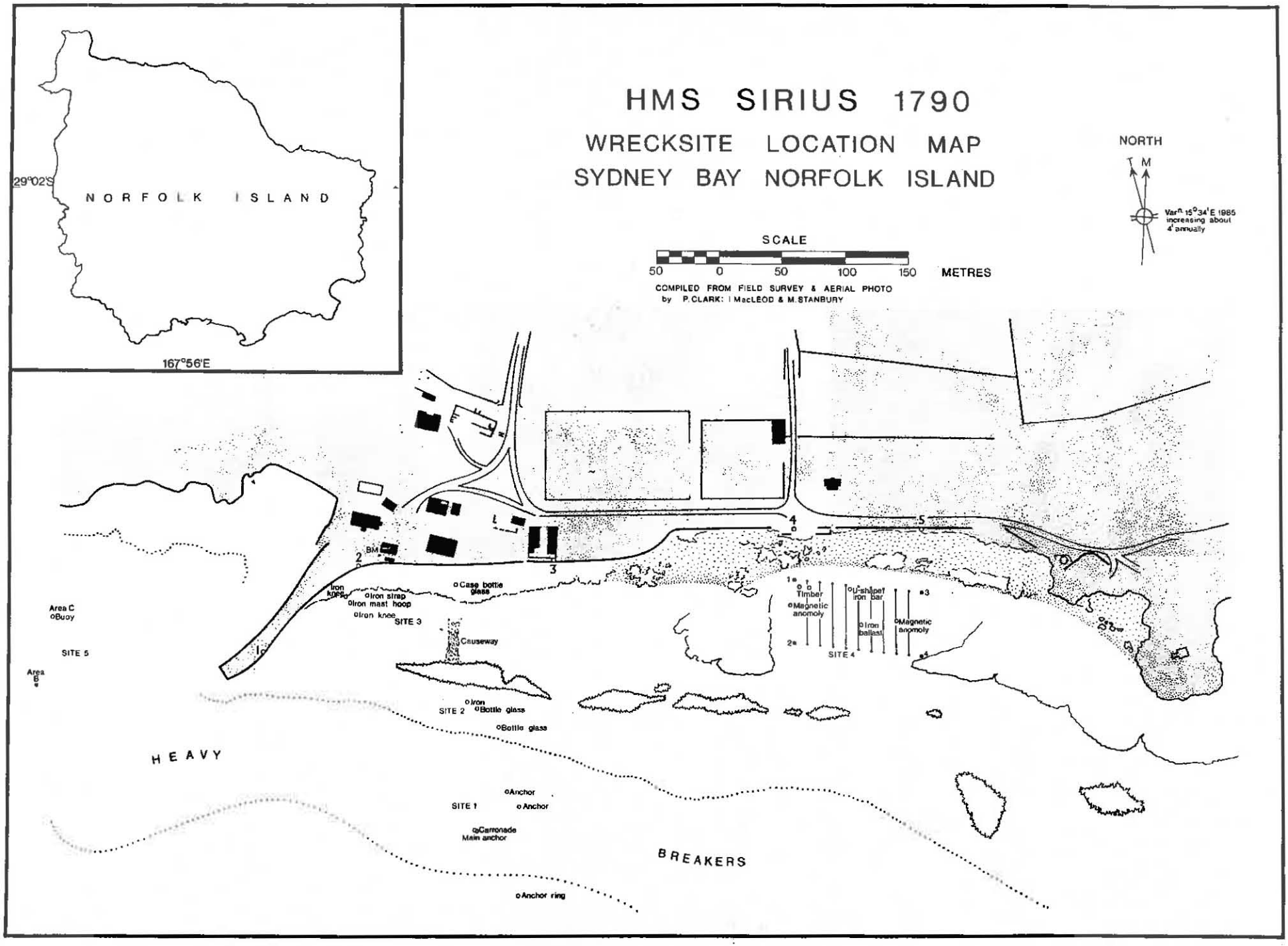


Figure 1. Wrecksite location map

1. Aims

It was expected that the underwater remains of the Sirius would lie in three distinct zones: beneath and beyond the outer swell zone; beneath the inner swell zone; and beneath the lagoon shoreward of the high reef platform. These three zones have their own characteristics in terms of accessibility to divers: the outer swell zone is reasonable in moderate swell conditions at high tide, or in low swell conditions at any tide; the inner swell zone is restricted to low swell, high tide conditions, and the lagoon is reasonable in most conditions. Both high and low tides occur in any one day, so it was expected that on most days it would be necessary to shift attention from low accessibility zones to higher accessibility zones as conditions deteriorated. An inflatable dinghy was thought the appropriate tender craft for divers working under the outside zone.

The aims as given below were intended to apply to the entire excavation programme (it was envisaged that there be seasons in 1985 and 1986). Thus only part of the stated aims were expected to be completed during the February- March 1985 season. It was envisaged that weather conditions would limit what could be done during this first excavation season, so it was hoped that expedition members might be able to assist in the Norfolk Island Museum during bad weather periods.

The stated aims were as follows:

1. Locate and accurately plot all artefacts in (hypothesised) initial stranding location. a) from shore
   b) underwater

2. Locate and accurately plot all artefacts in the final wreck location (the final wreck location had not at that time been found).

3. Locate and plot associated artefacts in the lagoon inshore from the wreck.

4. Excavate artefacts in initial stranding location.

5. Excavate artefacts in the final wreck location.

6. Excavate associated artefacts in lagoon.

It was also intended that attempts be made to progress with the recommendations made subsequent to the preliminary 1983 inspection (Henderson, 1984), regarding recording of artefacts previously raised from the Sirius wreck, site security, site management, short and long term conservation of the collection, and the housing and display of the collection. Some of these issues are not seen as a direct responsibility of the current fieldwork grants, but nevertheless are related, because the results of the fieldwork increase the need for longer term curating, conservation and display.

Figure 2. Equipment was stored behind the Royal Engineers' Office at Kingston. Photo: Pat Baker

2. Logistics

Expedition members obtained hotel accommodation at Kingston and used a hired van for transport of equipment and personnel. Hotel management also loaned a utility for equipment transport. Diving equipment was kept in a restored building close to the pier, made available by the Restoration Team at Kingston.

Equipment was flown to Norfolk Island from mainland Australia, so it was essential that plant be kept to an absolute minimum. Most of the equipment was borrowed from the Western Australian Museum in Fremantle, and the South Australian Department of Environment in Adelaide, and trucked to Sydney. Principal items were a 12 foot Avon inflatable dinghy powered by a 35 horse-power outboard engine, a water dredge (consisting of a fire-pump with attachments), magnetometer, metal detector, drawing, survey, photographic, recording and collecting equipment, medical kit, radios, conservation stores equipment and personal diving gear.

Some equipment (principally air tanks and refills, and lead weights) was hired on the island.

The site was known to be adversely affected by most weather conditions. The earlier feasibility survey had given some indications of diving conditions on site, but there was no direct knowledge among expedition members of the site conditions to be expected over a three week period.

For work on the initial stranding site, the inflatable (as a surf boat it has the advantage of being difficult to overturn, and it will not sink when filled with water) was usually taken by utility to the derrick on the pier, and craned into the water with all the necessary equipment already aboard. Divers would then leap aboard, and full power would be used to get out through the channel beside the pier before a heavy swell had the opportunity of overwhelming it. Returning to the pier from the site generally proved to be more perilous than leaving, because there was generally some water in the craft by then, adding to its weight and thereby reducing its speed. On several occasions it was filled with water beside the pier.

As an alternative to launching at the pier, the inflatable was placed in the water in the main swimming area - Emily Bay, and taken out to sea through the Emily Bay passage. This launching place had the advantage of access to both the lagoon (where a magnetometer survey was in progress) and the initial stranding site. However the passage was dangerous, specially when negotiated against the tide, because the 35 horsepower outboard was insufficient to make headway. On one occasion the inflatable was hit by a large swell and swamped, breaking the floor boards and causing substantial damage.

At the initial stranding site the inflatable was tended during diving operations by a diver who carried a radio for communication with shore. Expedition members now have a greater knowledge of site conditions to be expected. A great deal of bad weather was experienced in February 1985. The newspaper noted that the February rainfall of 362.2 mm was the highest since February 1894 when 411 mm was recorded. Nevertheless the consensus among divers and fishermen is that February is one of the best months for the wreck sites.

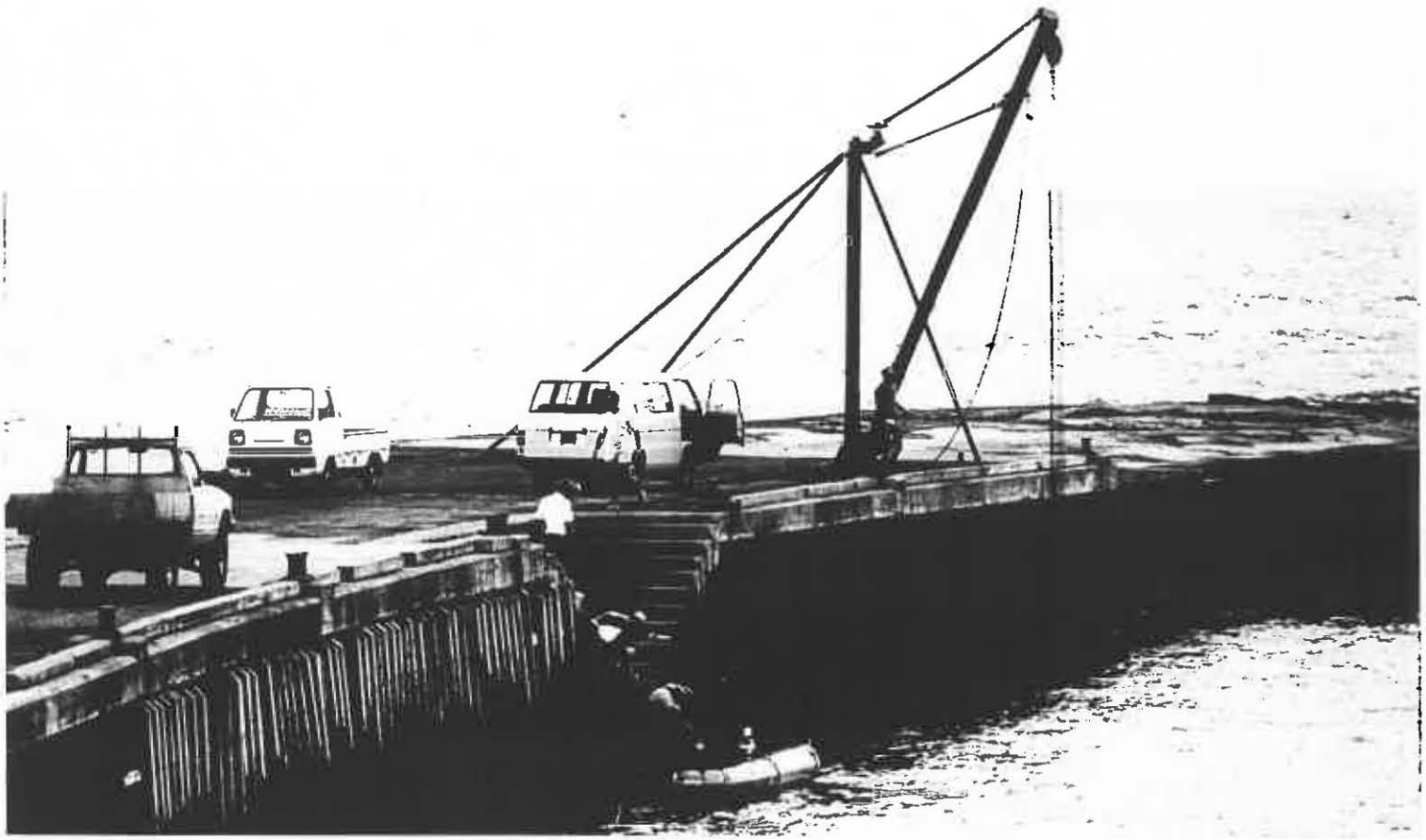


Figure 3. The inflatable dinghy was launched at the Kingston Pier.
Photo: Pat Baker

The Government work boat was made available on the two occasions when lifting operations were conducted. Substantial propulsion power was necessary for towing heavy objects away from the swells on the wreck site and into position beside the pier at high tide. From there a crane was used to remove them from the water to a waiting truck.

Storage and conservation facilities were provided by the Restoration Team and the Public Works Department. At the Works Depot tanks were constructed to hold the heavy objects.

3. Personnel

For cost reasons the intention was to have the smallest practical number of personnel, and to make these specialists who could either carry out the necessary tasks themselves or enroll the assistance of Norfolk Island residents.

The personnel were as follows:

Name	Institution or Background	Special Responsibilities
Graeme Henderson	Western Australian Museum	Expedition Leader
Jennifer Amess	Dept. Arts, Heritage and Environment, Canberra	Logistics
Ian MacLeod	Western Australian Museum	Conservator
Myra Stanbury	Western Australian Museum	Registration, Drawing
Patrick Baker	Western Australian Museum	Photographer
David Millar	Diving Medicine (QLD)	Doctor
Paul Brown	Maritime Archaeology Association of Queensland	Dive Master
Paul Clark	National Parks, Tasmania	Archaeologist
Tom van Leeuwen	Maritime Archaeology Association of Western Australia, Institute for Maritime Archaeology Hon. Auditor	Equipment Organisatio
Mark Staniforth	Victorian Archaeological Survey	Archaeologist
Terry Arnott	Maritime Archaeology Association of Victoria	Equipment Maintenance
Karen Atkison	Queensland. Diving Instructor	Diver

Personnel worked as honoraries or were paid by their home institution. All personnel paid a contribution of $120 each to the expedition.

4. Summary of Activities (taken from Henderson's diary)

16 February: Sea conditions poor. Team members arrived at Norfolk Island at 1350 from various Australian States, booked into the Paradise Hotel at Kingston (Ted Semple proprietor) and collected what equipment had arrived.

17 February: Sea conditions poor. Archaeologist Robert Varman offered to look after small items which might be recovered from the wreck site, and to talk to Chief Minister David Buffett about long term housing of such a collection. Varman has locally made stone water purifiers (similar ones were seen on the Cumberland wreck of 1830 off W. Australia). An iron anchor was examined at the house of Barry Evans, with a view to identification. The inflatable was assembled and tested, and the EDM was put into operation. MacLeod checked corrosion on displayed anchors. Divers went through diving safety procedures and planned site survey approaches.

18 February: Sea conditions poor. Clark commenced the land survey. Henderson, Amess and MacLeod visited Island Administrator Air Vice Marshall Trebilco and his Assistant John Nicholson. A whaler's try-pot beside the Administration Building was examined. Henderson, Amess and MacLeod spoke on the radio about the expedition. The Sirius anchor at the Works Depot was examined. Staniforth got the magnetometer working. Tanks and weight belts were hired. Mike Simpson told of finding a spectacle plate (indicative of a warship such as Sirius) some 250 metres west of the pier (the initial stranding was to the east of the pier). Clark obtained maps from National Parks and established bench marks. Van Leeuwin obtained a small pump (the dredge has not yet arrived because of air freight delays due to weather). We met Works Depot Administrator Colin Buffett (Bunny) who offered to build steel tanks for any heavy objects which might be raised.

19 February: Sea conditions poor. Amess, Henderson, and MacLeod met Chief Minister David Buffett to discuss housing, curating and display of Sirius material and other material at Kingston. The magnetometer was successfully tested.

20 February: Sea conditions poor. Staniforth's team worked in the lagoon establishing survey grid lines. In the evening Henderson lectured an audience of some 80, including Thornbirds author Colleen McCulloch, and Pitcairn Islander Dennis Fletcher Christian who mentioned that several cannon recently raised from the Bounty needed treatment. The dredge finally arrived on the Island.

21 February: Sea conditions moderate. The dredge was stolen overnight but returned by midday. Brown, Baker and Henderson visited the initial stranding site with the inflatable and located the largest anchor. This was buoyed and plotted with the theodolite. Conditions underwater (one hour after high tide) were marginal. Staniforth worked in the lagoon. In the afternoon Mike Simpson pointed out where he had found the spectacle plate. In the same vicinity were iron deck supports and copper bolts, yellow-metal sheathing, and miscellaneous modern rubbish. Staniforth swam through the channel seaward of the lagoon and located a case bottle and a musket ball.

22 February: Sea conditions moderate. Baker and Henderson located two small anchors on the initial stranding site, and buoyed the outermost. These were measured and surveyed with tape and compass. Van Leeuwin commenced chipping concretion from the large anchor, selected for raising for conservation and display. In the afternoon Millar went through resuscitation procedures. MacLeod spoke on conservation on radio in the morning, and spoke to the school about the expedition in the afternoon.

23 February: Sea conditions moderate. Dive teams operated on the west of pier site during most of the day, locating structural and cargo material and surveying this by tape and compass, with a view to ascertaining whether all or any of the material came from the Sirius. An iron deck support was raised for further examination. Ian MacLeod cleaned the spectacle plate and found the letters 'BERWICK', the ship re-named Sirius. Myra Stanbury is continuing cataloguing work on the Norfolk Island museum collection.

24 February: Sea conditions moderate. Work continued west of the pier. Myra Stanbury visited Bev McCoy to record iron ballast blocks with broad arrow markings.

25 February: Sea conditions poor. Robert Varman showed us a 1904 chart showing the 'causeway' in from the Sirius wreck area. Diving continued on the site west of the pier. It is now clear that a substantial mineteenth century wreck (presumably the whaler Mary Hamilton) lies here in the same place as the Sirius rudder fitting was found. Cine photographer Richard Swansborough demonstrated his Technic underwater propulsion vehicle.

26 February: Sea conditions marginal. Mark Staniforth took a team to the site west of the pier to continue the survey. At high tide a buoy was re-positioned on the initial stranding site. Expedition members examined the Bounty Museum collection. In the evening Ian MacLeod lectured at the school, Pat Baker at the Garrison Restaurant.

27 February: Sea conditions marginal. Some work was done on the initial stranding site, preparing an anchor for raising. An anchor ring, set in the coral seaward of the stranding sites, clearly represents an anchor raised earlier. In the lagoon a ballast block was located.

28 February: Sea conditions marginal. Mark Staniforth completed the survey of the site west of the pier. Tom van Leeuwen and Graeme Henderson searched between that site and the pier, finding chain seaward of the pier. Survey work proceeded in the lagoon. Diving on the initial stranding site was unsuccessful. In attempting to enter Emily Bay from the sea the inflatable was caught by an outgoing tide rush and had insufficient power to escape a breaking wave, which filled the boat and caused some damage.

1 March: Sea conditions poor. Mark Staniforth and David Millar continued the magnetometer survey in the lagoon. Others continued with repairs to the inflatable.

2 March: Sea conditions poor. Repairs to the inflatable continued, as did the magnetometer survey. Myra Stanbury continued drawing aftefacts. Ian MacLeod worked on field conservation. Pat Baker processed film. Graeme Henderson visited Les Brown to discuss local shipwrecks.

3 March: Sea conditions moderate. The last of the concretion holding the large anchor was chipped free. Mark Staniforth ran the metal detector through the gulley without result.

4 March: Sea conditions good. The anchor on the initial stranding site was raised with lifting bags and taken to the pier, where it was left under water to await completion of the treatment tank at the Works Depot. Henderson noticed round stones concreted to the reef top at low tide, east of the pier and looking like a ballast mound. Baker examined the gully adjacent and found copper fastening bolts which could indicate the final resting position of the Sirius. Divers continued chipping to free the carronade on the initial stranding site.

5 March: Sea conditions poor. Work continued in the lagoon.

6 March: Sea conditions poor. Jennifer Amess expressed concern that our imminent departure might leave the carronade on site exposed to damage by souvenir hunters. Terry Arnott returned artefacts loaned for recording. Mark Staniforth worked on survey results. Paul Brown took Mike Simpson to show him the point where he had located the spectacle plate. Pat Baker gave an evening lecture on the expedition at the Castaways Hotel.

7 March: Sea conditions poor. Expedition members worked on survey and other recording results, and packed equipment for departure.

8 March: Sea conditions poor. Puss Anderson advised Henderson that he would be surprised if the sea conditions did not moderate over the next 2-3 days, so Henderson and Arnott will stay to try to retrieve the carronade. The flight out for the others was delayed from 1500 hrs to 0400 hrs on 9 March.

9 March: Sea conditions poor. An attempted dive was unsuccessful. the inflatable was filled with water while negotiating the channel by the pier.

10 March: Sea conditions poor. No diving was attempted.

11 March: Sea conditions marginal. During a short dive some chipping was done on the carronade.

12 March: Sea conditions poor. No diving was attempted.

13 March: Sea conditions good. The carronade was chipped free and taken to the pier where the crane lifted it from the water onto a truck. Then it was taken to the Works Depot and placed in a specially built iron tank. Arnott and Henderson commenced packing.

14 March: Sea conditions poor. Packing was completed and the flight departed Norfolk for Sydney at 1620 hrs. Henderson arrived at Perth airport at 2130 hrs.

Figure 4. Henderson measures a broken anchor on the initial stranding site. Photo: Pat Baker

5. Methodology on Site

Prior to our arrival on Norfolk Island it was expected that the underwater remains of the Sirius would lie in three distinct zones: the initial stranding site beneath and beyond the outer swell zone; the hulls's final resting position beneath the inner swell zone; and flotsam beneath the lagoon shoreward of the high reef platform. These three zones have their own characteristics in terms of accessibility to divers: the outer swell zone is reasonable in moderate swell conditions at high tide, or in low swell conditions at any tide; the inner swell zone is restricted to rare low swell, high tide conditions; and the lagoon is reasonable in most conditions. Both high and low tide were to be expected on any one day, so the need was seen for the flexibility necessary to shift attention from low accessibility zones to higher accessibility zones as conditions deteriorated. An inflatable dinghy was borrowed with the intention of providing that flexibility.

The approach taken to the underwater sites was determined by three factors:

a) the immediate environment - a site generally covered by dangerous surf.

b) the isolation of Norfolk Island and the heavy cost of equipment freight forced the expedition to aim at a minimum of equipment.

c) the condition of the wreck itself is relatively poor, because of the turbulence and past salvage, and what remains is widely scattered.

During the expedition attention was directed to a number of discrete areas:

Site 1. the initial stranding site, on the outer edge of the breakers

Site 2. the gully between the outer reef and the high inshore reef platform where it was thought likely the Sirius hull finally broke up

Site 3. east of the pier, where iron structural components of ships lay exposed on the tidal reef platform

Site 4. the lagoon in Slaughter Bay

Site 5. west of the pier, where wreckage from several sources was located

Site 1. The Initial Stranding Site:

The site is briefly described in the 1984 Report. Survey methodology was basic because of the difficulties posed for divers by turbulence. Marker buoys were placed on the positions of three of the anchors, and the buoys were located in relation to shore features using theodolite. The anchors were also used as control points for a tape and compass survey of other less substantial wreckage.

A number of artefacts were raised. These included loose items such as sheathing tacks, lead sheathing and ballast stones, which were plotted on plastic drawing film and placed in calico bags for removal. Two large artefacts were raised: an anchor and a carronade. The anchor was chipped free of coralline encrustation which had attached it to the seabed. Then a large lifting bag and eight 200 litre drums were filled with air to raise the anchor to the surface. It was towed to a position close to the pier and then left under the water, pending removal to a treatment tank where the conservation process can be initiated. The carronade, which had been situated directly beneath the anchor, was then chipped free and raised by similar means. The carronade was taken by truck to the Works Depot where a tank was waiting.

Figure 5. Low tide east of the pier, showing some iron wreckage.
Photo: Pat Baker

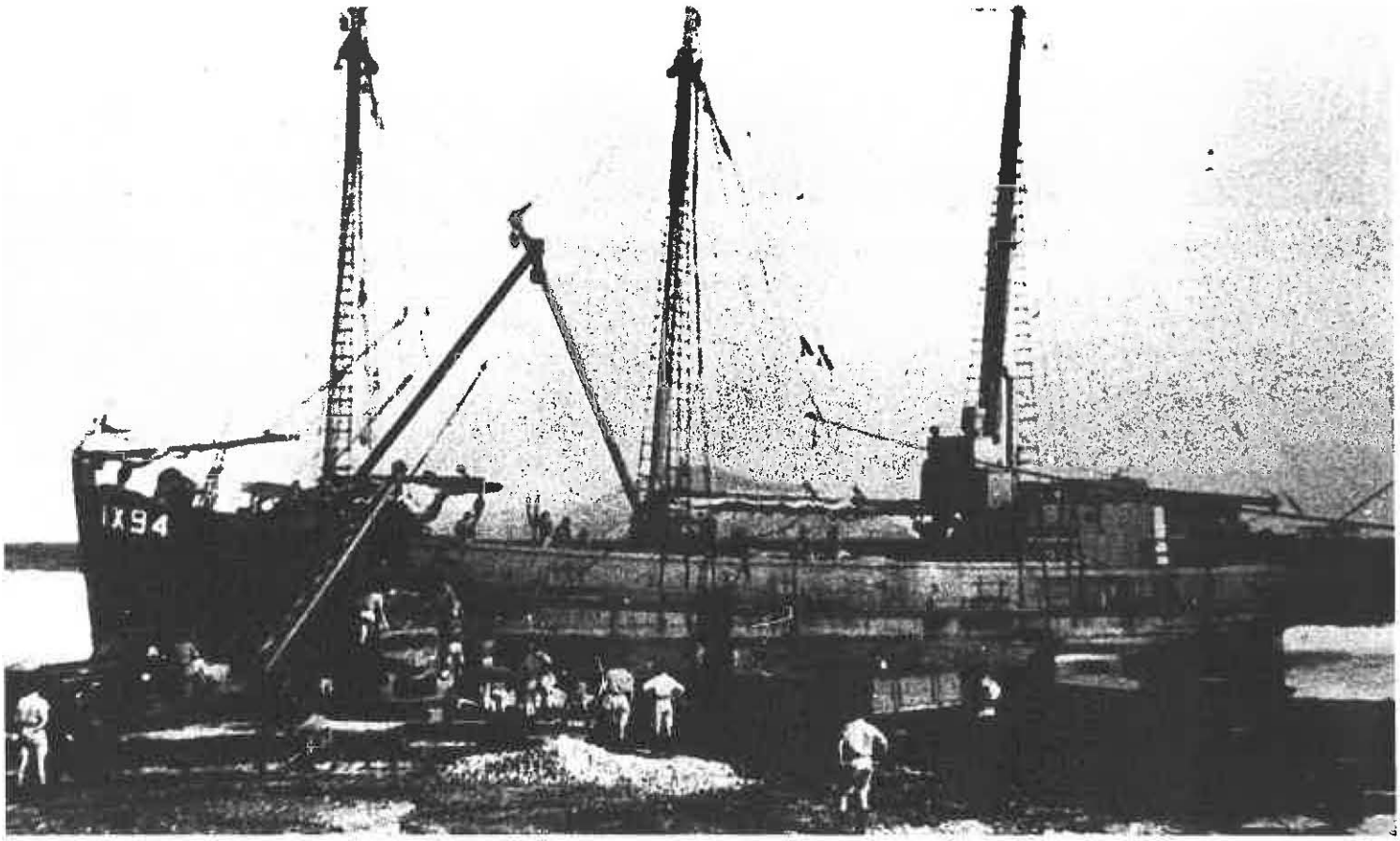


Figure 6. The auxilliary schooner Renaki in 1943

Site 2. Gully Between Reefs:

Along the seaward edge of the high reef platform lies a gully. As the tide falls the water flows off the high reef platform into the gully, and a strong along-shore current is generated in the gully. At low tide the force of the waves is spent on the outer reef before reaching the gully, (the gully is nevertheless full of white water), while at high tide some protection is given to the seabed by the additional water depth. The seabed is variable, some consisting of small stones and sand pockets under ledges, which might be lodging places for artefacts. At its western end (close to the pier) the gully becomes shallower, and provides little shelter to divers from the heavy breakers on the outside reef.

A metal detector survey in part of the gully failed to locate shipwreck material. A visual search by scuba divers located a musket ball, case bottle fragments and a plain glass fragment.

Archival sources indicated that in its final resting position the Sirius wreck lay very close to the edge of the high reef platform - that is, in the gully. The failure of scuba searches seeking structural remains in the eastern part of the gully implied either that the seas had ultimately entirely dispersed and destroyed the structural remains, or that the vessel had finally broken up to the extent that salvors could raise everything. A third possibility is that the final resting position of the Sirius was the eastern extremity of the gully, not far from the pier. If that is the case then it may be expected that some copper and iron structural items, and perhaps some ballast (some at least of the ballast spilled out of the ship at the initial stranding position) might lie there on the seabed. At no time during the four week 1985 season were the sea conditions calm enough to allow for a comprehensive search of this end of the gully. However one short dive resulted in the observation of copper fastening bolts on the seabed. This area requires further investigation.

Site 3. East of Pier Site

On the east side of the pier is a flat platform of calcareous rock which dries at low tide. Small rock pools act as collecting points for various debris.

Ferrous objects observed included a badly twisted iron deck support 3.75 metres by 9.5 centimetres by 2.5 centimetres, with bolt holes 45 centimetres apart and an iron bolt 40 centimetres long remaining in one of the holes. Two other iron deck supports had the dimensions 1.95 metres by 12 centimetres by 3 centimetres, and 3.5 metres by 15 centimetres by 8 centimetres. An iron mast hoop of 56 centimetres diameter had three iron bolts through it. A series of photographs show the three-masted auxilliary schooner Renaki wrecked on the reef platform on the east side of the pier in 1943. Local informants told us that the wooden hull of the Renaki was later burnt. The structural iron work lay there for some years and was then dumped near Bloody Bridge. Expedition members located the structural iron at the base of a cliff near Bloody Bridge. An iron deck support was raised and measured for comparison. Its dimensions were 3.14 metres by 8.2 centimetres by 2.5 centimetres. The Bloody Bridge deck supports were found to be substantially different to those on the West of Pier Site (see MacLeod appendix).

Several fragments of olive green case bottles were located and raised from the east side of the pier. The bottle shape indicated by the fragments was similar to case bottles found on the site of HMS Pandora (1791) and is thus consistent

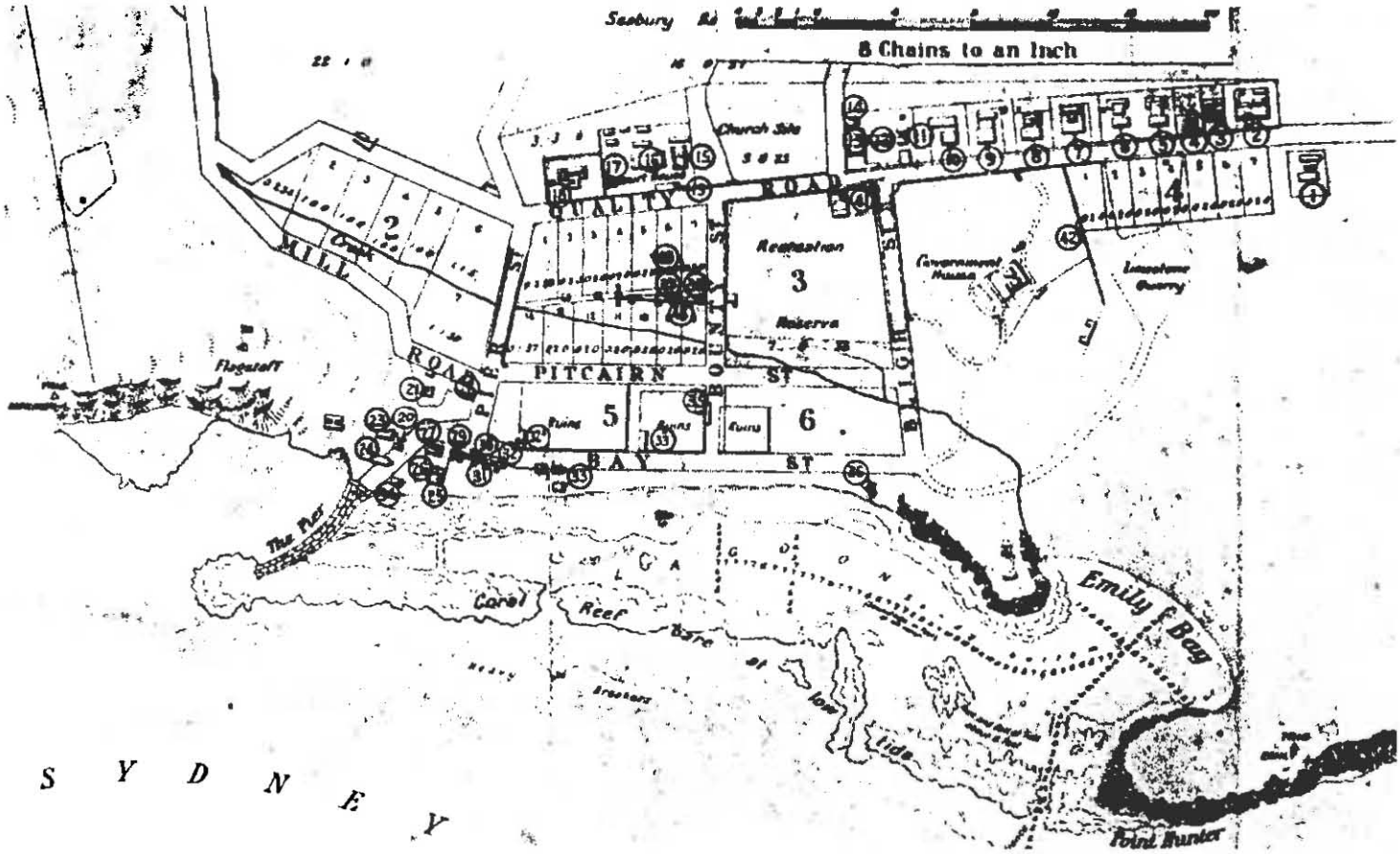


Figure 7. A chart of 1904 showing the causeway of limestone rubble heading out to sea/

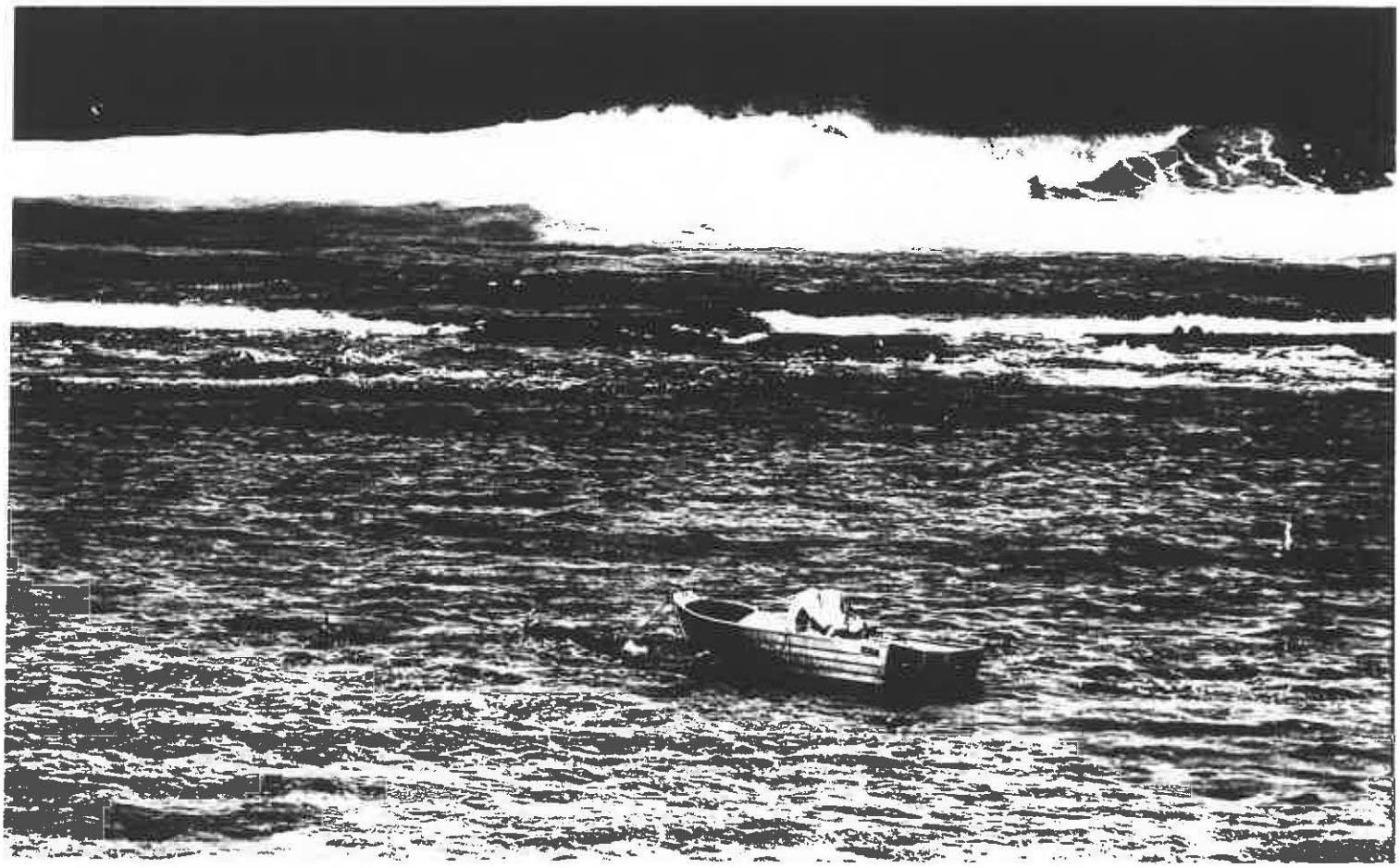


Figure 8. One diver tows the dinghy, while another dangles the detection head over the grid in the lagoon. An operator in the dinghy shelters the magnetometer from direct sun while taking readings. Photo: Pat Baker

Figure 9. A diver swims the detection head across the grid.
Photo: Pat Baker

with either the Sirius wreck or other activities in the early years of the settlement.

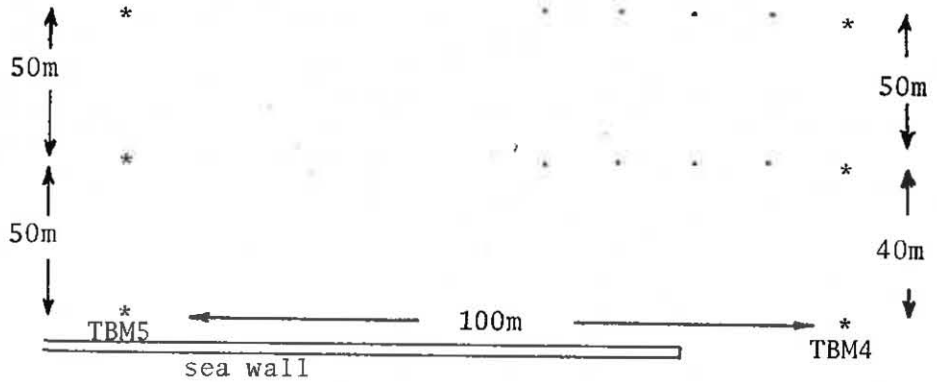
Water worn calcarenite and basalt rocks were observed loose in rock pools and in one area cemented close together in a mound on the reef platform. Given the apparent similarity to a ballast mound several samples were collected for analysis.

At the eastern end of the high reef platform, where the lagoon commences close to the beach, a causeway of flat stones has been built, running from the beach towards the Sirius wreck site. At high tide there is some 60 centimetres of water over the causeway. The date of building and function of the causeway have not yet been established. Some local informants speculated that it was built to facilitate salvage from the Sirius wreck during the 1790s, and indeed the salvage of the cannons would have been a difficult task. However the available 1790s maps do not show a causeway, and the earliest reference yet seen is a map of 1904.

Site 4. The Slaughter Bay Lagoon:

The water depth is less than 1 metre to 3 metres. Visibility is usually a minimum of 5 metres. The bottom consists of sand and broken coral over black mud and the remains of Norfolk pine trees. The lagoon was a brackish swamp 6000 - 10,000 BP. Sand and coral cover varies from almost nothing to greater than 1 metre. High tide allowed waves into the bay reducing visibility and increasing turbulence.

A parallelogram was established with 100 metre by 50 metre sides, 40 metres from TBM3 and 50 metres from TBM4 (see diagram).



The corners were delineated by iron 'pigs tails' hammered into the bottom with a floating buoy attached.

A series of lines was established every 10 metres out from the beach, each being held by a 30 centimetre length of iron. The magnetometer survey was carried out every 5 metres by swimming the 'fish' along and between these lines. A small aluminium dinghy was towed by another diver, and this contained the magnetometer control box. The magnetic field was measured and anomalies positioned and plotted.

A metal detector survey (Garrett X5500) was carried out in areas which showed anomalies with the magnetometer and in areas where visible material was present. Water dredging was attempted in the lagoon.

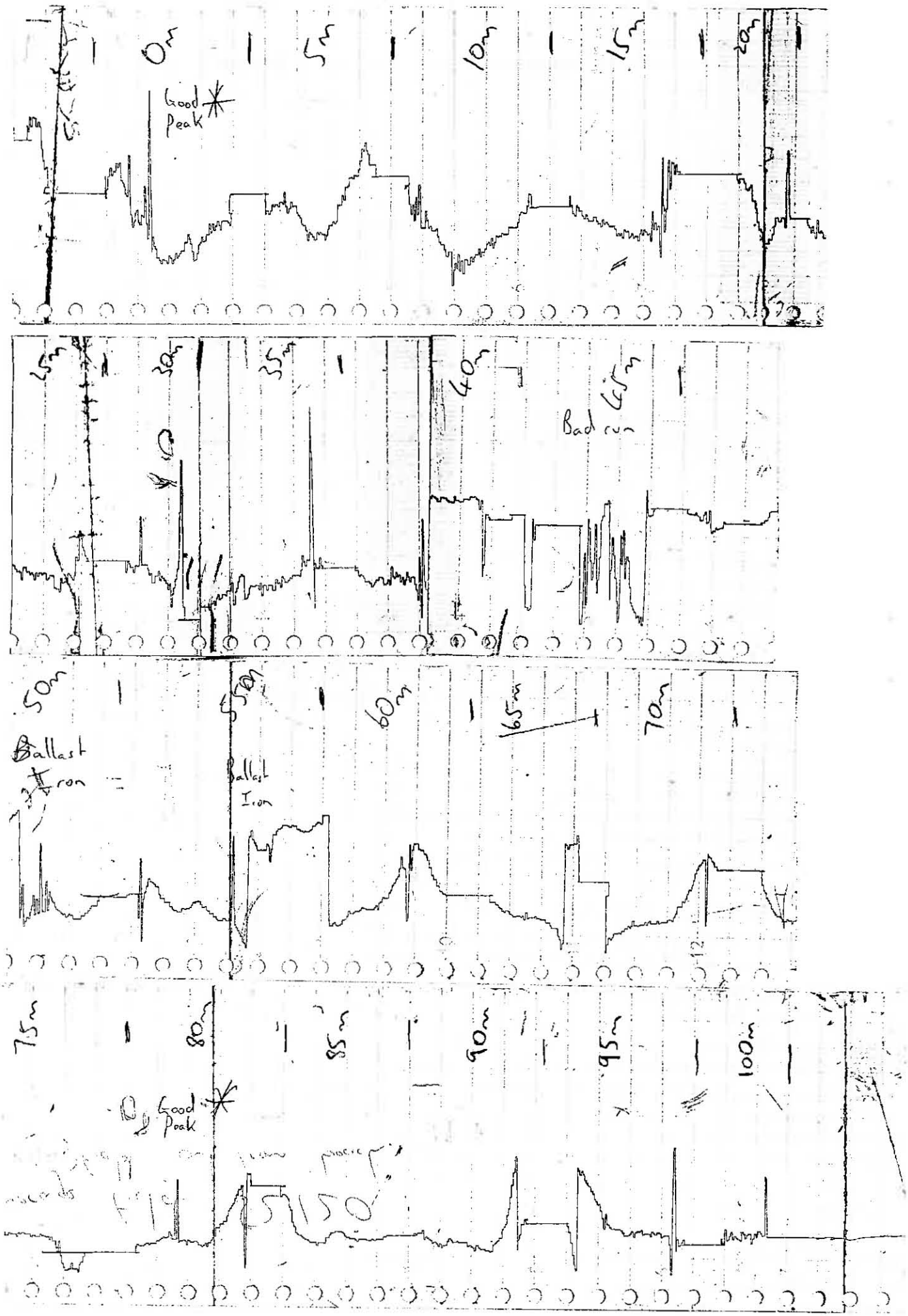
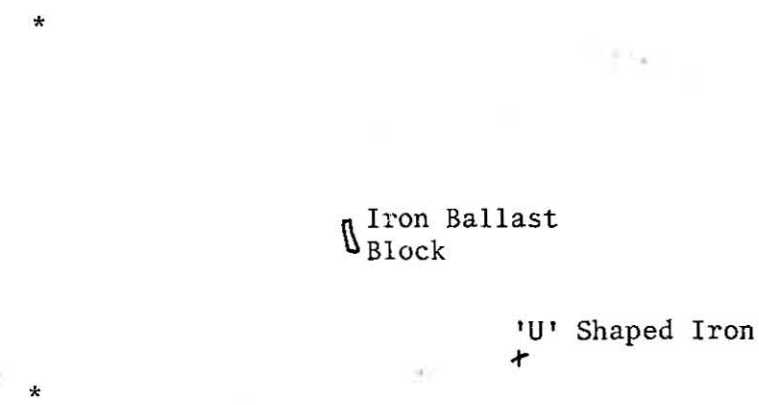


Figure 10. The magnetometer readout in the lagoon

Figure 11. Divers prepare the water dredge for investigation of targets in the lagoon. Photo: Pat Baker

The magnetometer survey resulted in two good point anomalies being located - one at the 25 metre point of the 0 metre line and the other at the 25 metre point of the 80 metre line. These are most likely to be discrete iron artefacts but despite attempts to water dredge the sites no visible material was found. An iron ballast block (SI37) was located and raised from the centre of the lagoon area. A 'U' shaped iron bar (SI41) 45 centimetres by 4 centimetres by 2 centimetres, was located by metal detector at a point near the start of the 40 metre line (4 metres at 45° SW from 0 metre mark on 40 metre line).



Five samples of timber and one of mud were obtained from three locations in the north west corner of the rectangle. Those labelled 1 and 2 come from location 1. Number 3 came from location 2 and 4 and 5 from location 3 (see site plan). There are quantities of glass and ceramic shards visible near the wave zone along the beach, but these small, sand degraded pieces are apparently from the 1850s or later.

The magnetometer survey of the Slaughter Bay lagoon identified two point anomalies which should be investigated. These may be from discrete iron artefacts and the evidence of the ballast block indicates that heavy material definitely from the Sirius was moved considerable distances by the seas and currents (or perhaps human agency). The magnetometer survey suffered from a temperamental magnetometer and the iron 'pig tails' which held the lines at the end of each run (see Magnetometer printout).

The metal detector showed its limitations and only one artefact was located by its use in the lagoon - a 'U' shaped iron piece of unknown function.
Both magnetometer and metal detector surveys were found to be of limited value within the lagoon because there are substantial remains from other sources including shipwrecks and human habitation of the island. However there is no question that such surveys should be carried out provided it is possible to ascertain which material is Sirius or to ascertain the extent of all shipwreck material in the Kingston area.

It remains to extend the magnetometer survey to cover the whole of the lagoon from the jetty to Emily Bay, and to excavate the point anomalies found. In order to more accurately complete the magnetometer survey 50 plastic pegs, 1 kilometre of 3 strand nylon rope and 12 x 8 inch diameter foam buoys are needed. The metal detector should be used over small areas and to pinpoint the likely locations produced in the magnetometer survey.

Figure 12. The site west of the pier lies adjacent to exposed rocks.
Photo: Pat Baker

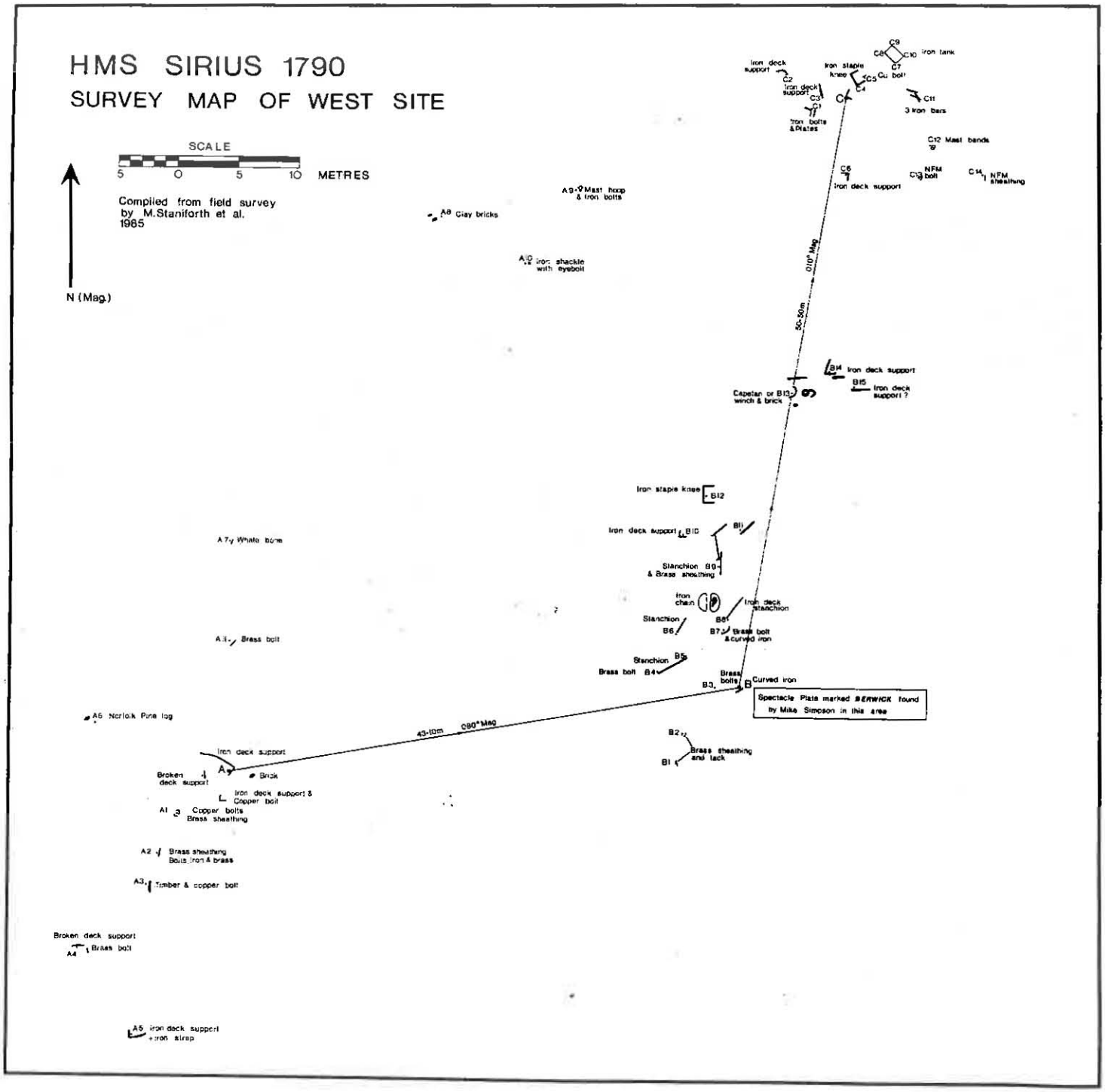


Figure 13. Map of the West Site

Site 5. West of Pier Site:

The water depth varied between 3 and 5 metres, and visibility was usually around 7 to 10 metres. The bottom consisted of gullies and sand holes between large outcrops of rocks and solid reef. Sand cover was generally minimal with a high component of broken coral. Benthic flora was generally small and most material was partially covered by algal growth and coralline algae. Swell could at times be a problem, reducing visibility and moving divers across the bottom.

The survey was carried out using 3 control points: A, B and C. Survey methodology was a simple tape and compass system from each of the central points. Each artefact was also measured and its orientation sketched. A number of artefacts were raised from the site after being surveyed in. No metal detector or magnetometer survey work was carried out in the area.

A total of 53 dives were made on the site over the 3 week period, totalling over 50 man hours on the site photographing, surveying and raising material. The underwater work focussed on two objectives:

a) development of a preliminary site plan to aid in interpretation and analysis

b) to assess and identify the probable origins of the material in the area.

The material is spread over an 'L' shaped area with arms roughly 50 metres long by 10 metres wide. The total area of the site is approximately 1000 square metres. The three survey control points were established and the tape and compass survey was carried out over the visible material in the area. For purposes of this discussion the survey areas have been labelled A, B and C and are indicated on the preliminary site plan.

Zero point A was an iron deck support knee with 3.0 metre long arm and 0.8 metre short arm, by 0.12 metre width and 0.06 metre thickness. Point A1 comprised two brass bolts (SI15 and SI16) and three pieces of brass sheathing (SI14 and SI18). Three other features were located in around points A and A1, these being two broken deck supports, one brass bolt (SI13) and a brick (SI16). Point A2 was an iron deck support (65 centimetres x 10 centimetres), brass sheathing (SI17), two iron bolts (SI19 and SI20) and one brass bolt (SI15) collected nearby. Point A3 was a length of timber 1.65 metres by 0.15 metres by 0.1 metres of very solid wood with a scarf joint at the south end. A treenail in the timber was 3 centimetres diameter. A copper bolt 36.5 centimetres by 1.7 centimetres (SI12) was raised from the area. Point A4, a broken iron deck support 1.55 metres by 0.01 metres by 0.005 metres with a long arm tapering and broken at both ends (SI9), was raised together with a threaded brass bolt (SI7) from the same area. Point A5 was an iron deck support 2.15 metres by 0.6 metres by 0.12 metres by 0.07 metres (SI10), and an iron object 5.40 centimetres by 1.15 centimetres (SI18) which were both raised. Point A6 was a section of Norfolk pine tree, corroded 200 litre drum hoops, tin cans and other recent rubbish. Point A7 was a piece of whale bone (SI28) which was raised. Point A8 was two clay bricks (SI22 and SI23), one of dimension 21.5 centimetres by 11.4 centimetres by 7 centimetres, impressed with the name 'HICKMAN' on one side and a frog on each side, and the other with circular mould marks on one side. Point A9 was an iron mast hoop (SI25) and iron bolt (SI27), and an iron shackle (SI24). Point A10 was a brass bolt (SI26) with wood attached.

Zero point B was a curved length of iron 1 metre by 0.1 metre by 0.06 metre, found previously by Norfolk Island diver Mike Simpson. Zero point B was 43.1 metres at 260° magnetic bearing from zero point A. Point B1 was a piece of brass sheathing (SI31) and a brass sheathing tack (SI36) which was raised.

Point B2 was also a piece of 0.07 centimetre thick brass sheathing. Point B3 was a group of two brass and one copper bolts (SI32) which were raised. The brass bolts were 14 centimetres by 2 centimetres, and 37 centimetres by 2.1 centimetres, and the copper bolt was 23.5 centimetres by 2 centimetres. The copper bolt may be from Sirius. Points B4 and B5 represented the two extremities of an iron deck stanchion 3 metres by 0.15 metres. A brass bolt 35 centimetres by 18 centimetres was raised from B5. Point B6 was a broken iron deck stanchion 1.5 metres by 0.15 metres. Point B7 was a curved section of iron 1 metre by 0.1 metre by 0.05 metres, and point B8 was a more complete 2 metre by 0.15 metre diameter iron deck stanchion. Point B9 was a group of three iron deck stanchions all concreted together and a section of brass sheathing (SI35) was raised from here. Point B10 was a broken iron deck support (0.6 metres by 0.57 metres by 0.15 metres by 0.1 metres). Point B11 was another iron deck support 1.7 metres long, and B12 was an iron staple knee 1.45 metres by 0.8 metres. Point B13 was three iron rings, the smallest being outer diameter 0.6 metres and inner diameter 0.4 metres, which appear to be part of a capstan or winch. A length of iron deck support, 1.5 metres long, was to the north of B13 and a brick, not raised, to the south. Point B14 was a partial iron deck support 1.45 metres by 0.8 metres, with a broken iron deck support alongside, and B15 was an iron deck support.

Zero point C was an iron deck support knee of unknown dimensions to which a buoy was tied and surveyed in from the shore. Point C1 was an iron deck support knee of dimensions 0.6 metres by 0.25 metres, and other iron work consisting of bolts and plates. Point C2 was an iron deck support knee of dimensions 0.63 metres by 0.82 metres with the longer arm pointing towards 340° magnetic. Point C3 was a broken iron deck support knee 1.15 metres long, pointing towards 330° magnetic. Point C4 was the corner of an iron staple knee 1.2 metres by 0.86 metres, with the long section pointing towards 330° magnetic. Point C5 was a copper? bolt of unknown dimensions. Point C6 was an iron deck support knee of 0.5 metres by 0.47 metres. Points C7, C8, C9 and C10 were the corner points of a rectangular iron tank of dimensions 1.5 metres by 1.2 metres by 1.3 metres high. The points required rectifying to establish the correct orientation on the plan. The short side of the tank points to 30° magnetic. Point C11 was three concreted iron bars. Point C12 was two mast bands. Point C13 was a non ferrous metal bolt. Point C14 was non-ferrous metal sheathing, and C15 was a brass bolt. No material was raised from this area.

The majority of the ferrous material in the survey areas A, B and C takes the form of broken and complete iron deck support knees, staple knees and deck stanchions. An iron deck support knee reported to be from the Renaki was raised from near Bloody Bridge for comparison with the iron deck support knee (SI10) from the West Site. These are different in dimensions and structure (for discussion see MacLeod) which indicates that the West Site is not part of the Renaki. Generally the short arm of the knees from the West Site is approximately 0.8 metres long by 0.15 metres by 0.06 metres. The length of the long arm on deck supports varies according to the position within a ship, and in this case varied up to 3 metres long. The most complete knees were at C (3 metres long), A5 (2.15 metres long), and B14 (1.45 metres long). Deck support knees were located at A, A2, A4, A5, B10, B11, B14, B15, C1, C2, C3 and C6. Two iron staple knees (at B12 and C4) were surveyed in. Iron deck stanchions were located at B4/B5, B6, B8, B9 (3), and B11.

These iron deck support knees, staple knees and stanchions represent nearly 50% of the site - at least 12 knees, 2 staple knees and 6 deck stanchions. While it is difficult to prove that they all come from the same vessel,

current indications are that they do. This suggests a wooden vessel with iron knees and stanchions, with two decks or more likely a t'ween deck (staple knees) and up to 3 metres depth of hold (deck stanchions). Other iron work included the mast hoop (SI25) located at A9, an iron bolt and an iron shackle with eyebolt from the same area. Two curved iron sections found at B and B7 and a large pile of iron chain were found to the west of B8. The chain may be anchor chain. The remains of an iron capstan or winch lying at B13 are approximately 0.6 metres diameter. More iron work was located at C1 (iron bolts and plates), C12 (mast band) and C11 (three iron bars). The distribution of the iron work over 100 metres from A5 to C7 and C8 and over 1000 square metres of sea bottom suggests that the heavy seas which pound the area have widely dispersed the material. The only point which might indicate a recognisable part of the vessel is the chain - perhaps from the bow - and the capstan.

The majority of non-ferrous metal on the site appears to be brass (see MacLeod). Brass bolts were located at A2, A3, A4, B3(2), B5 and B7. A total of 6 brass bolts were raised. Brass sheathing was raised from A1(3), A2, B1, B2, B9 and C14. This suggests a wooden vessel with brass fastenings and muntz metal sheathing (indicating post 1840). Only small traces of timber were still visible on several of the bolts. Also located on the site were a number of copper bolts (see MacLeod), and these were raised from near A, A1(2), A3 and B3. At least one may be from a different vessel (for example one from A1) as it has thread, a brass nut and washer. However the others appear to be good copper bolts, which could imply a vessel of 1780 to 1840. The fact that the spectacle plate was reportedly found near point B, combined with the 4 copper bolts, leads to the supposition that Sirius material has been deposited among the remains of a later vessel - the Mary Hamilton.

A number of bricks were located at A, A8(2), and B13 - all of which were raised. The frogs appear to suggest building bricks but it is possible that they were from the galley area or a whaling trypot works. The name 'HICKMAN' may enable identification of one of the bricks.

A piece of whale bone was located at A7. This may be from the vessel if she was a whaler. However there are substantial quantities of whalebone in Slaughter Bay lagoon - which may be an indication that it is associated with bay whaling conducted on the island. Lengths of timber occur in the area (A3), but these appear to be in too good a condition to be nineteenth or eighteenth century shipwreck material. Considerable amounts of junk, consisting of aluminium cans, 200 litre drums, bits of Norfolk pine and other rubbish is present all through the area.

Further investigation of the West Site is required to assess the extent of buried remains within the area. A more complete survey (swimline and magnetometer) should be carried out on the area to the west of the jetty to fully establish the extent of the material.

Figure 14. Clark and Stanbury prepare the survey equipment.
Photo: Pat Baker

6. Methodology Ashore

The aims of the 1985 Sirius expedition were not restricted to on-site activities. It was anticipated that at least as much material was held in private and public hands on the island as remained on the seabed. In order to be able to record a large proportion of the material held in private hands it was necessary to win the confidence and enthusiasm of the local populace. That meant an immediate commitment to a public relations programme which included not only public addresses on our own project, but also workshops for local people interested in conserving and restoring their own antiques. The result of that programme was that the expedition was allowed to examine and record a large quantity of Sirius material. However it is to be expected that more material will be revealed as community confidence and awareness continues to grow.

A. Land Based Survey:

The aims of this work were to clearly indicate the positions of underwater sites in relation to on-shore features, and to indicate the spatial relationship of material on the seabed, to assist in the understanding of what happened to the Sirius after first striking the reef. The theodolite survey covered Sydney Bay from Emily Bay to a point some 150 metres west of the Kingston Pier. Aerial photographs were used to fill in some details of shoreline and reefs. The survey was organised by Paul Clark.

B. Field Conservation:

Conservation of artefacts recovered during the expedition, and of material in the Norfolk Island Museum collection was conducted by Dr Ian MacLeod (see appendices 1 and 2).

C. Registration:

Registration of artefacts recovered from underwater sites during the 1985 expedition, and of material held on the island in private hands and in the Historical Society Museum, was coordinated by Myra Stanbury (see appendices 3 and 4). This information was then (back in Fremantle) developed by Stanbury into a computer catalogue of material recovered from underwater and another computer catalogue of material on the island thought to be associated with the Sirius (see appendices 5 and 6).

D. Illustration Recording - Photography and Drawing:

Pat Baker did the artefact photography and recorded activities and locations. Myra Stanbury did the artefact drawing (see appendix 4).

7. Discussion

The prime objective of the 1985 Australian Bicentennial Sirius Expedition was to investigate more thoroughly the probable areas of artefact concentration. These were initially identified as falling into three distinct zones: beneath and beyond the outer swell zone; beneath the inner swell zone; and beneath the lagoon shoreward of the high reef platform.

The investigations were therefore designed to locate and accurately plot the distribution of artefacts in these three locales. A variety of methodological techniques were employed for this purpose. They included swimline searches, magnetometer searches, underwater trilateration and theodolite survey from control stations on land.

As the planned programme of work was being initiated it became apparent that two further sites warranted attention. One was the inside reef section of the high reef platform on the east side of the Kingston pier, where iron structure from a wooden ship was seen at low tide, and the area west of the pier, whence local divers provided substantial evidence of shipwreck material.

Through the identification and spatial analysis of the artefacts in each locale, it was hoped that the findings would both confirm the site of initial stranding of the Sirius and provide some explanation as to the process whereby the vessel slowly, and finally, broke up.

It is useful to consider progress on each of the sites individually.

Site 1 is the area beneath and beyond the swell zone. Charts of the 1790s and later indicate that this is where the ship struck and the wreck remained. Divers raised one anchor from this area in 1905, and another in 1973, and it was universally assumed that the site was the place where the Sirius finally broke up. Inspection of the site in December 1983 by Henderson led to a questioning of this assumption. The material observed (anchors, one carronade, a little ballast, and rudder fittings) seemed more consistent with a stranding than a total wreck. Captain Hunter's journal supports this view:

> '.... the iron ballast having dropt out of her bottom, she was lifted fairly round, and was thrown more than her own length near to the shore, and was, by this change in her position, almost out of the reach of the break of the sea; that is, the surf, which before generally broke upon her, now broke outside.....'

What then was lost from the ship on the outside reef? Lieutenent Bradley wrote that the small bower anchor was cut away a little before the Sirius struck. Such an anchor would be expected some distance seaward of the stranding site material, and fits accounts of the previous location of the anchor raised in 1973 and now stored at the Works Depot. A ring, thought to be from this anchor, was located during the 1985 fieldwork (see site plan). The vessel struck stern first, so the rudder would inevitably have been unshipped, to wallow, semi submerged, away with the tide. After the vessel struck Hunter had the masts cut away to reduce the stress on the hull. Bradley's drawing shows that the masts drifted ashore. Two carronades fell overboard when the masts were cut down. One of these was raised during the 1985 fieldwork, but the other has not yet been located. Captain Hunter hoped to lighten the Sirius sufficiently for the rising tide to be able to move

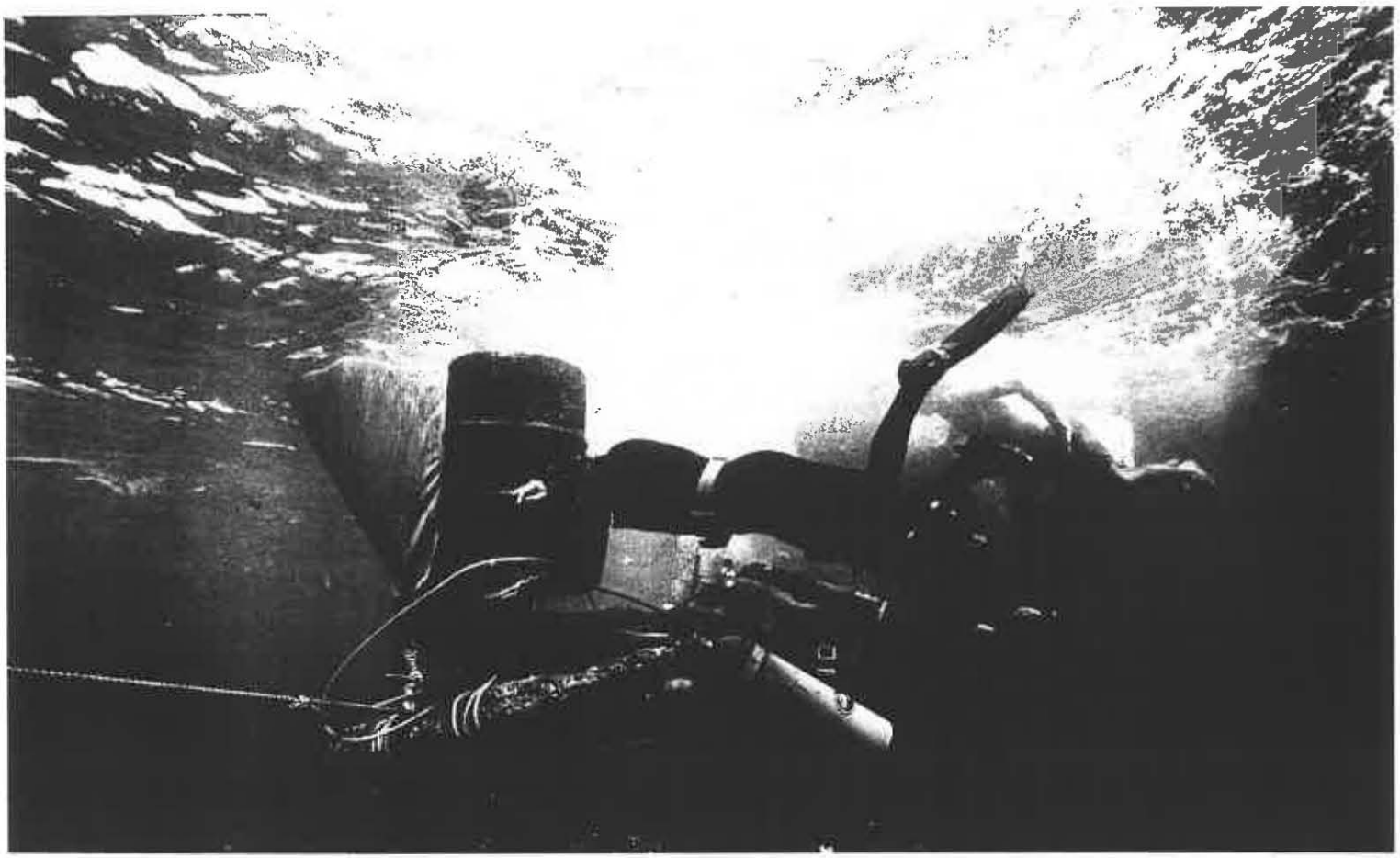


Figure 15. An anchor, floated with drums, is towed into deeper water.
Photo: Pat Baker

the hull inside the surf zone. A large anchor, lying directly above a carronade, was doubtless cast overboard shortly after the two guns. But it is clear that Hunter then turned his attention to offloading provisions and men. So the rest of the guns for example remained on board until they could be hauled ashore with their carriages in January 1791. Other material found in 1985 on the outer reef site was generally restricted to hull fastenings and fittings - a keel staple, sheathing nails and fragments, nails (probably wood-sheathing nails), lead sheathing fragments, rectangular iron ballast pigs, 'Thames' gravel, and bronze rudder or sternpost fittings. There were also two smaller anchors, both with broken arms.

The anchors left on the Sirius have caused some confusion. Since 1900 five have been observed - the one raised in 1905 and now at Macquarie Place in Sydney, the one raised in 1973 and now at the Works Depot, the one raised in 1985 and now lying in the water beside the Kingston pier, and the two remaining on site. It has been conjectured that these five anchors represent the ship's complement. Examination of the anchors and the site however makes this unlikely. Two of the anchors - those raised in 1973 and 1985 - are in good condition. The other three are broken. The two lying on the seabed close to rectangular iron ballast pigs are probably themselves ballast. The armless one now at Sydney was blasted free of the reef with explosives. It is possible that the arms were broken during the blasting, but alternatively that anchor too may have been simply carried on the Sirius as ballast.

Site 2, the gully running beneath the inner swell zone, has proved to be the most difficult area to investigate. Items found there - case bottle fragments, stoneware fragments, lead sheathing, a musket ball, copper fastening bolts - could be seen as being more consistent with the location of a vessel's final breaking up than the outer reef zone. However there is a need for further investigation of the site during calm conditions.

Site 3, the high reef platform to the east of Kingston pier, could be examined at leisure at low tide. The ironwork observed is clearly from the 255 ton three masted auxilliary schooner Renaki, wrecked there in June 1943. Photographs show the Renaki high and dry on the reef platform, with residents commencing the task of salvaging what was useful. The causeway running out from the shore has more obscure origins. It seems probable that when Hunter's men in 1791 hauled the Sirius cannon ashore with their carriages, he prepared the surface first: otherwise the gun carriages, with their small wheels, could not have functioned. But to date no 1790s reference has been seen to the causeway. Indeed a 1904 chart is the earliest reference yet seen. However there has not yet been a comprehensive search of the 1790s records. Archival work will be necessary to resolve this question.

Site 4, the Slaughter Bay lagoon, was investigated on the premise that material from the Sirius would have been washed or carried in that direction, and that some would have remained there. Being calm and shallow it was well suited to a magnetometer search. However the seabed consisted of a thin (generally less than 20 centimetres) layer of sand over irregular small pieces (5 to 20 centimetres across) of calcareous rock which interlocked to form an almost impenetrable layer of unknown depth. This makes it unlikely in much of the area that any substantial structure will have been buried to the extent necessary for preservation. One rectangular iron ballast pig was located. Despite its weight (over 50 kilograms) it had not buried itself in the layer of rock fragments. There was no evidence to indicate that this piece had drifted to the middle of the lagoon supported by structure from the Sirius. Nor does it seem likely that a boat carrying the piece ashore from the reef platform would have capsised there. Given its weight the piece would have been suitable as a small boat mooring, and that may well have been the reason for its location in the lagoon.

Figure 16. Conservator Dr Ian MacLeod inspects the spectacle plate.
~~Photo~~: Pat Baker

Site 5, was an area of wreckage west of Kingston pier. Local divers showed expedition members items they had raised from the site. These included a spectacle plate (a jury steering system) which is consistent with material from the Sirius. Therefore the site was examined carefully with a view to identification. It quickly became apparent that material from several shipwrecks, as well as modern rubbish discarded from Kingston pier, had collected in the same area. The bulk of the wreckage was consistent with a sailing ship of the second half of the nineteenth century.

A 218 ton whaler, the Mary Hamilton, called at Norfolk Island in April 1873 to load wood and water. She struck a rock near Nepean Island and was holed. Islanders helped the crew to run the vessel ashore 'near the jetty' at Kingston, where two days later heavy surf split her in two. Resident John Buffett noted in his journal 'in the morning being in a sinking state ran her on shore near the blow hole'. The blow hole is immediately inshore of the wreckage surveyed.

One item from the area is definitely from the Sirius: the spectacle plate is marked 'BERWICK', the earlier name of the Sirius. It is possible that the piece was used by a small boat as an anchor, and lost on the same spot as the Mary Hamilton. However it seems more likely that the piece drifted there supported by the timbers of the rudder. If that was the case then other fittings from the rudder are likely to have been deposited in the same place. Further metallurgical analysis of material from this site may give more indications of how much Sirius material was deposited here.

The 1985 Expedition had objectives beyond the underwater sites. Most important was the recording and identification of Sirius material in private and public hands on Norfolk Island. Chemical analysis of non ferrous material in the Historical Society's collection has assisted in identifying what is and is not from the Sirius. Another interesting current question is the origin of the two cannon mounted on carriages at the entrance to the government building at Kingston. The maintenance procedures carried out by the conservator revealed what may be interpreted as the number '18' on one of the trunnions. That in turn might be interpreted as an indication that these guns were manufactured during or after the year 1800, in which case they are not from the Sirius. Archival study will be necessary to resolve this question, but it should be noted that the carronade raised from the Sirius stranding site in 1985 (and therefore definitely from the Sirius) also appears to have the number '18' on a trunnion.

8. Recommendations

It is necessary at this point to examine the progress achieved in implementing the recommendations made in the January 1984 Report to the Australian Bicentennial Authority on the Sirius Wreck. They were, essentially as follows:

A. For reasons of site security the Sirius wreck should be declared an Historic Shipwreck under the Commonwealth Historic Shipwrecks Act.

B. As an aspect of site management a plaque should be placed on the foreshore adjacent to the wreck site to promote community awareness.

C. When a Museum on Norfolk Island is in a position to adequately curate material from the Sirius efforts should be made to bring together as far as possible all material salvaged from the vessel since its loss in 1791, including some of the items now abroad.

D. Survey and excavation should be conducted to provide further information about the vessel and its loss, and to ensure the preservation of material from the wreck The fieldwork should be divided into two seasons.

E. A conservator should examine Sirius material on Norfolk Island and report on long term conservation needs as well as implementing appropriate immediate procedures for treatment.

F. Appropriate storage and display of Sirius material should be organised on Norfolk Island. All available Sirius material should be fully recorded.

Very substantial progress has been made in implementing these recommendations: A: The Sirius wreck was placed under the protection of the Commonwealth Historic Shipwrecks Act on 29 October 1984. D: The process of survey and excavation is well under way: the first season was successful in all of its objectives, and it is expected that the survey and excavation will be completed as scheduled during the planned second season. E: A conservator has examined Sirius material on Norfolk Island, conducted immediate treatment on some objects, and advised local people on how to carry out longer term treatments on Norfolk Island. F: All accessible Sirius material on Norfolk Island has been registered, and where appropriate, photographed, drawn and labelled. It is however anticipated that some further material will be made available during the second season of fieldwork. Storage has been arranged for the material raised during the 1985 expedition. Discussions have taken place between the Department of Arts, Heritage and Environment and the Norfolk Island Government on the question of longer term curating and display of Sirius material.

A revised set of recommendation is therefore required:

A. Survey and Excavation. This work should be continued along the lines originally recommended, and completed in the second season, tentatively planned for February 1986.

B. Conservation of the Collection. Conservation is a crucial aspect of this project. Material raised during the February 1985 season (specifically the iron anchor and carronade) requires treatment which must be initiated by a professional conservator. The conservation aspect has other ramifications. The presence of conservators will not only ensure the preservation of material raised from the seabed during the two seasons of Bicentennial fieldwork - it will also have a strong positive influence (which should be fully exploited) in ensuring the preservation of other Sirius material on the island, and other cultural material on the island.

C. Housing of the Collection. Discussions between the Commonwealth Government and the Norfolk Island Government need to be continued to ensure that the collection is adequately housed and curated in the longer term. A display planner should be made familiar with the environment, the collection and the historical and archaeological background, and called upon to produce specific ideas for maximising the display potential of the collection and for bringing these ideas into effect. The display planner could accompany the planned second fieldwork expedition.

D. When a Museum on Norfolk Island is in a position to adequately curate material from the Sirius efforts should be made to bring together as far as possible all material salvaged from the vessel since its loss in 1791, including some of the items now abroad. One of these items is the chronometer saved from the wreck, the K1, made by Kendall. Captain Cook carried this same instrument on his second voyage, and Captain Hunter used it on the Sirius from the time the vessel first left England for Australia.

E. Site Management. When archaeological work on the site has been completed a plaque should be placed on the foreshore adjacent to the wreck site to promote community awareness. The plaque would give brief details of the location and significance of the wreck. Consideration should be given to the idea of displaying an anchor beside the plaque, if the environment is suitable. The wreck lies in the surf zone, so visiting divers should be advised not to swim on the site without supervision. Two anchors will be left on the site to indicate its location underwater.

F. Archival Research. No comprehensive archival work has yet been carried out in relation to the Sirius. Two centres need to be visited. Firstly is the Public Record office in London, where the building, early history, and fitting out of Sirius for her voyage to Australia can be studied. Secondly is the Mitchell Library in New South Wales, where documents relating to the history of the Sirius in Australia can be studied. This information is necessary for a considered final report on the project. The Mitchell Library work could be done en-route to the second fieldwork expedition to Norfolk Island.

G. Public Education. It is desirable that information about the Sirius project be made available to the widest possible audience in Australia and abroad. A documentary film was commenced during the 1985 fieldwork and encouragement should be given for that to be completed during the 1986 fieldwork season. After the final report has been completed consideration should also be given to the compilation of a popular book, drawing on the fieldwork and archival study.

Appendix 1. Conservation of Shipwreck Material on Norfolk Island during the 1985 Sirius Expedition.

Dr Ian MacLeod
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FREMANTLE

CONSERVATION REPORT

1985 *Sirius* Expedition - Norfolk Island

This report will cover the material conservation programme associated with the *Sirius* Expedition on Norfolk Island. The first part is an outline of the various activities on the island while the other parts will report in detail on the various aspects such as inspection of island based artefacts, on site measurements and chemical analysis of wreck material.

PART I - Summary of Events

Saturday, 16th February: - Inspected wreck site from shoreline by Kingston pier.

17th February:
- Attended All Saint's Church, Kingston.
- Visited Robert Varman - noted water purifiers similar to those from the *Cumberland* (1830).
- Inspected anchor c.1850-1900 at Borry's - needs treatment as it was actively corroding.
- Inspected cannon outside Administration building (new Military Barracks) - noted localized surface corrosion patterns consistent with photodecomposition of the protective coating.

18th February: - Visit to administrator with J. Amess and G. Henderson, and to the Secretary, John Nicholson. Visited local radio station and had brief interview regarding the expedition programme. Inspected *Sirius* anchor undergoing restoration in the Administration Works Depot.

19th February:
- Met with Chief Minister, Hon. David Buffett, regarding conservation problems of the islands collections in private and government care.
- Arranged visit to school and venue for practical workshop. Picked up missing pieces of the water dredge.

20th February: - Work on surveying wreck site markers. Attended talk by G. Henderson at the Isola Bella Restaurant.

21st February: - Copper fastening bolt, west of pier, was

identified as brass. First artefacts coming in for registration and conservation. Visit to works depot to liaise with Colin Buffett regarding conservation equipment needed for island treatment programme. Survey work from temporary bench marks.

22nd February: - Working on collection in Pier Store. Noted adverse storage conditions were promoting corrosion of many iron artefacts. Wrote some condition reports.

23rd February: - Dived on site west of Kingston pier. Made corrosion potential measurements on both ferrous and non ferrous objects - noted bottom conditions. Began treatment of K. Coop's rudder pintle - having previously taken samples of the corrosion products. Cleaning spectacle plate and found the name BERWICK stamped into the corroded bronze fitting!

24th February: - Attended church, All Saint's, Kingston. Deconcreted artefacts, worked on spectacle plate and K. Coop's pintle.

25th February: - Radio interview at breakfast. Gave plans for treatment tanks to Works Depot. Gave talk to the Norfolk Island School. Equipment purchases with J. Amess.

26th February: - Scrapped plans for concrete tank - a steel tank 2.4 x 1.2 x 1.2m will be constructed from existing supplies on the island. Gave a public workshop on conservation at the school from 8 p.m. - 10.40 p.m.!

27th February: - Support team for morning dive. Prepared treatment solutions - began treating *Mary Hamilton*(?) rudder pintle. Delivered public talk on 'Conservation of shipwrecks' at Isola Bella Restaurant to 95 people. Very good response.

28th February: - Surveying work on wreck site buoys. Deconcreted iron artefacts from *Mary Hamilton*(?)

1st March: - Examined small bell - corrosion pattern showed it had been recovered from sea water. Safety watcher for morning dive. Prepared caustic solution in new steel treatment tank. Treatment

reports on island based artefacts.

2nd March: - Discussions with Gordon Duval, resident geologist, regarding the nature of the lagoon in Slaughter Bay. Measured corrosion potentials of iron pig in the lagoon. Deconcreted ballast pig.

3rd March: - Attended All Saint's church, Kingston. Met Bob Tofts - identified wreck material. Cleaning/ stabilization of excavated artefacts.

4th March: - Anchor raised. Measured corrosion potentials of anchor by the pier - potential mapping of the anchor.

5th March: - Took small core samples from artefacts for chemical analysis. Inspected iron knees from the *Renaki* by Bloody Bridge - very different to the ones by the Kingston pier. Deconcreted one large knee at Works Depot. Inspected anchors with G. Henderson at several island locations. Visited Merval Hoare and inspected her artefacts - gave conservation advice.

6th March: - Took core samples of wreck material in pier store. Corrosion potential measurements on anchor by the pier. Treated two cannon on display at the Administration Office. Assisted at Pat Baker's slide show, Isola Bella Restaurant.

7th March: - Scoured island for sacrificial anodes. Prepared scrap metal for use and preconditioned it in the surf by the pier with Terry Arnott.

8th March: - Attached anodes to anchor (T. Arnott) with potential measurements. Packed up equipment and returned artefacts. Final inspection of collection in the pier store.

9th March: - Depart Norfolk Island - Sydney to Perth.

PART II - Public Talks and Inspections

One of the functions of the conservator on the expedition was to help establish a good working relationship with local island identities so that wreck material that was raised in the 1985 season could be treated on the island. This aim was achieved through the co-operation of the head of the

administrations works depot Bunney (Colin) Buffett and his staff plus the help of local divers such as Kerry Coop, Barley Christian, Jim and Neil Tavener, and Mike Simpson. The active support of Hon. David Buffett, the Chief Minister, was instrumental in this achievement.

Through the radio interviews the message of how we must preserve our material heritage was taken to a large section of the community. There was an excellent response to the practical conservation workshop at the school. In the following two weeks many people stopped me in the street to ask for advice on preserving their individual treasures. The response to the slide show talk on "conservation of shipwrecks and the stories they tell" was also very positive. In conjunction with Graeme Henderson I also inspected a range of anchors in private collections distributed across the island and gave practical conservation advice to the owners.

A range of artefacts recovered from land and marine sites was brought to our hotel for identification, conservation advice and possible treatment. Amongst these items was a small bell, 19cm tall, which apparently came from a local shipwreck. From an analysis of the wear pattern on the sound bow, the loss of the original crown staple from corrosion and the nature of the concretion on the interior of the bell it was possible to tell the owner that the bell had been in the sea for some time before it was recovered. Many small private artefacts were cleaned in chemical baths and given initial desalination treatment during our short stay; the owners were taught how to continue the stabilization process before the objects were returned.

At the request of Jennifer Amess, and the Department of Arts, Heritage and Environment an inspection was made of the Norfolk Island museum's collection in the Pier Store. The building itself was assessed in terms of its suitability as a repository for artefacts and a report on the nature of the corrosion problems and proposed treatments was prepared. A copy of that report is found in Appendix I.

A purpose built steel tank 2.4 x 1.2 x 1.2m was constructed by the Works Depot and given a protective bituminous paint coating. After being filled with rain water, 50kg of sodium hydroxide was added to prepare a suitable storage/treatment bath for medium sized iron artefacts. During the expedition all the small iron artefacts, which had been deconcreted at Kingston, were placed in the tank to begin their conservation treatment. The large iron ballast pig (SI 37, weight approx. 130kg) and the large iron knee (NI 9) were carefully lowered into the treatment tank after being deconcreted.

Figure 17. Divers take corrosion potential readings from iron objects on the west of pier site. Photo: Pat Baker

The carronade recovered on 13th March was taken directly from the sea onto a works depot truck and lowered into the above treatment tank. The immediate transfer of the gun into the caustic solution was the ideal conservation treatment and as such was a first. All mainland excavations with which the author has been associated have not been able to achieve this end, largely because of the tyrrany of distance of the wreck sites from the laboratories. The works depot have subsequently fabricated a large steel tank in which the *Sirius* anchor, raised in the 1985 expedition, will be conserved.

PART III - Conservation of Artefacts and Site Conditions

The excavation activities were largely confined to three areas in the vicinity of the Kingston jetty. The main site was where the anchor and carronade were recovered, the area west of the pier is where the spectacle plate and some of the other bronze fittings were found and the lagoon is the area east of the pier from where the large iron ballast pig was recovered.

Corrosion potential studies on various artefacts were carried out in situ in the areas west of the pier and in the lagoon. No measurements on the main site were performed owing to adverse diving conditions and the constraints of the excavation programme. Temperature, salinity and dissolved oxygen content of waters at Norfolk Island were obtained from the CSIRO Marine Laboratories in Hobart (1). The mean temperature of water at the 10m level is 20.80 ± 1.96°C with a salinity of 35.77 ± 0.04°/$_{oo}$ and a mean oxygen concentration of 5.42 ± 0.23ml/litre which corresponds to 105.8 ± 2.6% saturation. In essence this means that artefacts on the main site are exposed to moderately warm sea water of average salinity that is fully saturated with oxygen. The main site is also subject to very strong surge conditions which effectively sandblast the artefacts. The combination of these conditions means that unless objects have a protective covering of marine growth in the form of concretions (2,3) they will be subject to massive erosion. The strong surge also tends to inhibit the build up of marine growth on the artefacts - similar observations on the relative thickness of iron concretions have been made on material recovered from the Rowley Shoals wreck site which has similar adverse surge conditions. The concretion on the anchor was approximately 5mm thick whereas a thickness of 25-35mm would not be unusual on a similar object from a more protected site. Since many copper based alloys effectively inhibit colonization by marine organisms they will be subject to erosion from water borne debris

as well as general corrosion. Many artefacts recovered by islanders from the reef top show marked signs of erosion - small objects such as sheathing tacks can survive if they fall into a crevice which protects them from the surge but normally they will be worn away.

The site west of the pier and the lagoon area are also subject to strong current and local divers report the movement of large amounts of sand and coral debris across the seabed at certain times of the year. Partial burial of iron objects has a minimal effect on the overall corrosion rate but such conditons exert a pronounced effect on the way in which copper based alloys corrode (4). Some of the bronzes recovered from the area west of the pier showed up corrosion patterns which are consistent with them having been buried under several centimetres of sediment, i.e. they have corroded under conditions where the dissolved oxygen level is much lower than in the surface water above them. Under these conditions the bronzes retain their overall dimensions but the outer layers are a very crumbly matrix of corrosion products and residual metal.

The concretion layers on the large iron ballast pig (SI 37) acted as a type of recording device on the changing site conditions inside the lagoon area. The object was generally covered with a dense black layer of concretion 3.9 - 4.3mm thick. The type of concretion was consistent with the iron corroding under a sand-coral debris cover. Other parts of the concretion were more massive and up to 17.4mm thick with the outer layer stained the typical red brown of aerobically (fresh sea water) corroded iron. These observations indicate that part of the iron ballast became exposed for some years whilst a large section of it remained buried in the sand. The apparent distribution of artefacts from the wreck must be considered in the light of the above phenomena viz: many objects could easily remain buried during any one excavation season. A magnetometer survey would pick up ferrous metals but many copper alloys could easily be missed.

Discussions with Gordon Duval, the Islands resident geologist, confirmed observations made on the wood and mud that lies under the sand in the lagoon area. The black material is largely reduced iron oxides (magnetite) mixed with the products of weathered volcanic rocks - the lagoon was at one stage stagnant and the anaerobic conditions resulted in the underlying black mud. The degraded wood from the lagoon was identified by N. Mills Reid as being consistent with Araucaria heterophylla (Norfolk Island Pine).

Corrosion Potentials

When a metal is placed in oxygenated sea water it will corrode. The rate of corrosion depends on many variables such as the nature of the metal (alloy) itself, the temperature, water movement and the availability of dissolved oxygen. Copper alloys tend to corrode at a much slower rate than iron objects and this is simply a reflection of their position in the electrochemical series viz: copper is a noble metal (does not dissolve in non oxidizing acid solutions) whereas iron is a base metal (one that spontaneously dissolves in non oxidizing acid solutions). The measured voltage of a metal in sea water, relative to an arbitrary standard, can be used as a guide as to whether or not the object is in an active, passive or immune state with regard to its tendency to dissolve (corrode). Measurements of the corrosion potential of artefacts on site can be used to determine the predisturbance microenvironment and to get an estimate of the rate at which the object is corroding.

Measurements made on Norfolk Island covered material from the three sites although the anchor was only measured after being brought alongside the pier after being raised from the main site. The data listed in Table I, together with typical pH data from references 2, 3 and 4, shows that the microenvironment of the majority of the iron artefacts is that which is commonly found on well oxygenated wreck sites, i.e. similar to that of the *Lively* on the Rowley Shoals. Although the iron is corroding it is at a "steady state" and at a rate that is significantly lower than it would be if the concretion was removed. The iron 'U' shaped fitting (SI 41) gave a potential 100mV more positive (less negative) than the artefacts from the lagoon and west of the pier. This potential suggested that the artefact might be more extensively corroded and this was confirmed when the object was deconcreted.

The potential of the anchor when first measured by the pier was much less negative than all the other iron objects on Norfolk Island. This situation was caused by the exposure of a section of the shank to direct contact with the oxygenated sea water, i.e. an area of concretion approximately 50cm x 10cm was left behind when the anchor was raised. Within two hours of being shifted the exposed metal had turned a typical red brown rusty colour. Potential mapping indicated that there were no discontinuities in the anchor. The potential of the anchor was monitored and it gradually drifted towards more positive values as the anchor adjusted to its new environment (see Fig. 1). The difference in potential of the anchor after four days by the pier to that of undisturbed iron was approximately 220mV which means

that it was corroding at about four times its predisturbance rate, e.g. about 0.4mm/year instead of 0.1mm/year. Since it was expected to be several months before the large T shaped steel tank could be built for conserving the anchor, it was decided to protect the anchor by attaching a sacrificial anode. An anode normally comprises of a metal such as zinc or an aluminium alloy which is electrically connected (e.g. by a copper cable) to the object which is a less reactive metal such as iron. The iron object gains protection as the electrons released from the corroding anode flow through the copper wire into the anchor, i.e. the anchor is the cathode of the corrosion cell, while the sea water completes the circuit. The island was scoured for 24 hours but no sacrificial anodes were available - the only ones around were inside rain water tanks!

With the assistance of Terry Arnott we were able to obtain approximately 60kg of aluminium alloy engine blocks, gear boxes, and water pumps from the local garages for less than ten dollars. Some heavy duty copper cable was donated by Neil Tavener. The engine parts were degreased and given a mild etch in dilute sodium hydroxide before being wired together into two lumps which were thrown from the pier into the violent surge by the anchor on the night of 7th March to precondition the passive film on the alloys. The anchor's potential was measured early in the morning of 8th March - it had stabilized at a plateau level -0.340 volts (see Table I). Within two minutes of attachment of the 30kg anode the corrosion potential had fallen to -0.524 volts which showed that (i) good electrical contact had been made and that (ii) the anode was working. At the normal sea water pH of 8.2 the passive film on aluminium alloys takes some time to break down which is why the engine parts were etched with mild caustic and placed in the surging water overnight since the scouring action of the sand would help to activate the anode. To make a good electrical contact with the anchor a small band of concretion was removed from the shank and the copper cable was twisted to form a strong metal - metal contact.

The performance of the anode will be assessed when a conservator returns to Norfolk Island to begin treatment of the carronade and the anchor. The response of the corrosion potential of the anchor to the sacrificial anode is the first reported use of such improvised systems in the field - sacrificial anodes were first used by the author in an experiment in 1983 on the site of the SS *Xantho* at Port Gregory, Western Australia. The implications of the above exercise for other excavations are great - objects can be moved to a more secure location, provided that suitable sacrificial anodes are attached, without endangering the survival

of the object. Under proper controlled conditions such anodes can effectively begin "electrolysis" treatment whilst the object is in situ. An estimate of the weight of the anchor was made using the volume of displaced sea-water necessary to gain buoyancy and the calculated value is 1.4 ± 0.2 tonne.

Treatment and Analysis of Artefacts

The two cannon outside the Administration building were seen to be in need of restoration treatment as they were suffering from surface corrosion which resulted in a disfiguring red brown iron stain on the otherwise black cannon surface. The corrosion was most marked on the quarter of the surface which received the greatest amount of sunlight (see Fig. 2). Being only a few hundred metres from the sea the sun would cause the black cannon to heat up sufficiently to concentrate the salt spray to a level where there was significant break down of the protective coatings that had been applied in the past. The old coating was removed by scrubbing the cannon with a bristle brush saturated with kerosene - this also removed some of the surface rust. Areas such as the touch holes were excavated with the aid of dental tools before being filled with a microcrystalline wax paste which was coloured with lamp black. The black paste was rubbed into the cannon by hand and as the solvent (White Spirit) evaporated the wax was burnished by hand using old cotton rags. Apart from improving the aesthetic qualities of the display this simple treatment prevents ingress of moisture and salt and so prevents further corrosion of these historic objects.

Apart from the items recovered by the expedition several artefacts brought along to the base camp were given basic conservation treatment. Iron objects were mechanically deconcreted then drawn, photographed again and finally placed in storage in a 2 wt% sodium hydroxide solution in the specially built tank at the Works Depot. Copper based objects were examined for specific corrosion patterns, some material was sampled for research purposes and other items were placed in inhibited citric acid solutions to help remove some of the chloride salts and the marine encrustation. Many of the copper alloy bolts had vestiges of wood attached to them and the corrosion patterns indicated that the majority of the copper bolts had been drawn and they had generally been extensively sandblasted/ eroded by the rapid water movement over the site. The patination was typical of a fully oxygenated site viz: blue green copper (II) hydroxy

chlorides overlaying the initial red brown copper (I) oxide layer, Cu_2O.

While examining the spectacle plate (NI 2) and noting the erosion patterns and evidence of gas bubbles in the original casting, some lettering was noted. After careful application of a dilute (2 wt%) inhibited citric acid solution and excavation with a dental tool, the letters BERWICK were exposed. Since the *Sirius* was originally built as the Berwick this firmly established that the fitting, found west of the pier, was from the flagship of the First Fleet. The other marine concretion was removed by soaking in a citric acid solution and scrubbing with a bristle brush. The object was then washed in a 2% wt sodium sesquicarbonate solution to help remove more of the harmful chloride ions.

A broken rudder pintle found in the same area as the spectacle plate was also examined and samples were taken for analysis. The corrosion patterns indicated that this object, like the spectacle plate, had been buried under several cms of sand for some time but it appeared to be much more dense and was free of casting porosity. These two factors suggested that it was most probably not associated with the *Sirius* wreck but may have come from a vessel such as the *Mary Hamilton*. The corrosion patterns around the head of the pintle indicated that the pin had been cast first and then placed in the mould for the head and jaws of the pintle before a second pour of metal. It was thought that the corrosion patterns might be due to different metallurgical or chemical compositions of the two parts of the pintle.

Because of the apparent "contamination" of some of the sites the provenance of the various artefacts is of major archaeological significance. The set of bronze rudder gudgeons and pintles in the Pier Store showed similar casting porosity patterns to the spectacle plate and were almost certainly *Sirius* material. Small samples of metal were drilled from a pintle, a gudgeon, the horseshoe and a broad copper strap. A sample was also taken from a brass like bolt (SI 32) excavated during this season. The results of the chemical analyses are shown in Table II. Inspection of the data shows unequivocally that the spectacle plate, rudder gudgeon (NI 18), rudder pintle (NI 16), horseshoe and strap are from the same source. The first three bronze objects were probably cast from the same melt - the casting porosity (gas bubbles in the metal) patterns are identical and the range of metal contents is within the normal variation one finds within an individual object (5). The horseshoe and the strap are apparently from the same source and it is likely that the "brass bolt" SI32C is also from

the same foundry as the other *Sirius* material. Although the bolt had the typical pale yellow colour, when freshly abraded, of a brass the chemical analysis showed it to be a low tin bronze. The assignment of the type of alloy to an artefact purely on the base of colouration is fraught with many dangers. The remains of the wood attached to the bolt were identified by N. Mills Reid as chestnut, Castanea sp. and probably C. sativa or European chestnut rather than C. dentata (N. American). Chestnut was sometimes used in the framing of some ships - the timber identification is consistent with SI32C coming from the English built *Sirius*.

The composition of the rudder pintle from the western site is clearly markedly different to that of the *Sirius* artefacts. The chemical analyses of the pin and arms of the pintle (NI 3) are sufficiently different to support the interpretation based on the observed corrosion patterns viz: the pin was cast first and the rest of the object subsequently cast around the pin. The difference of 1% in the tin analyses is statistically significant when compared with the variations in each sample area. The trace metal analyses for the NI 3 pintle show that the manufacturers were using the same basic materials for each pour.

Analysis of the concretion in the eye of one of the *Sirius* gudgeons showed that there had been selective corrosion of the lead and zinc components. This behaviour indicates (4) that the object had been resting for some time in a partially aerobic site, i.e. it was covered by a layer of sand for some years. Such a fate is entirely consistent with the shifting sands found in the lagoon and in the area west of the pier.

Summary

The 1985 *Sirius* Expediton was successful and covered many aspects of conservation. The collection in the pier store was examined and found to be in need of conservation treatment. A proposed treatment programme is outlined in Appendix I. Through public lectures, radio interviews, workshops and visits a large section of the local community was made aware of the need to conserve their material heritage and of how to use simple techniques to stabilize archaeological and archival materials. Apart from giving initial conservation treatment to the artefacts recovered during the expedition several objects previously recovered by local divers were also treated. One such object was the spectacle plate from the *Sirius* which

bore the vessel's original name, 'BERWICK'. From chemical analyses of and corrosion patterns on the spectacle plate, a collection of objects in the Pier Store could be positively identified as being *Sirius* wreck material. Other objects recovered from the same area as the spectacle plate were shown to be from another wreck, probably the *Mary Hamilton*. The two cannon outside the Administration offices in Kingston were cleaned and given a protective coating whilst instructing Works Depot staff in the appropriate techniques. Analysis of corrosion phenomena showed that some of the wreck material has been covered by sand for a considerable time and that much material from the main site would have been lost through the combined effects of erosion and corrosion. The use of sacrificial anodes to protect archaeological iron objects after excavation was demonstrated with the large anchor. The simplicity and applicability of the technique has major implications for future maritime archaeological excavations.

Acknowledgements

I would like to acknowledge the help of my colleague, Nancy Mills Reid, who identified the timber samples.

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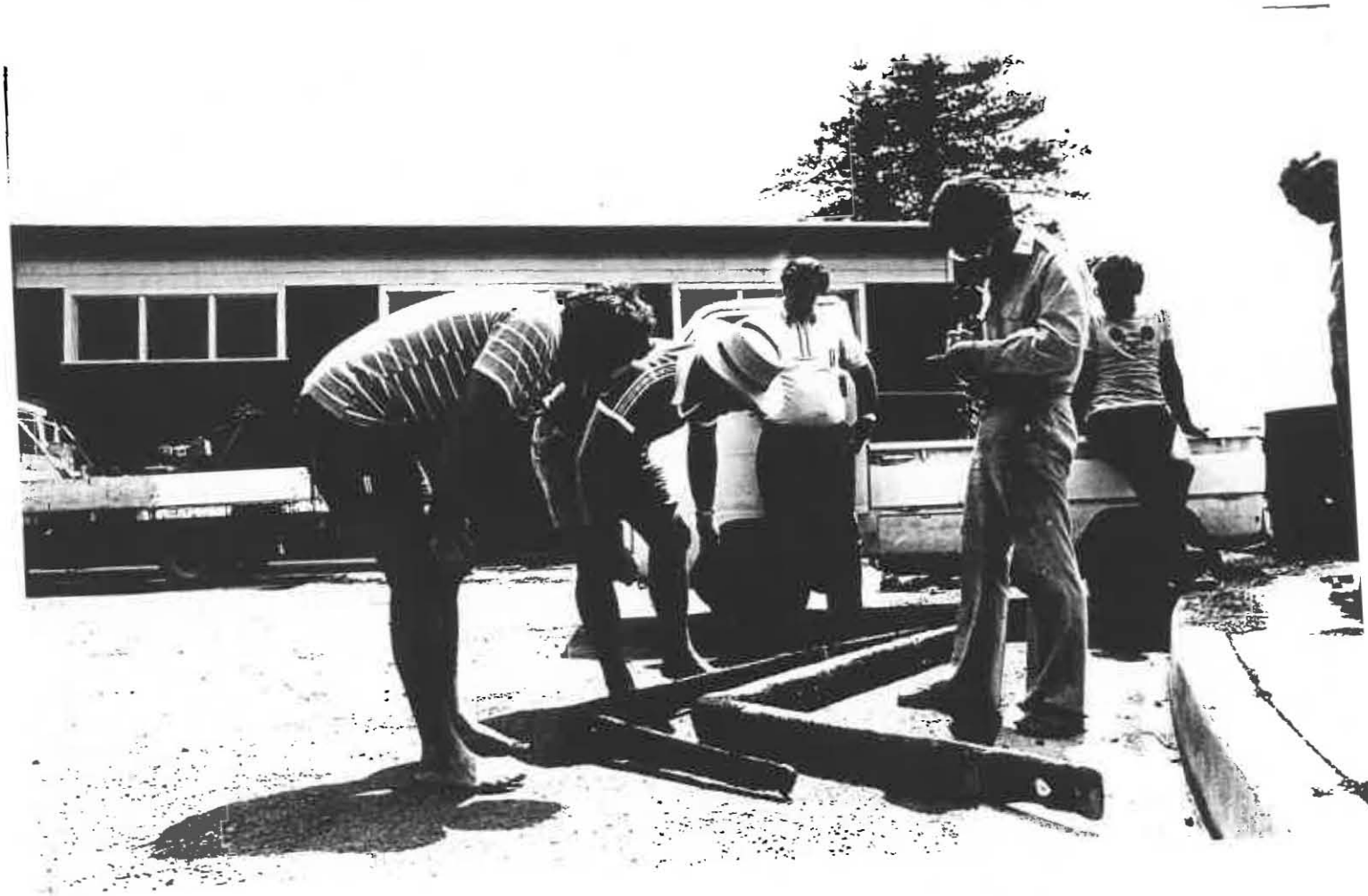

Figure 18. Iron knees from Mary Hamilton and Renaki are compared.
Photo: Pat Baker

Table I

Corrosion potentials of artefacts on the *Sirius* wreck site, Norfolk Island

Object	Location, Number	Corrosion Potential volts vs AgCl sea water	Date
Iron knee	SI 9+	-0.564	23/2/85
Iron knee	SI 10+	-0.536, bubbles	23/2/85
Iron strap	SI 18+	-0.558, 3mm concretion over white metal	23/2/85
Iron ring	near SI 18+	-0.555, water depth 8.5m	23/2/85
Copper bolt	near SE 10+	-0.380, lying proud of sea bed	23/2/85
Iron ballast	SI 37*	-0.562 to -0.542, thick graphitized layer	2/3/85
Iron fitting	SI 41*	-0.452 to -0.474, bubbles evolved, badly corroded	2/3/85
Iron anchor	SI 57	mean -0.423 ± 0.006, 2.1m	2.00 pm 4/3/85
Iron anchor	SI 57	mean -0.345 ± 0.004, 2.0m	10.00 am 6/3/85
Iron anchor	SI 57	mean -0.340 ± 0.002, 2.0m	7.30 am 8/3/85
		-0.524 with anode	7.40 am

+Located west of pier.

*Lagoon site.

Table II

Object	Cu	Sn	Pb	Zn	Ag	Bi	Ni	Sb	Fe	As
Spectacle plate NI 2	93.14	3.97	0.43	0.032	0.100	0.097	0.155	0.214	0.11	0.23
Rudder gudgeon NI 18	89.91	4.92	0.53	0.036	0.142	0.068	0.176	0.175	0.68	0.17
Rudder pintle NI 16	92.57	5.05	0.35	0.027	0.099	0.020	0.087	0.103	0.0008	0.29
Horseshoe NI 15	98.76	0.22	0.41	0.0062	0.110	0.058	0.095	0.103	0.0054	0.19
Strap NI 14	98.55	0.26	0.41	0.0032	0.107	0.045	0.090	0.026	n.d.	0.19
Bolt SI 32 C	98.35	0.47	0.22	0.029	0.236	n.d.	0.094	0.162	0.0093	0.06
Pintle jaw NI 3	73.42	3.44	12.78	7.87	0.097	0.135	0.15	0.35	0.29	0.105
Pintle pin NI 3	76.10	2.48	13.16	7.32	0.100	0.13	n.d.	0.32	0.28	0.105

All the above values are the average of two separate determinations. Where the sum of the metal analyses is less than 100% it is because some of the core sample was corroded. Between 20 and 100mg of each sample was dissolved in 10% nitric acid, 2 wt% tartaric acid and the solutions analysed by atomic absorption spectroscopy.

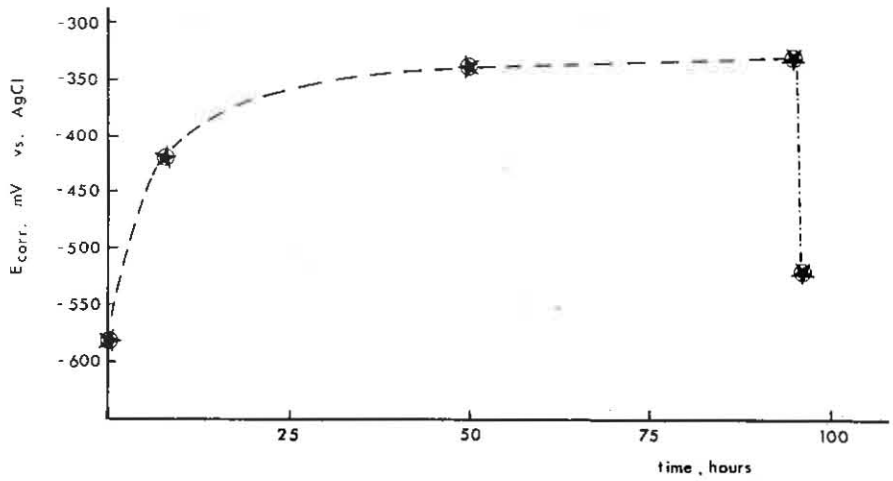

Fig. 19. Plot of the corrosion potential of the *Sirius* anchor, by the Kingston pier, versus the time since the anchor was shifted from the main site. The final measurement refers to the potential shortly after connection of the sacrificial anode.

Fig. 20. Cannon outside the administration building showing marked surface rusting on the areas most exposed to direct sunlight. This photograph was taken before the conservation treatment.

Appendix 2. Report on the Condition of Museum Material in the Pier Store Museum, Kingston, 1985.

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General Observations

The collection is currently housed on the lower floor in the Pier Store, one of the historic buildings down by the quay at Kingston. The building itself is only a few hundred metres from the shore and is often covered with a fine mist of sea spray. The restored structure suffers from the problems that are generally found with salt saturated sandstone structures that have recently undergone major environmental changes, such as being made watertight after long periods of exposure to the elements. Initial inspection of the building showed that it was damp and musty - the lower gallery door had not been open for some time and as a result the air had become stale.

A layer of salt laden, loose mortar-sandstone dust covered objects within a sixty centimetre margin around the walls which were fretting and had large patches of salt crystals/mortar/sandstone dust which came away if brushed against. The problem of salts migrating into the interior of the building should gradually diminish until a new "steady state" is attained in four or five years time.

During the time of the "Sirius Expedition" approximately 10,000cm^3 of dust, salt and rock debris was removed from around the skirtings. The objects that were covered with debris have been physically cleaned of the loose material and sorted according to their nature and source. This preliminary cataloguing was performed by Myra Stanbury of the W.A. Museum.

Iron Objects

Wrought iron:

All the iron objects in the collection are in urgent need of conservation treatment for without positive steps being taken to arrest their accelerated corrosion the remaining archaeological information will be lost. Many large iron fittings from Crank Mill are in dire need of treatment - layers of rust up to 2mm thick are falling off the teeth of the main drive gear wheel. All the iron objects recovered from the Kingston area have high levels of chloride salts in them and are inherently unstable.

The treatment of iron artefacts all revolves around washing the objects "free" of chloride ions. The washing needs to be done in sodium hydroxide (caustic soda) solutions containing approximately twenty grams of sodium hydroxide per litre of solution (2 wt%). The sodium hydroxide provides a strong driving force to help remove the aggressive chloride ions.

In the absence of sophisticated conservation equipment the storage of iron artefacts in such caustic solutions not only prevents further decay/corrosion of the metal but it actively assists in the ultimate stabilization process viz. chlorides come out of the iron into the caustic solution. If electrolysis facilities are made available then the overall treatment time for artefacts is greatly reduced. For example, an old iron axe may need soaking in caustic soda solutions for two years to stabilize it but the treatment time would be about three weeks if the object was suitably electrolysed. Once the artefacts have undergone basic stabilization treatment they need to be given a coating of a protective lacquer to help exclude the moist salt air from the metal surface for without such physical barriers the corrosion process will start off again.

Cast iron:

The treatment of cast iron objects requires similar techniques to those described above except that treatment times are normally much longer. Corroded cast iron will often have a very soft graphitized surface and this layer bears all the inscriptions, if any are indeed present. If given rapid electrolysis (high current) in caustic solutions, the evolving hydrogen gas will blast the outer surface away and so obliterate all the archaeological details such as weight and foundry marks. Removal of the chlorides from a wrought iron anchor may take as little as seven months whereas a carronade, such as the one just raised from the "Sirius", will take between four and six years of gentle electrolysis. The number of man-hours involved in such extended electrolytic procedures is not all that great since the treatment virtually looks after itself once the initial deconcreting and preparation of anodes, cradle etc. has been done. Regular weekly checks on the solution levels (to make sure the cannon surface does not become dry) and periodic measurement of chloride levels will ensure that the treatment is progressing satisfactorily.

As the salt levels in the wash solution builds up there is a slowing down of the rate at which they are being released until a plateau is reached. Once plateaus have been established the solution needs to be changed. During the first periods of electrolysis, bore water, such as from Horrock's Bore, would be suitable but for the final treatment period fresh rain water should be used for making up the caustic baths. After the chloride removal is effected the cast iron object must be washed free of residual caustic, dewatered and then impregnated with a microcrystalline wax. Currently the wax impregnation facility is only available at the Western Australian Museum.

Copper-brass-bronze:

A large number of artefacts made from copper and its alloys are currently housed in the Pier Store. A cursory inspection of the objects showed that many of them have localized severe corrosion (pitting) and that most of them are suffering from some form of corrosion due to (i) the previous site history and (ii) their present storage conditions. Amongst the material is the greater part of a set of rudder pintles and gudgeons from the "Sirius" which are in need of basic conservation treatment. Removal of non aesthetically important corrosion products and coralline material is effected by soaking the artefacts in tubs of a wash solution comprising of 5 wt% citric acid, 1 wt% thiourea. The cleaning of the softened materials and subsequent washing in a mixture of sodium carbonate and sodium bicarbonate goes a long way in stabilization of the artefacts. Total treatment time for such materials ranges from ten to eighteen months and involves three or four changes of the washing solutions over that period.

Ceramics-glassware:

Many of the bottles from the early settlement period are opalescent and some are actively exfoliating. Because of phase changes brought about by prolonged burial in a salty environment and because salt solutions that have penetrated the glass crystallize and blister the surface layers, it is essential that these materials are treated. In most cases simple washing for two months in "tap water" followed by a few months in deionized (rain) water will normally prevent further damage. A number of consolidants are available which effectively stabilize the already damaged surface. Similar problems occur in ceramics where salt crystallization will often destroy the

glaze; adoption of a routine washing procedure will normally lead to effective stabilization of most salt affected ceramics.

Textiles:

Materials of plant or animal origin are all susceptible to deterioration through weathering brought about by rapid changes in relative humidity and by the action of sunlight. The accumulation of dust, grit and salt accelerates the rates at which cotton, wool, silk etc. breakdown since their abrasive action is most marked when objects are being moved around (handled). Washing the textiles using appropriate non-ionic detergents will normally enhance the condition of the object through the simple removal of dirt and grime. Proper storage away from direct sunlight and from insect attack will normally prolong the life of a garment. The examples of fragments of old military uniforms found on sites in the Kingston - Arthur's Vale area are in a delicate condition and need consolidation either by couching down onto a supportive backing or by using a lamination technique.

Work Proposals

As soon as a curator - conservator is/are appointed it is essential that treatment of most of the archaeological iron work commences as much of this material is in very bad repair. Pending the arrival of a controlled current-voltage source some electrolysis work could be performed using a modified commercial battery charger.

Treatment of the massive wheel sections from the crank mill can await the availability of the large steel tank being used to treat the "Sirius" anchor.

Immediate treatment of the massive bronze rudder fittings from the "Sirius" could take place using large, commercially available, plastic tubs.

Glass and ceramic materials could begin desalination by simply immersing them in plastic tubs ("fish baskets").

All the above proposals are suggestions on a FIRST AID basis and are no real substitute for a systematic treatment of the objects over a period of eighteen months to two years. For massive and fragile items such as a "Sirius" carronade it may be possible to use facilities currently being made available at the Administration Works Depot.

Equipment

Sodium hydroxide (caustic soda) ICI 1.2 tonne pallet @ approx. $721 per tonne (each bag of caustic weighs 50kg)	$865
DC current-voltage variable power supply unit	$420
2 x ACI (Nylex E60 75 gallon tank) plastic tubs at 3' x 2' x 2' @ 163.26	$326
10 x ACI (Nally's Stacknester no. 12 @ $22.17) plastic tubs (approx. 80 litre capacity)	$222
50kg of citric acid crystals @ $4.35/kg	$218
10kg of thiourea @ $3.10/kg	$31
Hand tools	$280
TOTAL	$2362

Appendix 3. Report on Catalogue of Artefacts Recovered from Underwater Sites During the 1985 Sirius Expedition, Norfolk Island.

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FREMANTLE

For purposes of analysis, the artefacts in this catalogue are grouped according to their site location. While the physical details of the various sites are described more fully elsewhere in the report, the individual sites are defined here as follows:

a) SITE 1: Stranding Site. Lies on the outer edge of the fringing reef, bearing 127°30'°(M), 220 m from Station 1 (situated on pier); and, bearing 194°(M), 210 m from Station 3 (situated on shore) (see Figure 1.). Heavy artefacts i.e. anchors, cannon, rudder fittings etc. indicate possible stranding site of Sirius. Also referred to as "Sirius site", "edge of surf zone", "outer edge of surf zone", "outside reef", and "outer swell zone".

b) SITE 2: Inside Reef - Gully between reefs. A 35 m wide gully running between an inner high reef platform and the outer fringing reef. Artefacts are concentrated in an area bearing 205°(M), 130 m from Station 3, and 75-110 m due north of Site 1. Also referred to as "inner swell zone".

c) SITE 3: Inside Reef - East site. Lies immediately east of Kingston pier (at inshore end), and extends 90 m eastwards to the remains of a man-made causeway. Most of the area is exposed at low tide. Bearing 328°30'(M), 200 m from Site 1.

d) SITE 4: Slaughter Bay Lagoon. Lies directly south of Stations 4 and 5. Comprises a small lagoon, protected by coral outcrops to the east and west, with outcrops of high reef platform to the south. The central area bears 60°(M), 350 m from Site 1.

e) SITE 5: West Site. Lies to the west of Kingston pier bearing 276°(M), 170 m from Station 1 and bearing 294°, 375 m from Site 1. Artefacts are concentrated in three areas, specified as areas A, B and C. (Figure 2.).

All artefacts recovered from the underwater sites have been registered with the prefix 'SI'. This does not presume however, a definite association with the wreck of the Sirius. Preliminary observations suggest that one or more vessels of differing time spans have been wrecked in the vicinity of Sydney Bay. As a result, the artefact assemblages are seen to represent mixed groups of finds. With this problem in mind, the accurate identification of the various assemblages and individual artefacts becomes crucial to the determination of whether or not they belong to the Sirius or another shipwrecked vessel.

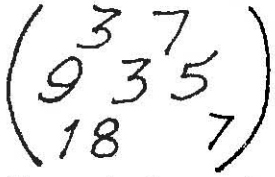
CATALOGUE

SITE 1: Stranding Site

Armament

SI 58 Carronade

As yet, no dimensions or details are available as the carronade was raised with its concretion intact. One trunnion, however, is partially exposed and appears to bear the following inscriptions:



The carronade lay directly beneath the anchor SI 57.

Fastenings and Fittings

a) Non-Ferrous

SI 43 Bronze bolt with rounded point

Length	255 mm	[10 2/16"]
Head diam	33 mm	[1 5/16"]
Shaft diam	20 mm	[12/16"]

SI 46 Bronze ring - possibly part of a pulley sheave coak

Outer diameter	40 mm
Inner diameter	33 mm
Height	32.5 mm

SI 52 Unidentified bronze fragment - for analysis

SI 44 Brass hooked object - possibly keel staple

Length	102 mm
Width	16.5 mm
Thickness	6.0 mm

SI 47 Part of brass keel staple (?)

Length	48.5 mm
Width	9.0 mm
Thickness	3.5 mm

SI 45 Brass sheathing nails and fragments

The sample recovered consisted of three sizes of nails

i) Round head, square shanked.

Length	53.5 mm [2 2/16")
Head diam	13.0 mm [8/16"]
Mid-shank	5.5 x 5.5 mm

Probably wood-sheathing nails

ii) Round head, square shanked

Length	36.5 mm [1 7/16"]
Head diam	8.5 mm [5/16"]
Mid-shank	4 x 4 mm

Probably copper (or brass) sheathing nails

SI 58 Photo: R.Varnam

Figure 21. The exposed carronade trunnion showing markings. Photo: Robert Varman

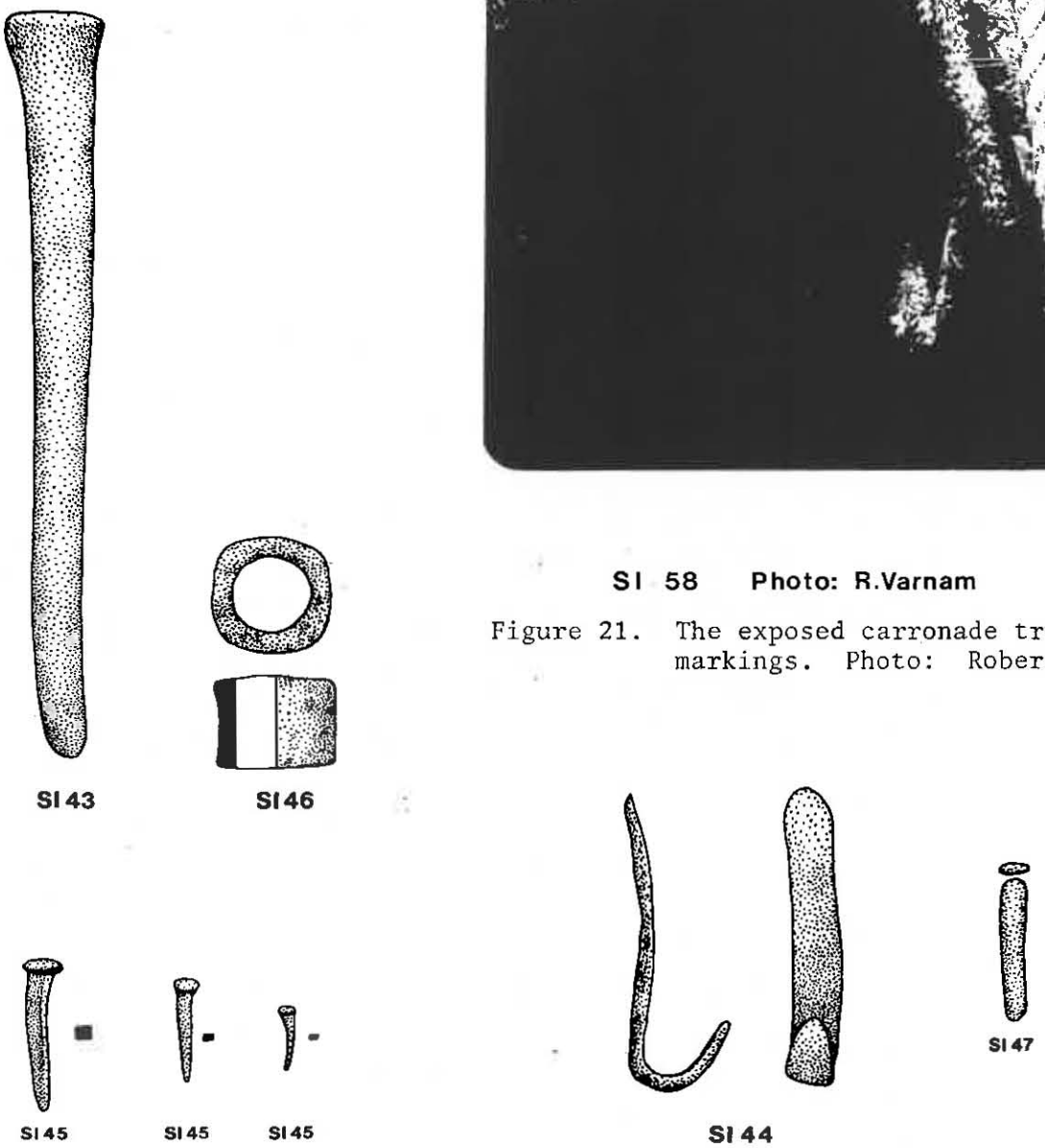


Figure 22. Non-ferrous fastenings from Sirius

iii) Round head, square shank
Length 23 mm [14/16"]
Head diam 6 mm [4/16"]
Mid-shank - worn

SI 48 Lead sheathing fragments

b) Ferrous

SI 57 Old Plan Long Shanked Anchor

In order to compare the measurements of this anchor with the one raised in 1973, (NI 20), and that in Macquarie Place, Sydney (MPS) the dimensions are presented in the following table:

	Length of Shank	Length of Flukes	Span of Flukes	Thickness of Palms	Weight
SI 57	4.55 m [14'11"]		2.7 m [8'11"]		Est. 1.4± 0.2 tonne [28 cwt] [MacLeod, 1985]
NI 20	4.62 m [15'1"]	1.75 m [5']	2.62 m [8'6"]	6.5 cm [2 9/16"]	
MPS	4.60 m [15'1"]		c. 1.52m [c.5'] Broken		

As a further comparison, the following standard specifications are given by Falconer (1815:12) for anchors made in his Majesty's dock-yard.

Wt.	Length of Shank	Length of Flukes	Thickness of Palms
28 cwt	14'4"	4'9¼"	0 1 5/8"
31 cwt	14'9"	4'11"	0 1 7/8"
33 cwt	15'0"	5'0"	0 1 7/8"
34 cwt	15'1"	5'¼"	0 2"
35 cwt	15'2"	5'3/8"	0 2"

SI 51 Unidentified piece of iron

SI 50 Unidentified iron tool

Stone

SI 49 Flintstone (?)

SI 53 Chert/Thames gravel (?)

SITE 2: Inside Reef - Gully between reefs

Armament

SI 3 Lead musket ball
Diam 16.5mm

Glass

SI 4 Case bottle fragments and 1 plain glass fragment

SITE 3: Inside Reef - East site

Stone

SI 56 2 Rock samples -
natural calcarenite and basalt.
(Pers. comm. Robert Varnam)

Glass

SI 1 Fragments of olive green case bottle

SI 2 Fragment of olive green case bottle with air bubbles in glass.

SITE 4: Slaughter Bay Lagoon

Ballast

SI 37 Iron ballast pig (Kentledge)
Length 955mm
Width 145mm
Depth 125mm

Similar to examples from Bounty Museum (NI 40) and Bev McCoy (NI 36)

Ship's fittings

SI 41 Unidentified wrought iron fitting - U-shaped.
Length 448mm
Width of bars 40mm
Thickness of bars 20mm

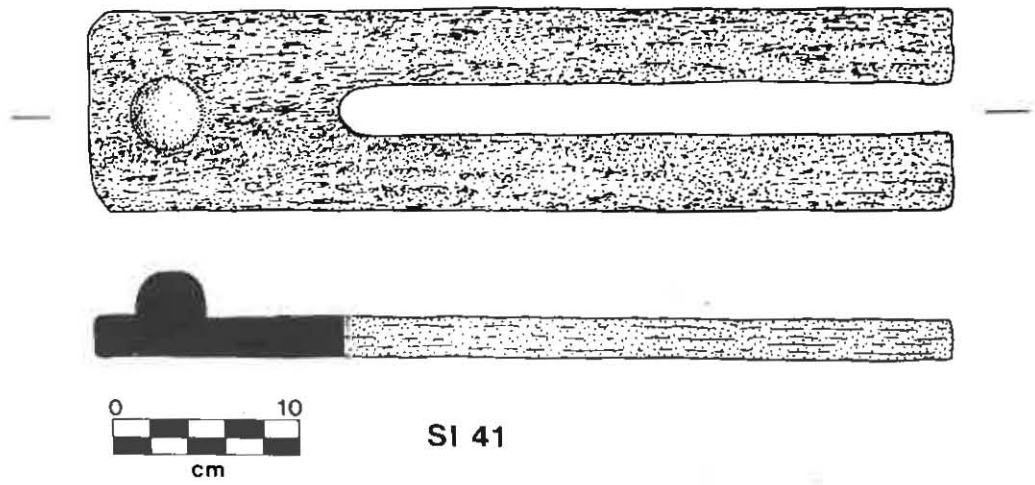
Miscellaneous

SI 40 White china sherd from cup
SI 42 Black substance - unidentified.

SITE 5: West Site

Bone

SI 28 Pieces of whalebone (A7)



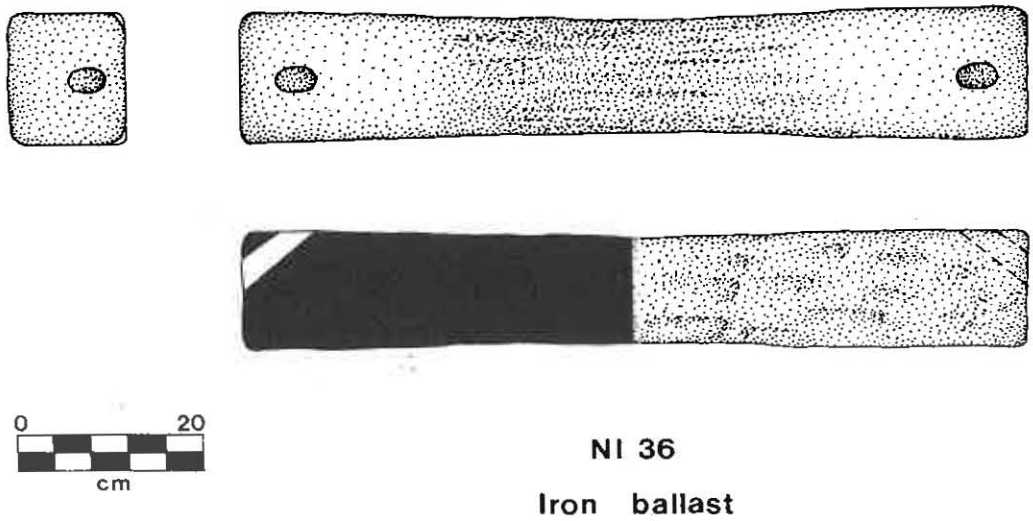


Figure 23. Iron artefacts from the lagoon.

SI 38) Pieces of whalebone (A7)
SI 39)

Clay bricks

SI 16 Pinkish clay brick with frog on each side
Dimensions N/A (A)

SI 21 Clay brick with frog on one side. Indented circular casting marks on the other
Length 230mm
Width 113mm
Depth 77.5mm (A)

SI 22 Clay brick with maker's name on one side: HICKMAN.
Length 230mm
Width 113mm
Depth 77.5mm (A8)

SI 23 Clay brick with frog on each side. Circular mould marks in frog.
Length 230mm
Width 111mm
Depth 75.5mm (A8)

Rock samples

SI 55 Rock samples for analysis

Ship's Fastenings and Fittings

a) Non-Ferrous

SI 7 Brass bolt with thread and nut. (A4)

SI 15 Brass bolt
Length 298mm
Diam 19mm (A2)

SI 26 Brass bolt with remains of wood.
Necking of bar with dezincification.
Length 450mm
Diam 20mm (A11)

SI 8 Brass sheeting (A1)

SI 11 Brass sheeting (A2)

SI 14 Brass sheeting
0.6mm thick (A1)

SI 5 Copper bolt with right angle bend (A1)

SI 6 Copper bolt with brass nut and washer. Bent. (A1)

SI 12 Copper bolt
Length 365mm
Diam 17mm (A3)

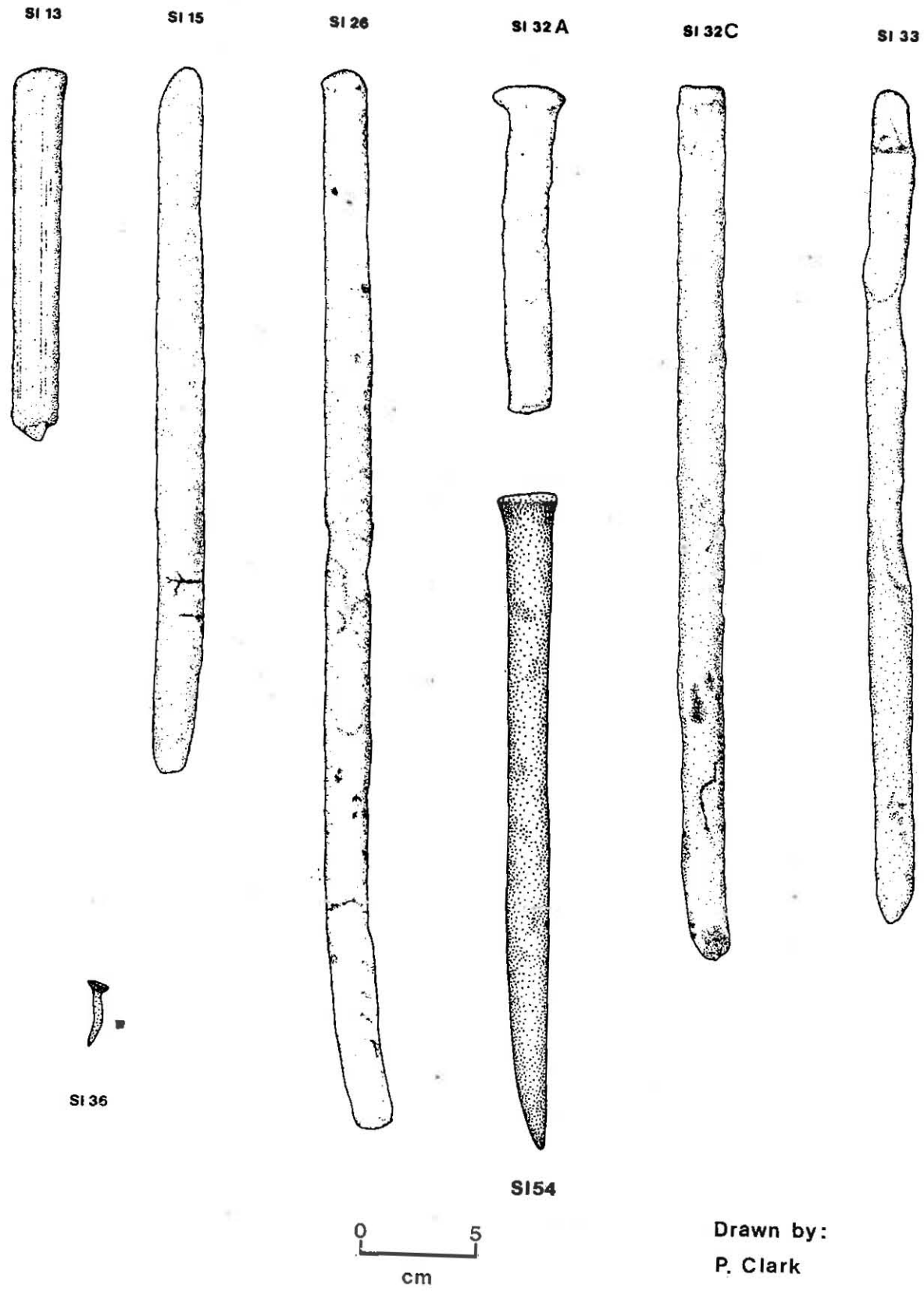


Figure 24. Non-ferrous fastenings from Sirius

SI 13 Copper bolt
Length 155mm
Diam 18mm (A1)

Area A: Ferrous

SI 24 Iron shackle with eyebolt. (A10)

SI 25 Iron mast hoop. (A9)

SI 18 Iron strap (plate)
Length 510mm
Width 89mm
Thickness 11.5mm (A5)

SI 19 Wrought iron bolt with broken head
Length 340mm
Diam 22.5mm (A2)

SI 20 Wrought iron bolt
Length 204mm
Diam 15mm (A2)

SI 27 Iron bolt
Length 377mm
Diam 31mm (A9)

SI 9 Iron deck support (A4)

SI 10 Iron deck support (returned to site) (A5)

Area B: Non-Ferrous

SI 32A Brass bolt
Length 140mm
Diam 20mm
Head diam 34mm (B3)

SI 32C Brass bolt with wood [Analysed by Ian MacLeod]
Length 370mm
Diam 21mm (B3)

SI 33 Brass bolt
Length 350mm
Diam 18mm (B5)

SI 36 Round head, square shank brass sheathing tack
Length 28mm
Head diam 9mm
Mid shank 3.5 x 3.5mm (B1)

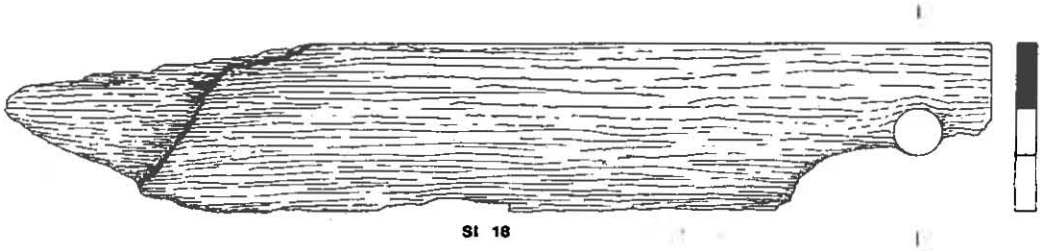
SI 30 Brass sheeting, 0.7mm thick (B2)

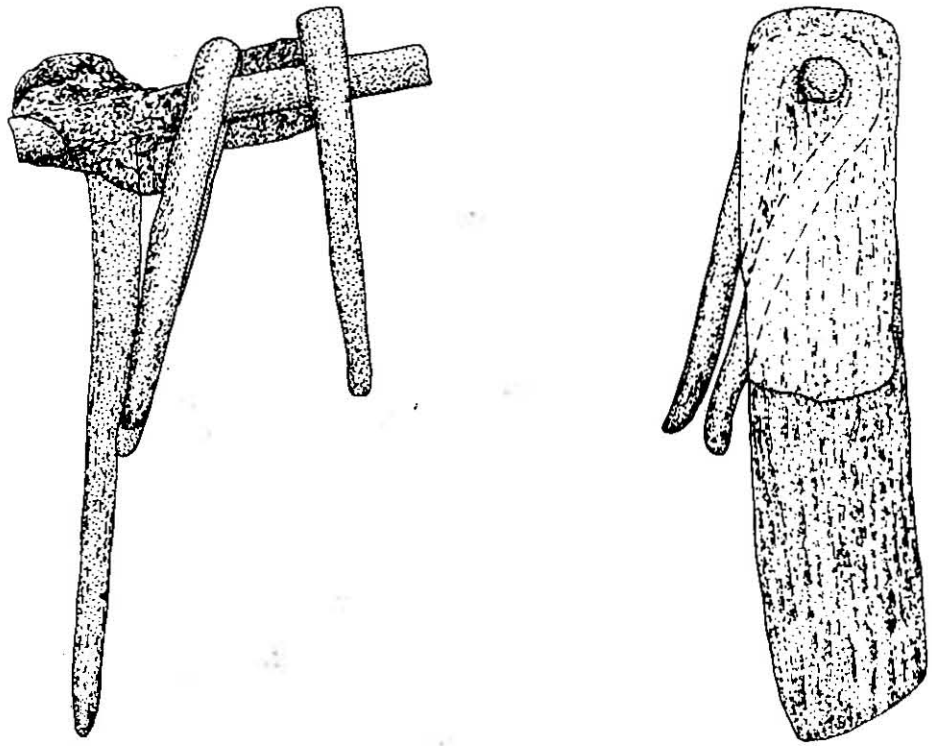
SI 31 Brass sheeting, 0.7mm thick (B1)

SI 35 Brass sheeting (B9)

SI 32B Copper bolt
Length 235mm
Diam 20mm (B3)

IRON FITTINGS





SI 24

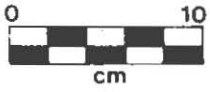


Figure 25. Iron fittings.

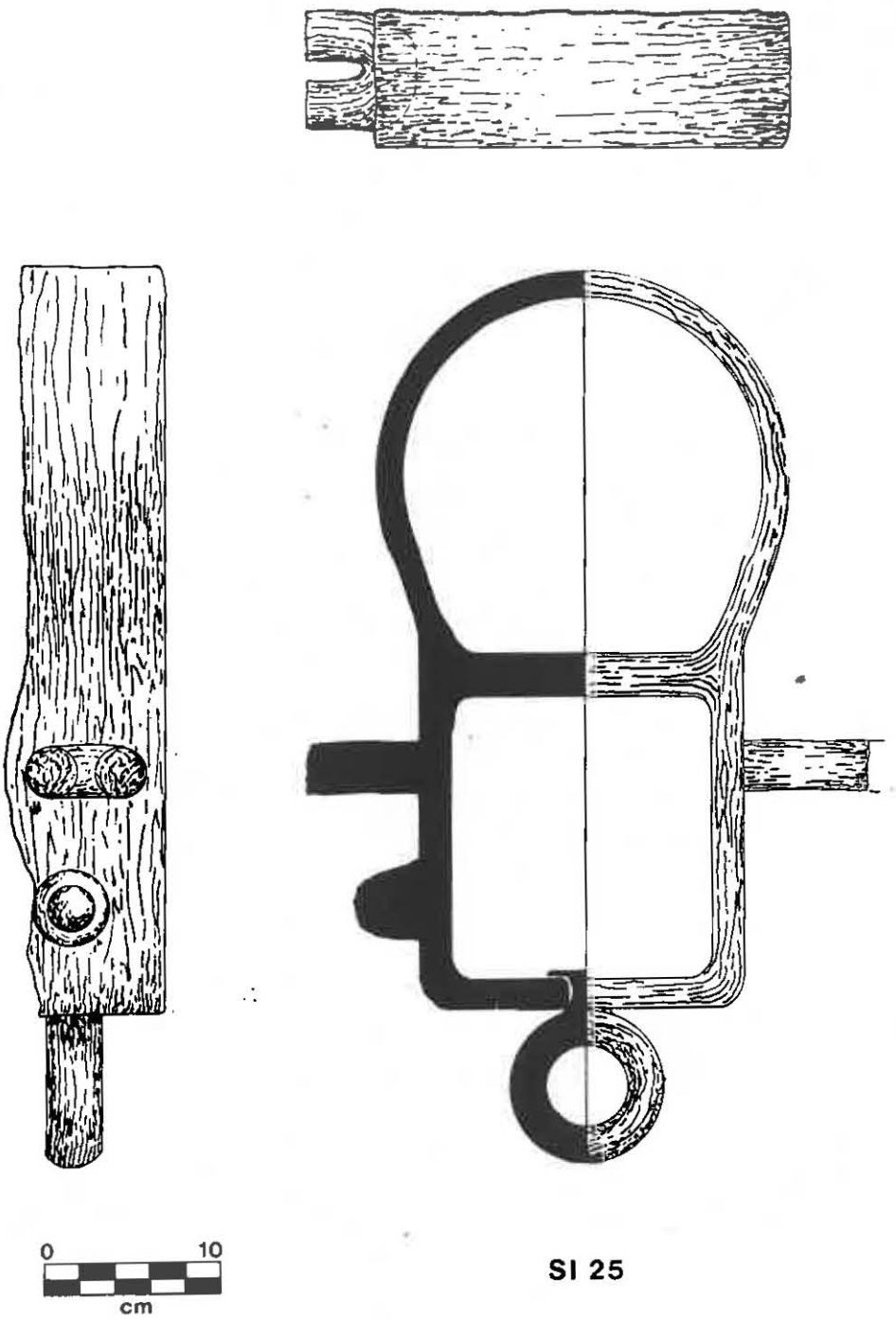


Figure 26. Mast hoop from west site.

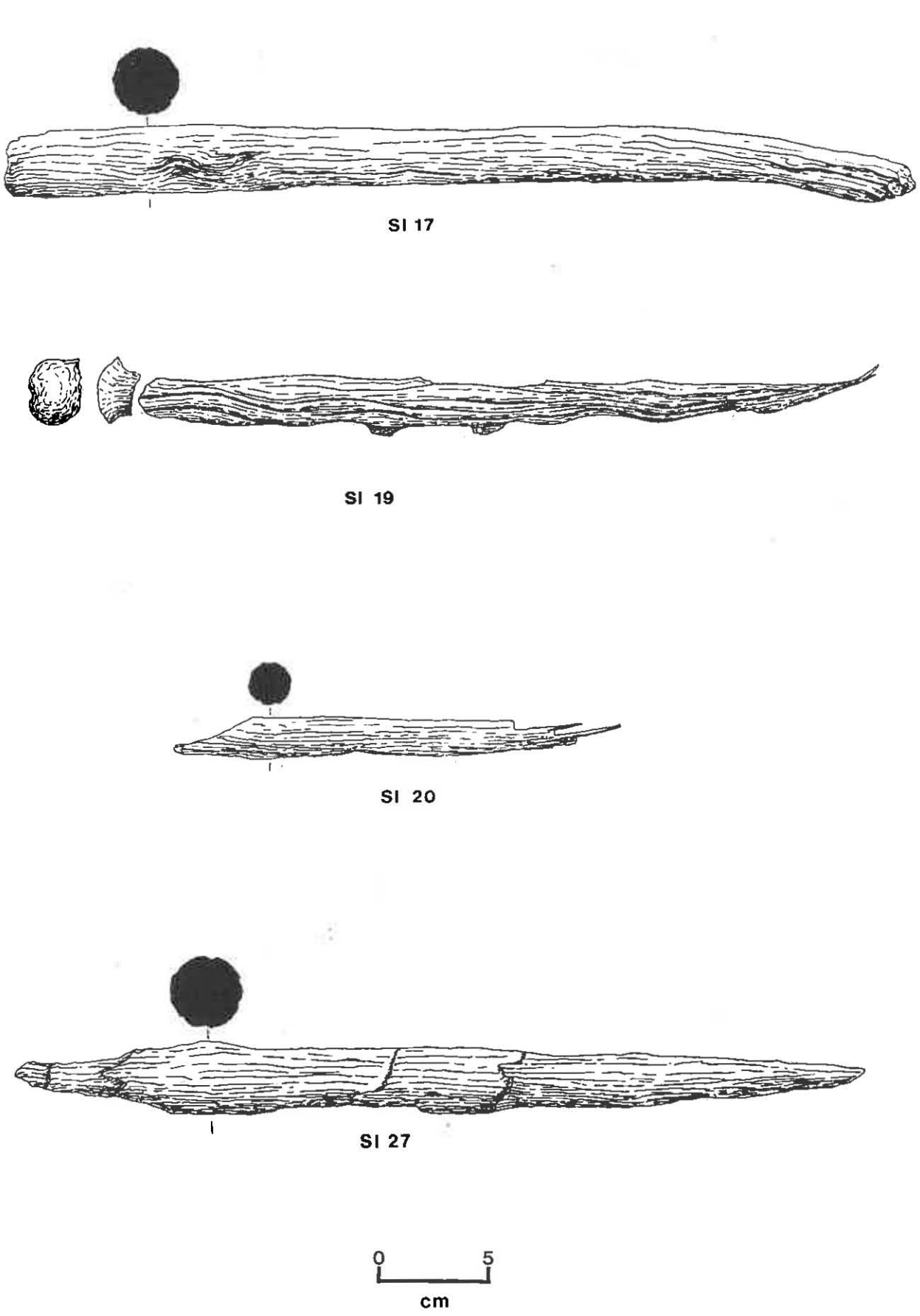


Figure 27. Iron bolts.

Area unspecified

SI 17 Iron bolt
Length 405mm
Diam 29.3-20mm

SI 54 Copper bolt
Length 275mm
Diam 17mm

SI 29 Iron deck support

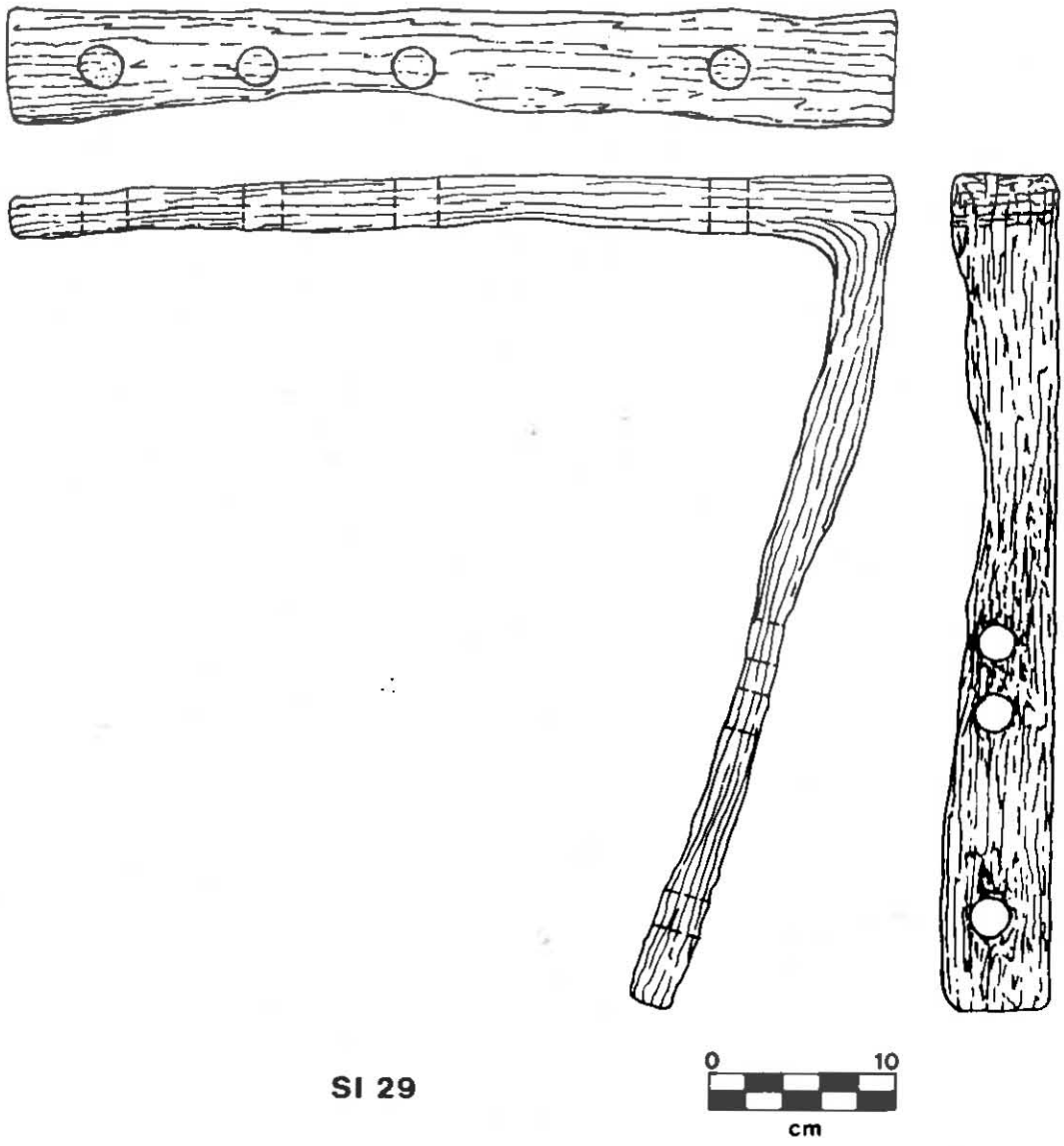


Figure 28. Iron deck support.

References

Falconer, W., 1815 A New Universal Dictionary of the Marine
London: Cadell & Davies.
Library Editions, New York 1970.

Henderson, G., 1984 Report to the Australian Bicentennial Authority on the December 1983 Preliminary Expedition to the Wreck of HMS Sirius (1790) at Norfolk Island.
Report - Department of Maritime Archaeology, Western Australian Museum: No.22

Appendix 4. Report on Registration and Drawing of Artefacts

Myra Stanbury
Assistant Curator
Department Maritime Archaeology
WA Maritime Museum
Cliff Street
FREMANTLE

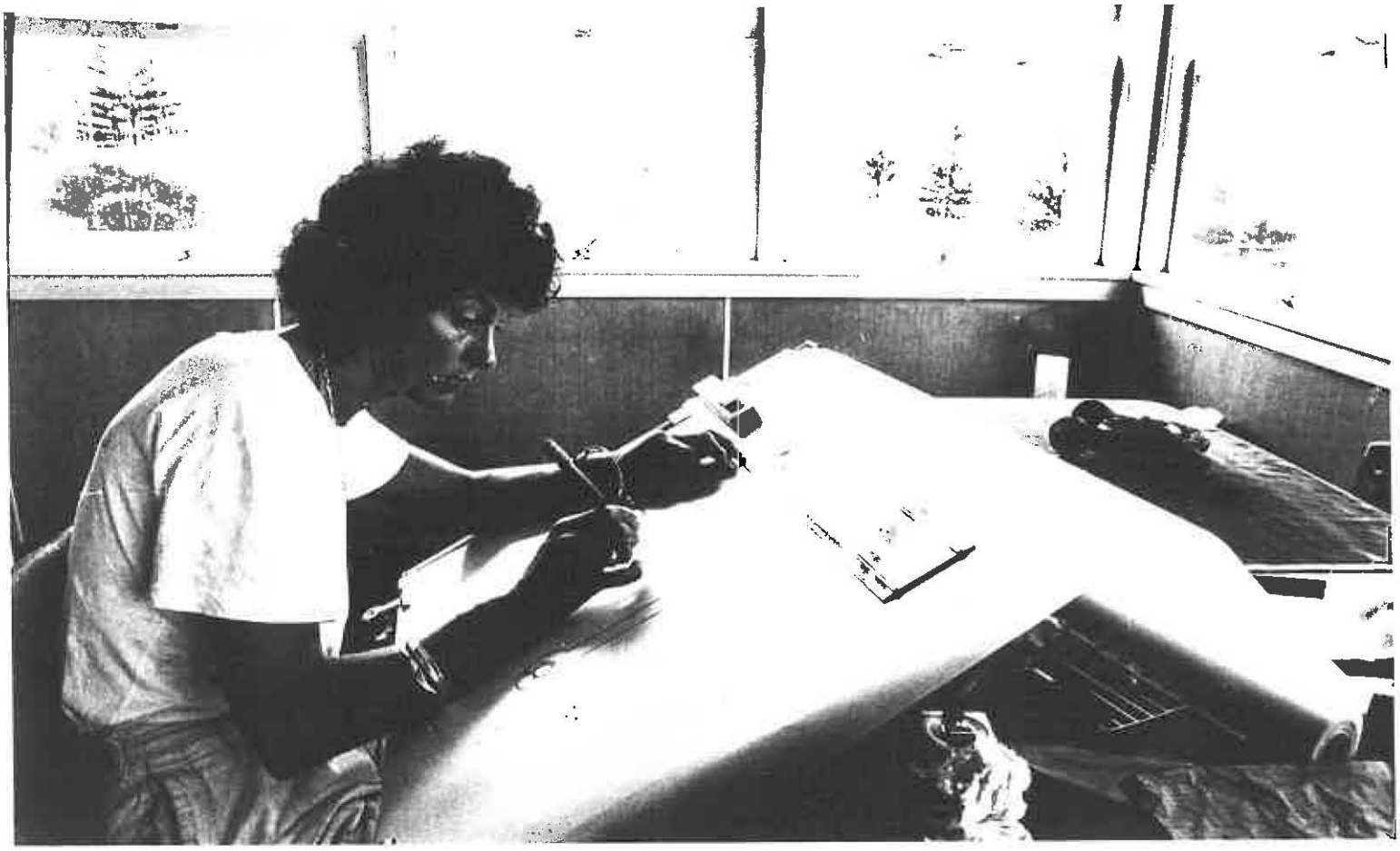


Figure 29. Stanbury draws the rudder chains. Photo: Pat Baker

1. Registration and drawing:

During this season's expedition, two separate registers were compiled:

a) a register of artefacts raised during the 1985 underwater survey and excavation work. Although artefacts in this category have all been assigned the prefix 'SI' (Sirius), it should not be assumed that they are definitely associated with the Sirius until a more positive identification has been made. Archaeological indications are that material from different shipwrecks (e.g. the whaler Mary Hamilton (1876)) may have come to rest in the same general locations as that of the Sirius, particularly in the area to the West of the Pier and the lagoon.

b) a register of maritime artefacts held in private collections and/or by the Norfolk Island Historical Society. Items in this category have the prefix 'NI' (Norfolk Is.) and include a variety of objects believed to have come from the Sirius and/or other Norfolk Island wrecksites. Again, many of the artefacts are yet to be positively identified as belonging to the Sirius.

All artefacts recovered during the 1985 expedition were recorded through photographs and drawings, as too were artefacts submitted by private owners.

2. Assessment of the Norfolk Island Historical Society Collection:

This collection originally formed the basis of the Norfolk Island Museum and was housed in the Administration Building. Following the restoration of the Pier Store building it was transferred to this (its present) location. Over the past 3-4 years, accession and maintenance of this collection has fallen into decline due partly to the waning enthusiasm of volunteers and lack of professional consultative and administrative support.

At the request of Mrs Jennifer Amess, an attempt was made to create some order out of the chaos with the aim of assessing the quantity and type of material in the collection. On the basis of this assessment, recommendations could then be submitted to the Norfolk Island Administration with regard to requirements for conservation treatment, curating, storage and display.

The material fell into several broad categories:

a) Maritime archaeological;
b) Maritime historical;
c) Convict period;
d) Early settlement;
e) Local history;
f) Military history;
g) Whaling;
h) Prehistoric
i) Ethnological;
j) Archaeological;
k) Material on loan (not donated).

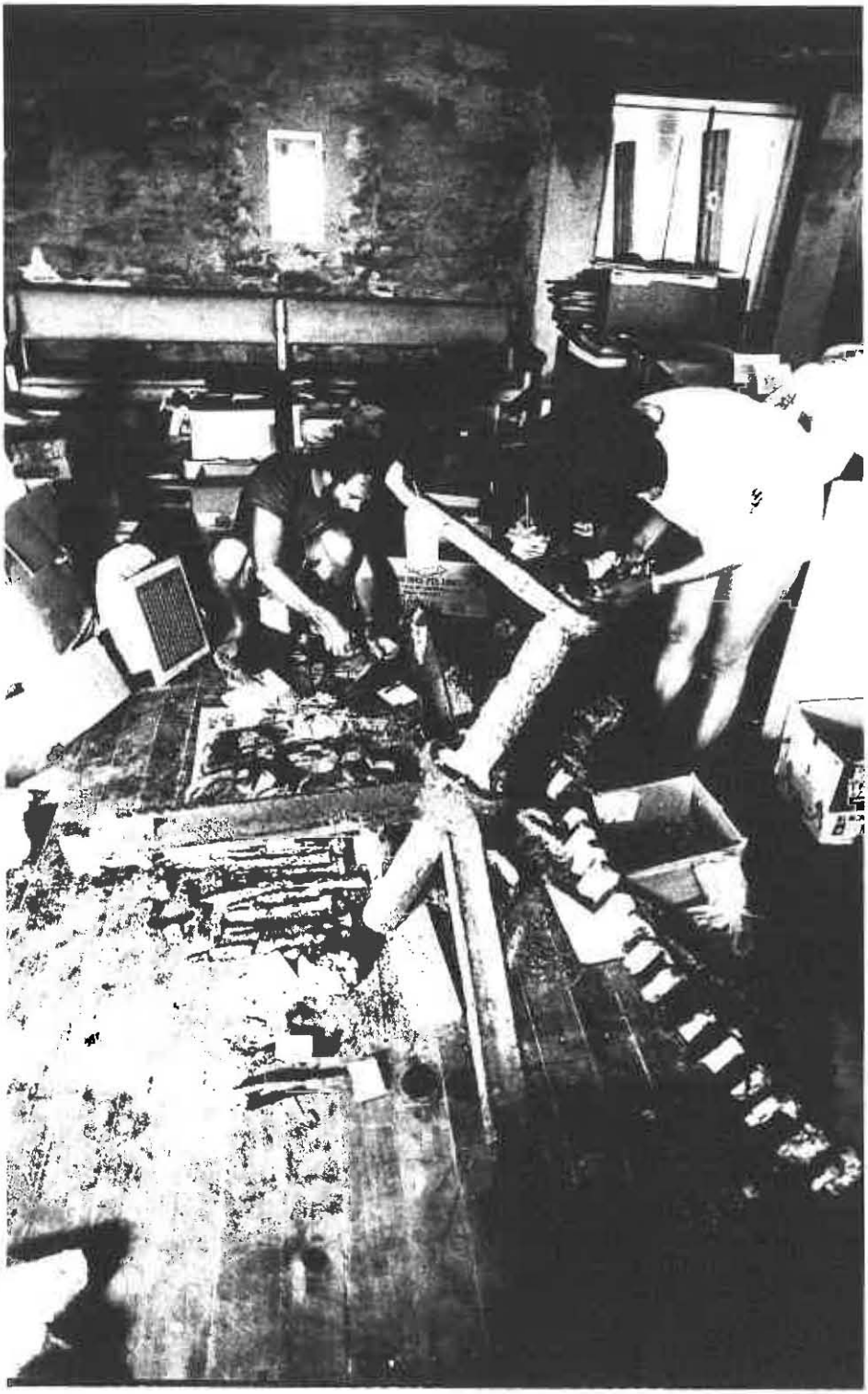


Figure 30. Millar and Atkison work on registration of the Historical Society collection. Photo: Pat Baker

Within the limited time available, as many artefacts as possible were numbered with a simple sequential system of numbering, and a brief description entered on an index card. Accumulated surface dust, sand, cobwebs and other debris was superficially removed with a vacuum cleaner and duster and as much material as possible placed under cover in the existing glass show cases, or away from available light source.

The existing storage environment is hot, humid, very dusty and not appropriate in its present condition for the stable maintenance of the type of materials being housed. A separate conservation assessment was made by Dr Ian MacLeod.

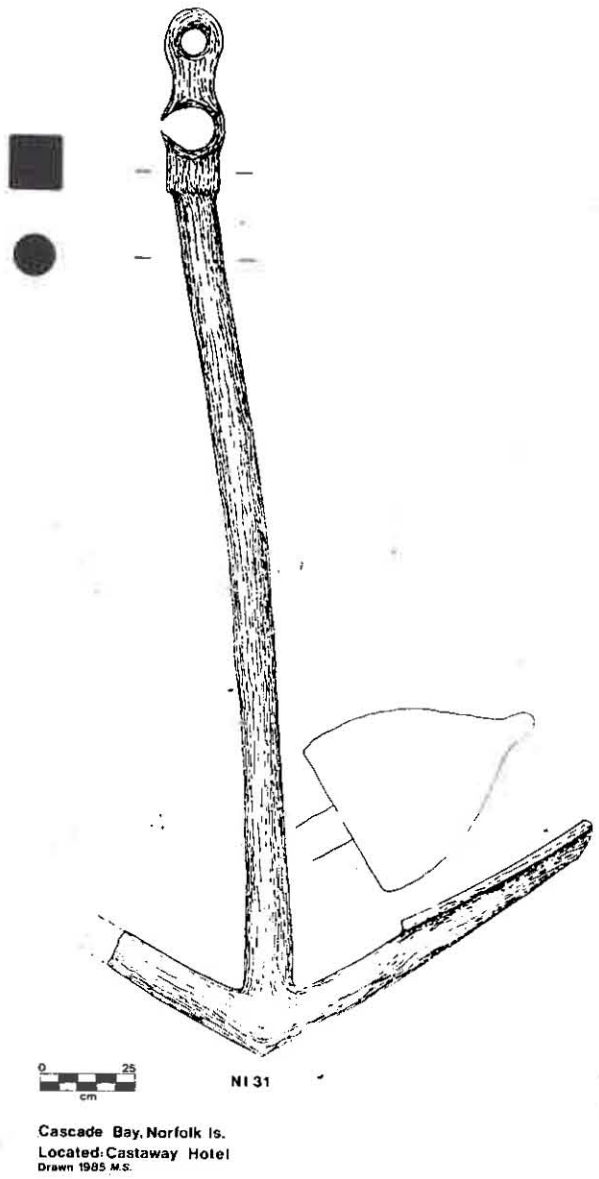


Figure 31. An old plan anchor from the forecourt of the Castaways Hotel.

IRON ANCHOR

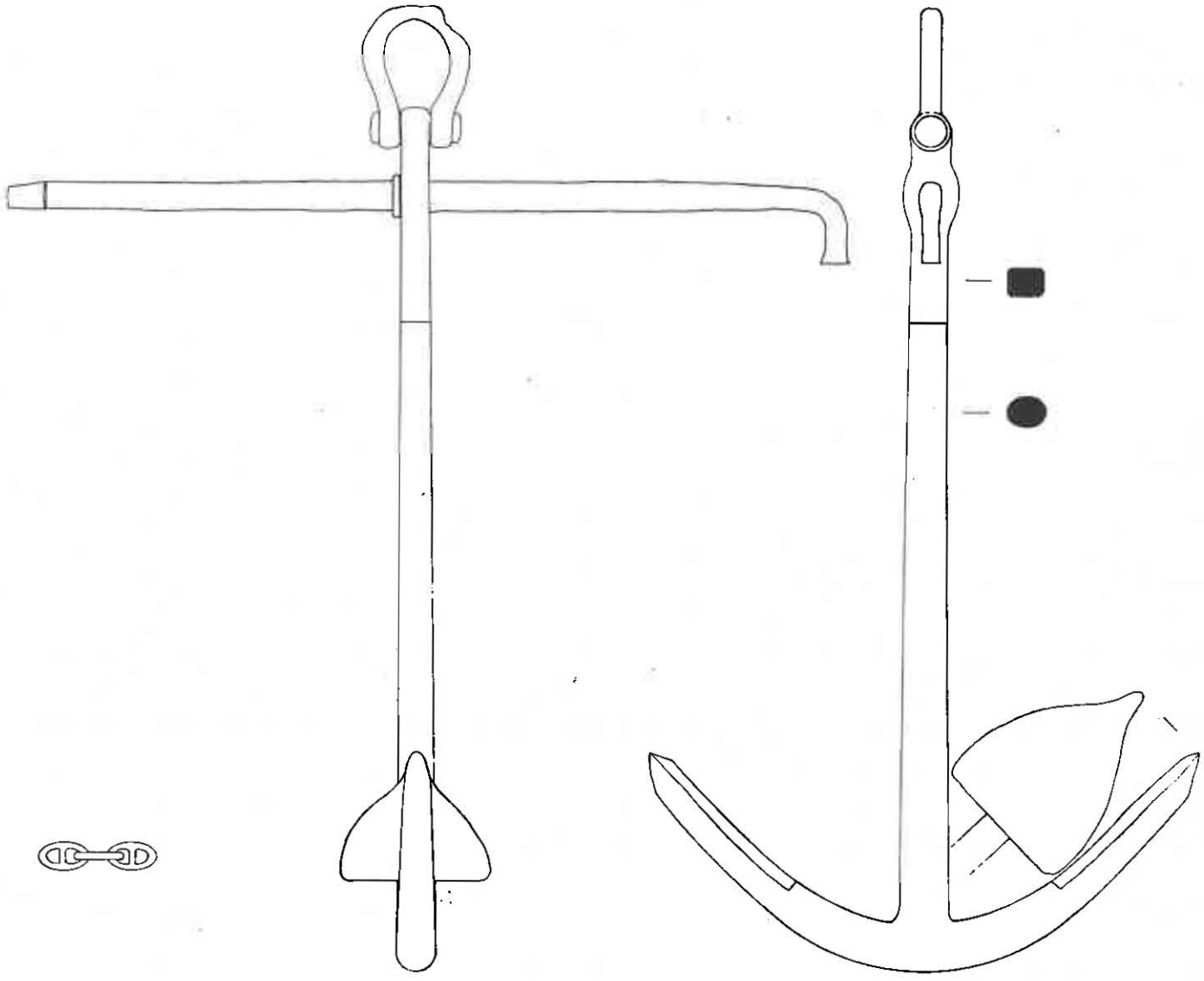


Figure 32. Iron anchor at the residence of Borry Evans

CANNON

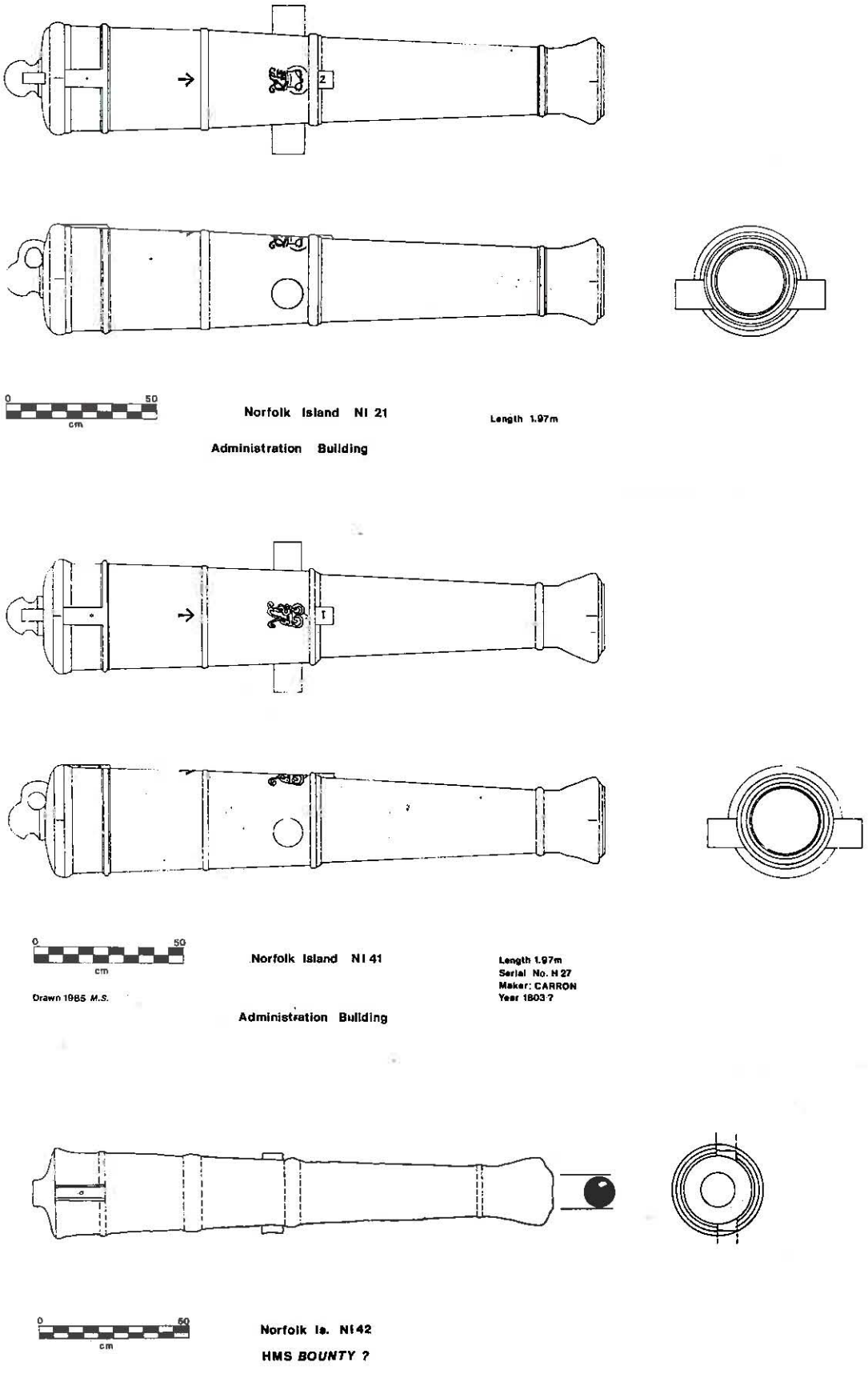


Figure 33. Iron cannon from the administration building and the pier store museum.

COPPER ALLOY FASTENINGS- COOP COLLECTION

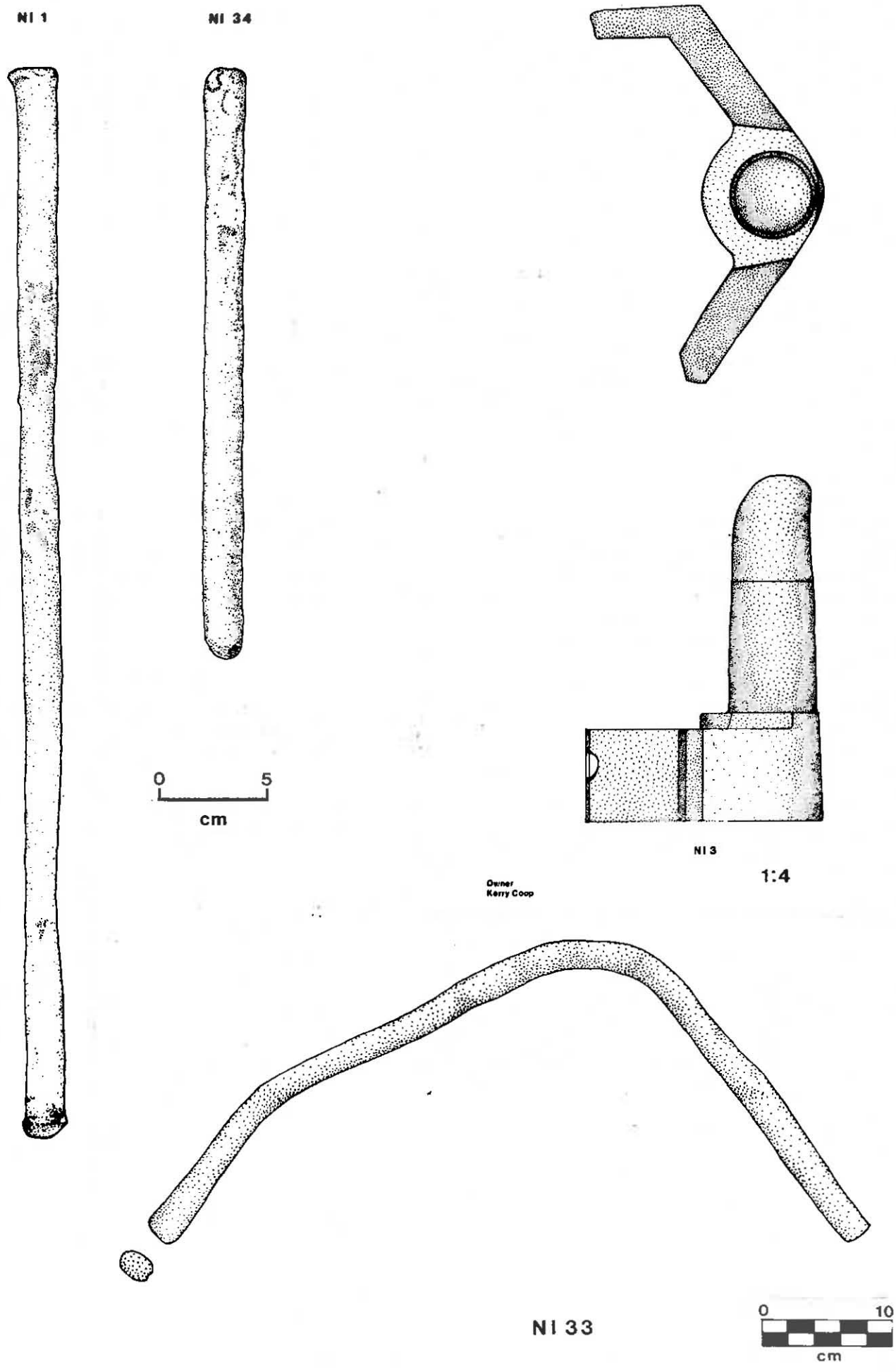


Figure 34. Miscellaneous non-ferrous items.

COPPER ALLOY ARTEFACTS – NORFOLK IS. MUSEUM

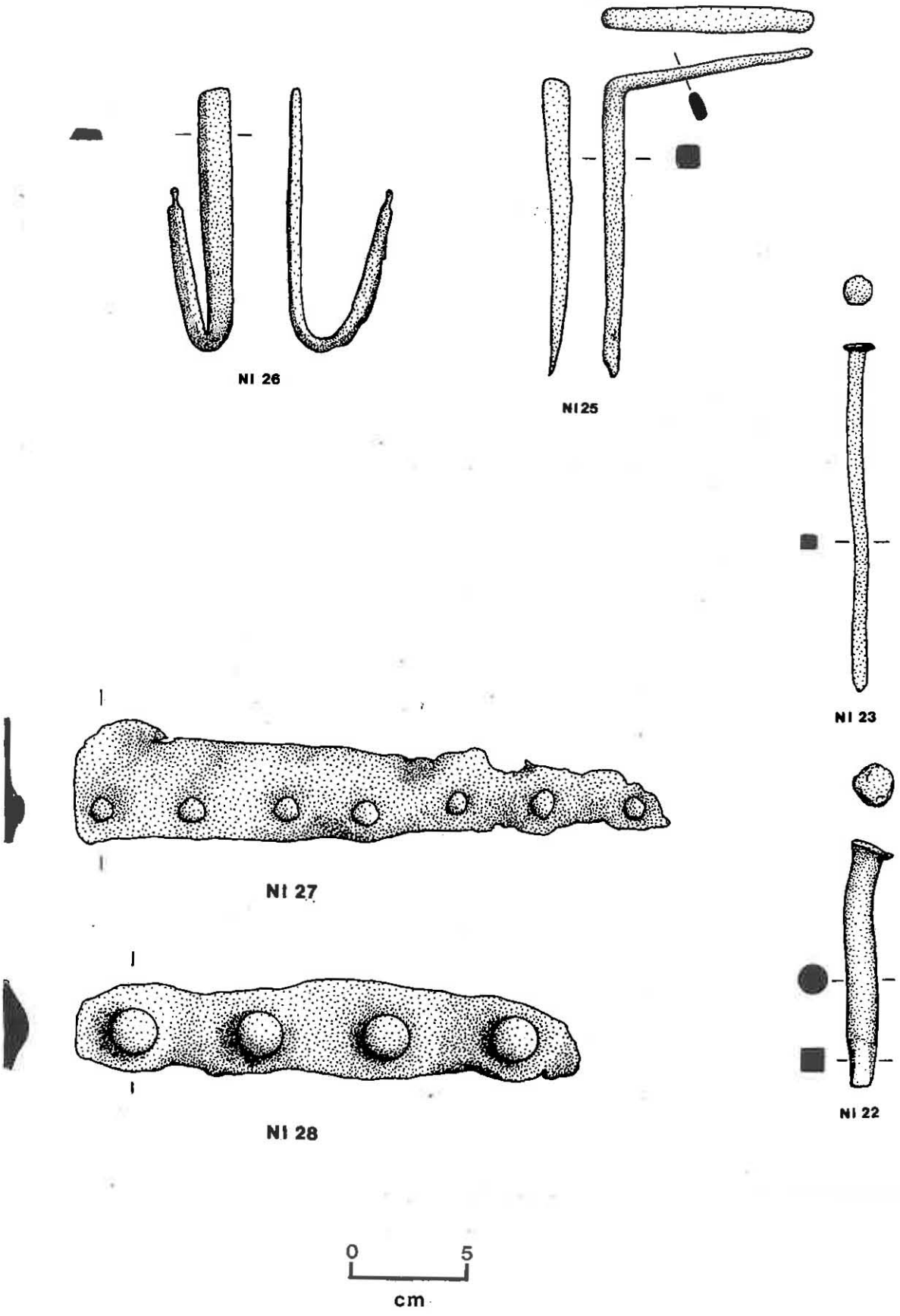


Figure 35. Miscellaneous non-ferrous items.

COPPER ALLOY OBJECTS-BOUNTY and NORFOLK IS. MUSEUMS

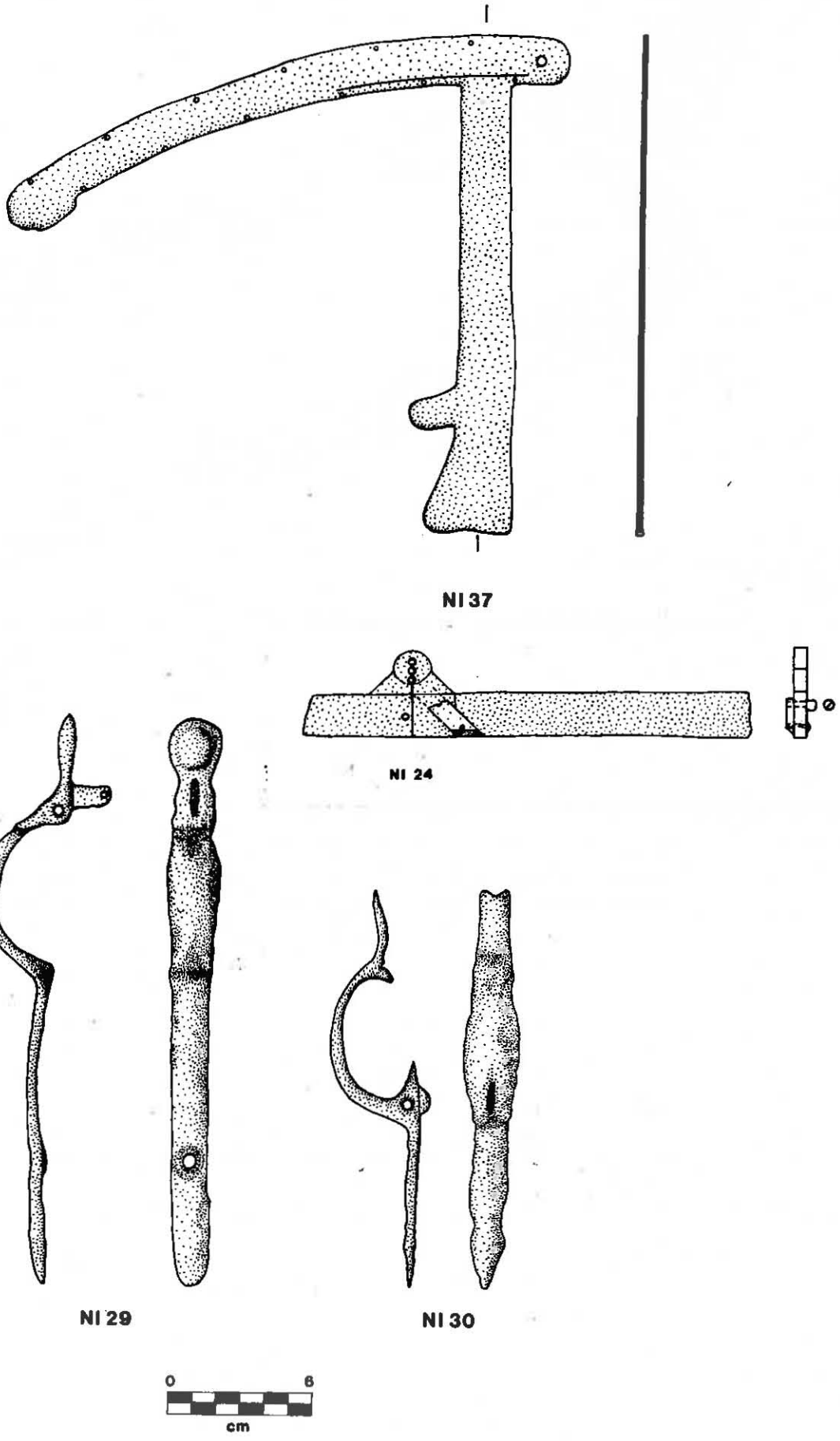


Figure 36. Miscellaneous non-ferrous items.

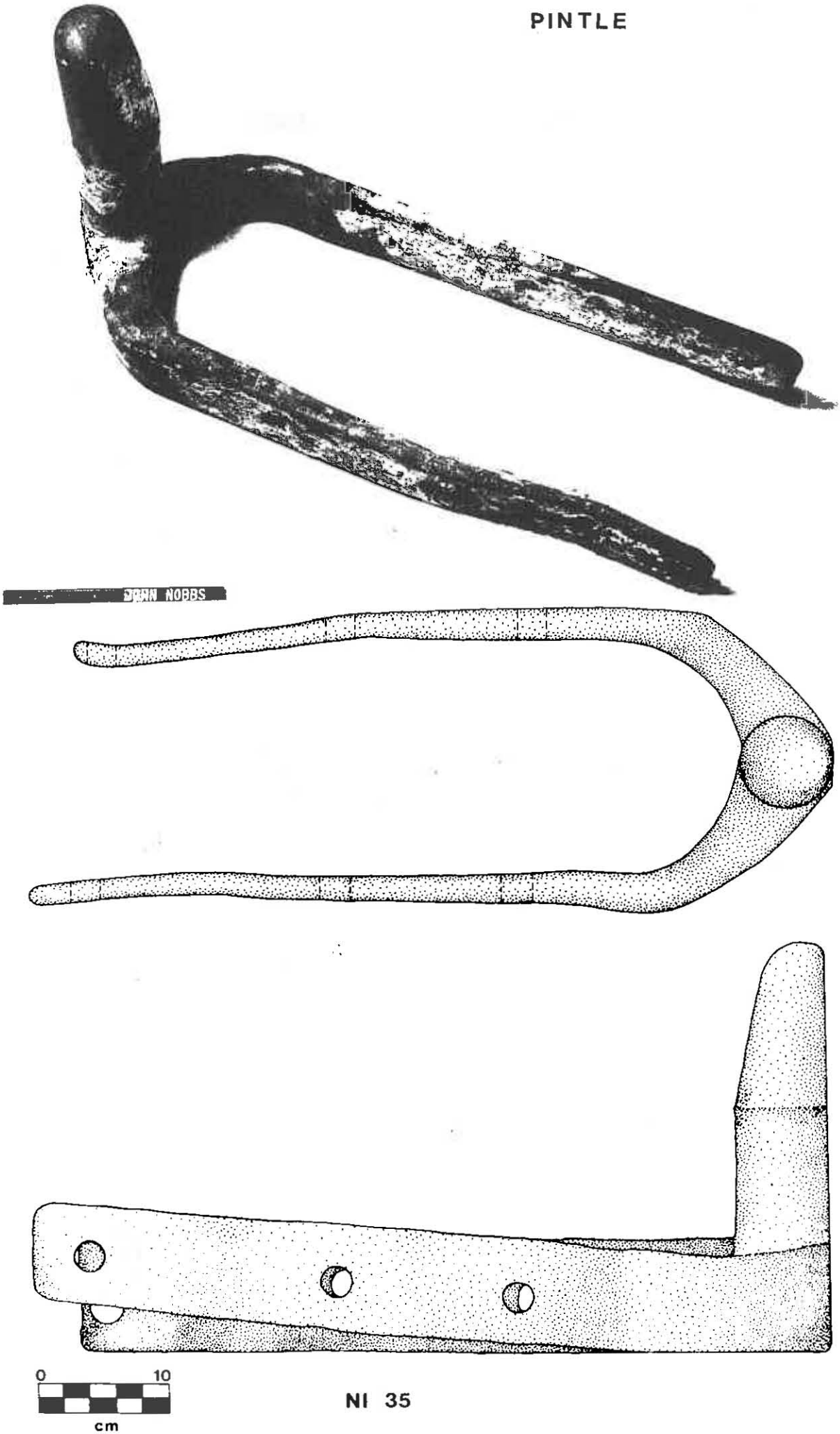


Figure 37. Pintle from John Nobbs' residence

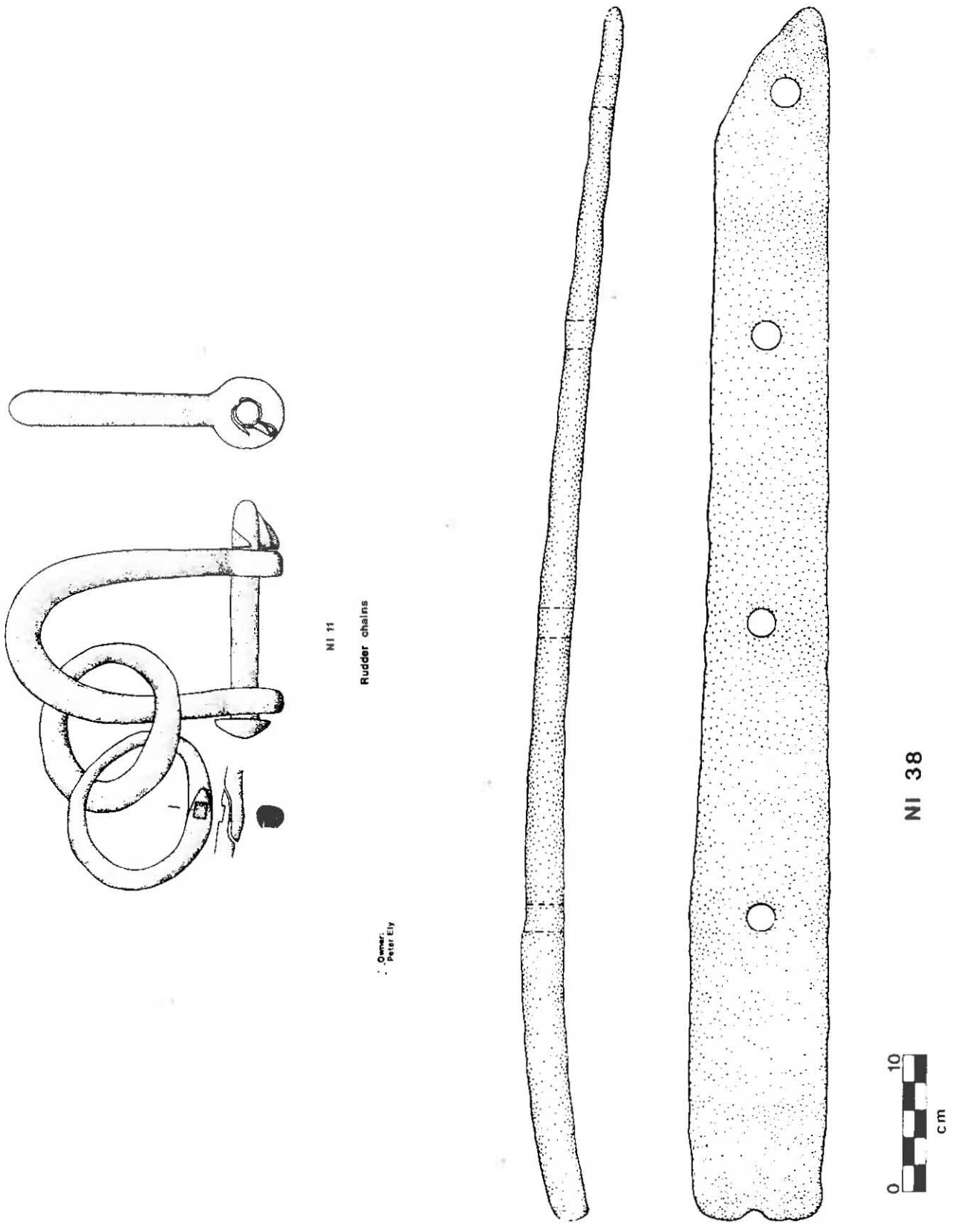


Figure 38. Rudder fittings.

SPECTACLE PLATE

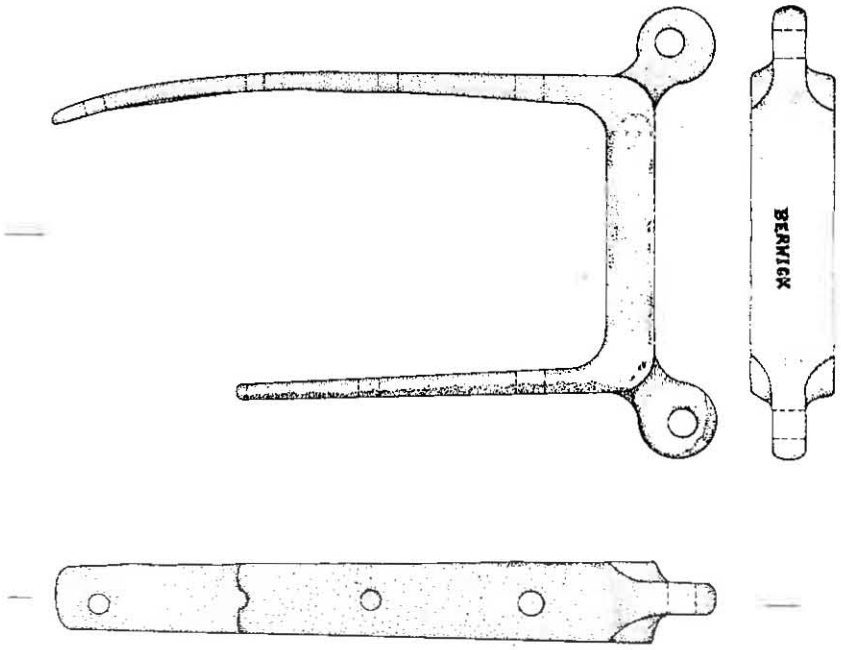
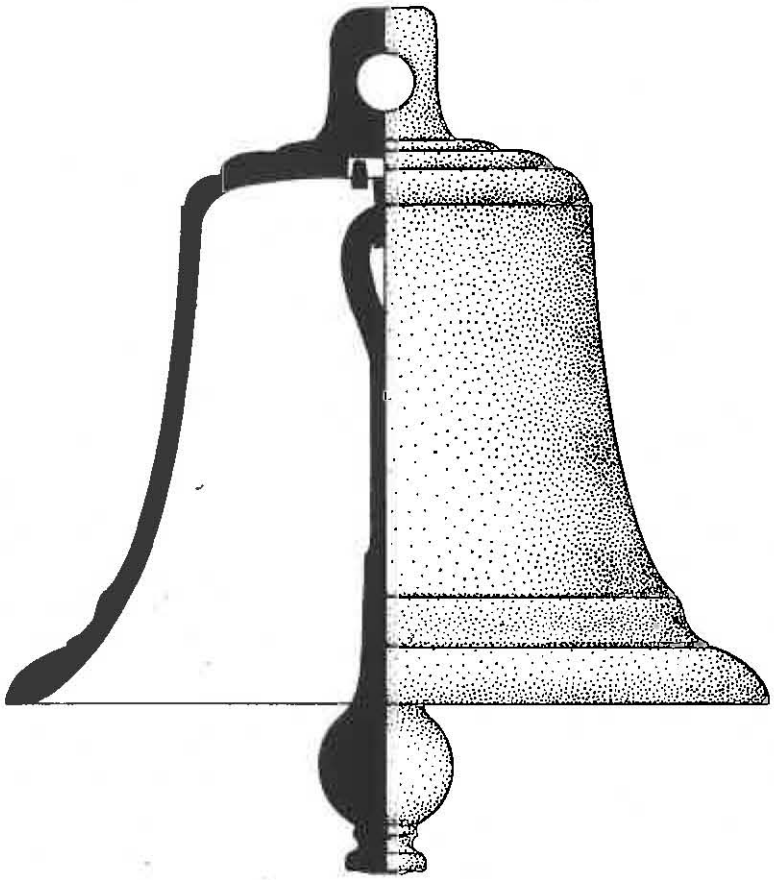


Figure 39. Spectacle plate from Sirius

SHIP'S BELL



NI 31

Owner:
B. Burrell

1:2

Figure 40. Ship's bell from residence of B. Burrell.

Appendix 5 SIRIUS ARTEFACT CATALOGUE 1985 Myra Stanbury

DATE 07/31/85 PAGE 1

1)	REG.NO	1
2)	DATE	02/19/85
3)	NO.	1
4)	DESCRIPTION	FRAGMENT OLIVE GREEN CASE BOTTLE
5)	CODE	44
6)	LOCATION	INSIDE REEF-EAST SITE,NEAR BALLAST STONES
7)	NOTES	CO-ORDINATES TAKEN FROM TBM 2
8)	STORAGE	H2O
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	1

1)	REG.NO	2
2)	DATE	02/19/85
3)	NO.	1
4)	DESCRIPTION	FRAGMENT OLIVE GREEN CASE BOTTLE
5)	CODE	44
6)	LOCATION	INSIDE REEF-EAST SITE,NEAR BALLAST STONES
7)	NOTES	AIR BUBBLES IN GLASS
8)	STORAGE	DRY. ROBERT VARNAM.
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	2

1)	REG.NO	3
2)	DATE	02/21/85
3)	NO.	1
4)	DESCRIPTION	MUSKET BALL DIAM 16.5 mm
5)	CODE	34
6)	LOCATION	INSIDE REEF-GULLY BETWEEN REEFS
7)	NOTES	
8)	STORAGE	DRY
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	3

1)	REG.NO	4
2)	DATE	02/21/85
3)	NO.	14
4)	DESCRIPTION	CASE BOTTLE FRAGMENTS AND 1 PLAIN GLASS FRAGMENT
5)	CODE	44
6)	LOCATION	INSIDE REEF-GULLY BETWEEN REEFS
7)	NOTES	
8)	STORAGE	WET
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	4

1)	REG.NO	5
2)	DATE	02/23/85
3)	NO.	1
4)	DESCRIPTION	COPPER BOLT WITH RT. ANGLE BEND
5)	CODE	32
6)	LOCATION	WEST SITE - A1,050/5.6 m
7)	NOTES	
8)	STORAGE	DRY ROBERT VARNAM

SIRIUS ARTEFACT CATALOGUE 1985

DATE 07/31/85 PAGE 2

9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	5
1)	REG.NO	6
2)	DATE	02/23/85
3)	NO.	1
4)	DESCRIPTION	COPPER BOLT WITH BRASS NUT AND WASHER. BENT.
5)	CODE	32
6)	LOCATION	WEST SITE - A1,050/5.6 m
7)	NOTES	
8)	STORAGE	DRY. ROBERT VARNAM.
9)	PHOTO	
0)	DRAWN	
11)	Rec. No.	6
1)	REG.NO	7
2)	DATE	02/23/85
3)	NO.	1
4)	DESCRIPTION	BRASS BOLT WITH THREAD AND NUT.
5)	CODE	32
6)	LOCATION	WEST SITE - A4 050/19.4 m
7)	NOTES	
8)	STORAGE	DRY. ROBERT VARNAM.
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	7
1)	REG.NO	8
2)	DATE	02/23/85
3)	NO.	0
4)	DESCRIPTION	BRASS SHEETING
5)	CODE	32
6)	LOCATION	WEST SITE - A1 050/5.6 m
7)	NOTES	
8)	STORAGE	DRY.ROBERT VARNAM.
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	8
1)	REG.NO	9
2)	DATE	02/23/85
3)	NO.	1
4)	DESCRIPTION	IRON DECK SUPPORT.
5)	CODE	82
6)	LOCATION	WEST SITE- A4,050/19.4 m
7)	NOTES	
8)	STORAGE	CAUSTIC - NORFOLK PWD
9)	PHOTO	MA 2560 A
10)	DRAWN	NO
11)	Rec. No.	9
1)	REG.NO	10
2)	DATE	02/23/85
3)	NO.	1
4)	DESCRIPTION	IRON DECK SUPPORT

SIRIUS ARTEFACT CATALOGUE 1985

DATE 07/31/85 PAGE 3

5)	CODE	82
6)	LOCATION	WEST SITE -A5,030/23.3 m
7)	NOTES	
8)	STORAGE	RETURNED TO SITE
9)	PHOTO	MA 2560 A
10)	DRAWN	NO
11)	Rec. No.	10
1)	REG.NO	11
2)	DATE	02/23/85
3)	NO.	0
4)	DESCRIPTION	BRASS SHEETING 0.7 MM THICK
5)	CODE	32
6)	LOCATION	WEST SITE - A2,010/13.0 m
7)	NOTES	
8)	STORAGE	DRY. ROBERT VARNAM
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	11
1)	REG.NO	12
2)	DATE	02/23/85
3)	NO.	1
4)	DESCRIPTION	COPPER BOLT. L.365 mm; D. 17 mm.
5)	CODE	32
6)	LOCATION	WEST SITE - A3,040/12.80 m
7)	NOTES	
8)	STORAGE	DRY. ROBERT VARNAM.
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	12
1)	REG.NO	13
2)	DATE	02/23/85
3)	NO.	1
4)	DESCRIPTION	COPPER BOLT L.155 mm; D.18 mm
5)	CODE	32
6)	LOCATION	WEST SITE - A1,050/4.00 m
7)	NOTES	
8)	STORAGE	DRY. ROBERT VARNAM.
9)	PHOTO	MA2591
10)	DRAWN	
11)	Rec. No.	13
1)	REG.NO	14
2)	DATE	02/23/85
3)	NO.	2
4)	DESCRIPTION	PIECES OF BRASS SHEETING 0.6 mm THICK
5)	CODE	32
6)	LOCATION	WEST SITE - A1,050/5.6 m
7)	NOTES	
8)	STORAGE	DRY. ROBERT VARNAM.
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	14

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1)	REG.NO	15
2)	DATE	02/23/85
3)	NO.	1
4)	DESCRIPTION	BRASS BOLT L.298 mm; D.19 mm
5)	CODE	32
6)	LOCATION	WEST SITE - A2,040/9.2 m
7)	NOTES	STRESS CORROSION,CRACKING+POOR CASTING,H2O EROSIO
8)	STORAGE	DRY. ROBERT VARNAM.
9)	PHOTO	MA2591
10)	DRAWN	YES
11)	Rec. No.	15

1)	REG.NO	16
2)	DATE	02/23/85
3)	NO.	1
4)	DESCRIPTION	PINKISH CLAY BRICK WITH FROGS L. W. D.
5)	CODE	25
6)	LOCATION	WEST SITE- A, DATUM AREA
7)	NOTES	PARTIALLY DE-SALINATED
8)	STORAGE	DRY. ROBERT VARNAM.
9)	PHOTO	MA 2562B
10)	DRAWN	NO
11)	Rec. No.	16

1)	REG.NO	17
2)	DATE	02/23/85
3)	NO.	1
4)	DESCRIPTION	IRON BOLT L.405 mm; D. 29.3 - 20 mm
5)	CODE	82
6)	LOCATION	WEST SITE
7)	NOTES	DECONCRETED
8)	STORAGE	CAUSTIC. NORFOLK PWD.
9)	PHOTO	MA2591
10)	DRAWN	YES
11)	Rec. No.	17

1)	REG.NO	18
2)	DATE	02/23/85
3)	NO.	1
4)	DESCRIPTION	IRON STRAP (PLATE) L. 510 mm; W. 89 mm; D. 11.5 mm
5)	CODE	82
6)	LOCATION	WEST SITE - A5,045/11.8 m
7)	NOTES	DECONCRETED
8)	STORAGE	CAUSTIC. NORFOLK PWD.
9)	PHOTO	MA2591
10)	DRAWN	YES
11)	Rec. No.	18

1)	REG.NO	19
2)	DATE	02/23/85
3)	NO.	1
4)	DESCRIPTION	WROUGHT IRON BOLT WITH BROKEN HEAD.L.340 mm;D.22.5
5)	CODE	82
6)	LOCATION	WEST SITE - A2,040/9.2 m
7)	NOTES	DECONCRETED
8)	STORAGE	CAUSTIC. NORFOLK PWD.

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9)	PHOTO	MA2591
10)	DRAWN	YES
11)	Rec. No.	19
1)	REG.NO	20
2)	DATE	02/23/85
3)	NO.	1
4)	DESCRIPTION	WROUGHT IRON BOLT L. 204 mm; D. 15 mm
5)	CODE	82
6)	LOCATION	WEST SITE - A2,040/9.2 m
7)	NOTES	DECONCRETED
8)	STORAGE	CAUSTIC. NORFOLK PWD.
9)	PHOTO	
10)	DRAWN	YES
11)	Rec. No.	20
1)	REG.NO	21
2)	DATE	02/24/85
3)	NO.	1
4)	DESCRIPTION	CLAY BRICK L. 230 mm; W. 113 mm; D. 77.5 mm
5)	CODE	25
6)	LOCATION	WEST SITE - A, CLOSE TO DATUM POINT
7)	NOTES	FROG ON ONE SIDE. CIRCULAR CASTING MARKS ON OTHER.
8)	STORAGE	DRY. ROBERT VARNAM.
9)	PHOTO	MA 2562B
10)	DRAWN	NO
11)	Rec. No.	21
1)	REG.NO	22
2)	DATE	02/24/85
3)	NO.	1
4)	DESCRIPTION	CLAY BRICK.L.230 mm;W 113 mm;D.77.5 mm
5)	CODE	25
6)	LOCATION	WEST SITE - A8,200/50 m
7)	NOTES	MAKER'S MARK: 'HICKMAN'
8)	STORAGE	DRY. ROBERT VARNAM.
9)	PHOTO	MA 2562B
10)	DRAWN	NO
11)	Rec. No.	22
1)	REG.NO	23
2)	DATE	02/24/85
3)	NO.	1
4)	DESCRIPTION	CLAY BRICK L. 230 mm;W.111 mm; D. 75.5 mm
5)	CODE	25
6)	LOCATION	WEST SITE - A8,200/50 m. Same area as SI25 & SI27
7)	NOTES	FROG ON EACH SIDE. CIRCULAR MOULD MARKS IN FROG.
8)	STORAGE	DRY. ROBERT VARNAM.
9)	PHOTO	MA 2562B
10)	DRAWN	NO
11)	Rec. No.	23
1)	REG.NO	24
2)	DATE	02/24/85
3)	NO.	1
4)	DESCRIPTION	IRON SHACKLE WITH EYEBOLT

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5)	CODE	82
6)	LOCATION	WEST SITE - A10,211/49.2 m
7)	NOTES	
8)	STORAGE	CAUSTIC. NORFOLK PWD.
9)	PHOTO	MA 2562A,2590
10)	DRAWN	YES
11)	Rec. No.	24
1)	REG.NO	25
2)	DATE	02/24/85
3)	NO.	1
4)	DESCRIPTION	IRON MAST HOOP
5)	CODE	82
6)	LOCATION	WEST SITE - A9,210/57 m
7)	NOTES	
8)	STORAGE	CAUSTIC. NORFOLK PWD.
9)	PHOTO	MA 2561,2575,2591
10)	DRAWN	YES
11)	Rec. No.	25
1)	REG.NO	26
2)	DATE	02/24/85
3)	NO.	1
4)	DESCRIPTION	BRASS BOLT WITH REMAINS OF WOOD L.450 mm;D. 20 mm
5)	CODE	32
6)	LOCATION	WEST SITE- A11,180/11 m
7)	NOTES	WOOD FOR ANALYSIS.NECKING OF BAR-DEZINCIFICATION
8)	STORAGE	DRY.ROBERT VARNAM.
9)	PHOTO	MA2591
10)	DRAWN	
11)	Rec. No.	26
1)	REG.NO	27
2)	DATE	02/24/85
3)	NO.	1
4)	DESCRIPTION	IRON BOLT L.377 mm; D 31 mm
5)	CODE	82
6)	LOCATION	WEST SITE - A9,210/57 m
7)	NOTES	DECONCRETED.
8)	STORAGE	CAUSTIC NORFOLK PWD
9)	PHOTO	MA2591
10)	DRAWN	YES
11)	Rec. No.	27
1)	REG.NO	28
2)	DATE	02/24/85
3)	NO.	1
4)	DESCRIPTION	WHALEBONE - ? RIB
5)	CODE	41
6)	LOCATION	WEST SITE - A7,180/19.5 m
7)	NOTES	
8)	STORAGE	DRY. ROBERT VARNAM
9)	PHOTO	2562A
10)	DRAWN	NO
11)	Rec. No.	28

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1)	REG.NO	29
2)	DATE	02/24/85
3)	NO.	1
4)	DESCRIPTION	IRON DECK SUPPORT
5)	CODE	82
6)	LOCATION	WEST SITE - A(?),250/0.29 m
7)	NOTES	DECONCRETED 0.46x0.45x0.60x0.03 m
8)	STORAGE	CAUSTIC. NORFOLK PWD
9)	PHOTO	MA2590
10)	DRAWN	YES
11)	Rec. No.	29

1)	REG.NO	30
2)	DATE	02/25/85
3)	NO.	0
4)	DESCRIPTION	BRASS SHEETING 0.7 mm THICK
5)	CODE	32
6)	LOCATION	WEST SITE - B2,050/6.10 m
7)	NOTES	CLEANED IN CITRIC
8)	STORAGE	DRY ROBERT VARNAM
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	30

1)	REG.NO	31
2)	DATE	02/25/85
3)	NO.	0
4)	DESCRIPTION	BRASS SHEETING 0.7 mm THICK
5)	CODE	32
6)	LOCATION	WEST SITE - B1,040/8.10 m
7)	NOTES	CLEANED IN CITRIC
8)	STORAGE	DRY. ROBERT VARNAM
9)	PHOTO	
10)	DRAWN	NO
11)	Rec. No.	31

1)	REG.NO	32
2)	DATE	02/25/85
3)	NO.	1
4)	DESCRIPTION	BRASS BOLT L. 140 mm;D 20 mm; HD 34 mm.
5)	CODE	32
6)	LOCATION	WEST SITE - B3,090/2.00 m
7)	NOTES	CLEANED IN CITRIC
8)	STORAGE	DRY. ROBERT VARNAM
9)	PHOTO	MA2591
10)	DRAWN	YES
11)	Rec. No.	32

1)	REG.NO	32
2)	DATE	02/24/85
3)	NO.	1
4)	DESCRIPTION	BRASS BOLT WITH WOOD.L.370 mm;D.21 mm
5)	CODE	32
6)	LOCATION	WEST SITE - B3,090/2.00 m
7)	NOTES	CLEANED IN CITRIC
8)	STORAGE	DRY. ROBERT VARNAM

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9)	PHOTO	MA 2561,2591
10)	DRAWN	YES
11)	Rec. No.	33
1)	REG.NO	32
2)	DATE	02/25/85
3)	NO.	1
4)	DESCRIPTION	COPPER BOLT L.235 mm; D.20 mm
5)	CODE	32
6)	LOCATION	WEST SITE - B3,090/2.00 m
7)	NOTES	CLEANED IN CITRIC
8)	STORAGE	DRY.ROBERT VARNAM
9)	PHOTO	MA2591
0)	DRAWN	NO
1)	Rec. No.	34
1)	REG.NO	33
2)	DATE	02/25/85
3)	NO.	1
4)	DESCRIPTION	BRASS BOLT L. 350 mm; D. 18 mm
5)	CODE	32
6)	LOCATION	WEST SITE - B5,120/5.10 m
7)	NOTES	CLEANED IN CITRIC
8)	STORAGE	DRY. ROBERT VARNAM
9)	PHOTO	MA2591
10)	DRAWN	YES
11)	Rec. No.	35
1	REG.NO	35
2)	DATE	02/23/85
3)	NO.	0
4)	DESCRIPTION	BRASS SHEETING
5)	CODE	32
6)	LOCATION	WEST SITE - NEAR B9
7)	NOTES	CLEANED IN CITRIC
8)	STORAGE	DRY. ROBERT VARNAM
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	36
1)	REG.NO	36
2)	DATE	02/25/85
3)	NO.	1
4)	DESCRIPTION	BRASS SHEATHING TACK
5)	CODE	32
6)	LOCATION	WEST SITE - B1,040/9.2 m
7)	NOTES	CLEANED IN CITRIC
8)	STORAGE	DRY. ROBERT VARNAM
9)	PHOTO	MA2590
10)	DRAWN	YES
11)	Rec. No.	37
1)	REG.NO	37
2)	DATE	03/02/85
3)	NO.	1
4)	DESCRIPTION	IRON BALLAST 955 X 145 X 125 mm

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5)	CODE	84
6)	LOCATION	SLAUGHTER BAY LAGOON
7)	NOTES	DECONCRETED
8)	STORAGE	CAUSTIC NORFOLK PWD
9)	PHOTO	MA 2567,2568A
10)	DRAWN	NO
11)	Rec. No.	38
1)	REG.NO	38
2)	DATE	03/02/85
3)	NO.	1
4)	DESCRIPTION	WHALEBONE - RIB ?
5)	CODE	41
6)	LOCATION	WEST SITE (?).FINDER PETER ELY
7)	NOTES	
8)	STORAGE	DRY. ROBERT VARNAM
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	39
1)	REG.NO	39
2)	DATE	03/02/85
3)	NO.	1
4)	DESCRIPTION	WHALEBONE - SMALL PIECE
5)	CODE	41
6)	LOCATION	WEST SITE (?).FINDER PETER ELY
7)	NOTES	
8)	STORAGE	DRY.ROBERT VARNAM
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	40
1)	REG.NO	40
2)	DATE	03/02/85
3)	NO.	1
4)	DESCRIPTION	WHITE CHINA SHERD FROM CUP
5)	CODE	28
6)	LOCATION	SLAUGHTER BAY LAGOON,045/4 m from 0 m on 40 m lin
7)	NOTES	PARTIALLY DESALINATED
8)	STORAGE	DRY. ROBERT VARNAM
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	41
1)	REG.NO	41
2)	DATE	03/02/85
3)	NO.	1
4)	DESCRIPTION	UNIDENTIFIED WROUGHT IRON FITTING
5)	CODE	82
6)	LOCATION	SLAUGHTER BAY LAGOON,045/4 m from 0 m on 40 m lin
7)	NOTES	DECONCRETED
8)	STORAGE	CAUSTIC. NORFOLK PWD
9)	PHOTO	MA 2568A,2590
10)	DRAWN	YES
11)	Rec. No.	42

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1)	REG.NO	42
2)	DATE	03/02/85
3)	NO.	1
4)	DESCRIPTION	BLACK SUBSTANCE - UNIDENTIFIED
5)	CODE	17
6)	LOCATION	SLAUGHTER BAY LAGOON
7)	NOTES	HARD SUBSTANCE, T-SHAPED PROFILE
8)	STORAGE	DRY. ROBERT VARNAM
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	43

1)	REG.NO	43
2)	DATE	03/03/85
3)	NO.	1
4)	DESCRIPTION	BRONZE (OR BRASS) BOLT.L.255 mm;D.20 mm.
5)	CODE	31
6)	LOCATION	STRANDING SITE (Outside reef)
7)	NOTES	CLEANED IN CITRIC. POSS.RUDDER FASTENING.
8)	STORAGE	DRY. ROBERT VARNAM
9)	PHOTO	MA2590
10)	DRAWN	YES
11)	Rec. No.	44

1)	REG.NO	44
2)	DATE	03/03/85
3)	NO.	1
4)	DESCRIPTION	BRASS HOOKED OBJECT - KEEL STAPLE ?
5)	CODE	32
6)	LOCATION	STRANDING SITE (Outside reef)
7)	NOTES	CLEANED IN CITRIC
8)	STORAGE	DRY. ROBERT VARNAM
9)	PHOTO	MA2590
10)	DRAWN	YES
11)	Rec. No.	45

1)	REG.NO	45
2)	DATE	03/03/85
3)	NO.	44
4)	DESCRIPTION	BRASS SHEATHING NAILS AND FRAGMENTS
5)	CODE	32
6)	LOCATION	STRANDING SITE (Outside reef),240/3.0 m
7)	NOTES	CLEANED IN CITRIC
8)	STORAGE	DRY. ROBERT VARNAM
9)	PHOTO	MA2590
10)	DRAWN	YES
11)	Rec. No.	46

1)	REG.NO	46
2)	DATE	03/03/85
3)	NO.	1
4)	DESCRIPTION	BRONZE RING - PART OF COAKE?
5)	CODE	31
6)	LOCATION	STRANDING SITE (Outside reef),240/3.0 m
7)	NOTES	CLEANED IN CITRIC
8)	STORAGE	DRY. ROBERT VARNAM

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9)	PHOTO	MA2590
10)	DRAWN	YES
11)	Rec. No.	47
1)	REG.NO	47
2)	DATE	03/03/85
3)	NO.	1
4)	DESCRIPTION	PART OF BRASS KEEL STAPLE ?
5)	CODE	32
6)	LOCATION	STRANDING SITE (Outside reef),240/3.0 m
7)	NOTES	CLEANED IN CITRIC
8)	STORAGE	DRY. ROBERT VARNAM
9)	PHOTO	MA2590
10)	DRAWN	YES
11)	Rec. No.	48
1)	REG.NO	48
2)	DATE	03/03/85
3)	NO.	0
4)	DESCRIPTION	LEAD SHEATHING FRAGMENTS
5)	CODE	34
6)	LOCATION	STRANDING SITE (Outside reef).240/11.9 m
7)	NOTES	
8)	STORAGE	DRY. ROBERT VARNAM
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	49
1)	REG.NO	49
2)	DATE	03/03/85
3)	NO.	1
4)	DESCRIPTION	FLINTSTONE ?
5)	CODE	15
6)	LOCATION	STRANDING SITE (Outside reef),240/3.0 m
7)	NOTES	
8)	STORAGE	DRY. ROBERT VARNAM
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	50
1)	REG.NO	50
2)	DATE	03/03/85
3)	NO.	1
4)	DESCRIPTION	UNIDENTIFIED IRON TOOL
5)	CODE	83
6)	LOCATION	STRANDINGSITE (Outside reef),240/3,0 m
7)	NOTES	
8)	STORAGE	CAUSTIC. NORFOLK PWD
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	51
1)	REG.NO	51
2)	DATE	03/03/85
3)	NO.	1
4)	DESCRIPTION	UNIDENTIFIED PIECE OF IRON

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5)	CODE	80
6)	LOCATION	STRANDING SITE (Outside reef),240/3.0 m
7)	NOTES	
8)	STORAGE	CAUSTIC NORFOLK PWD
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	52
1)	REG.NO	52
2)	DATE	03/03/85
3)	NO.	1
4)	DESCRIPTION	BRONZE FRAGMENT
5)	CODE	31
6)	LOCATION	STRANDING SITE (Outside reef),OUT FROM SIGNAL STN
7)	NOTES	FOR ANALYSIS
8)	STORAGE	DRY. ROBERT VARNAM
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	53
1)	REG.NO	53
2)	DATE	03/04/85
3)	NO.	1
4)	DESCRIPTION	CHERT/THAMES GRAVEL ?
5)	CODE	17
6)	LOCATION	STRANDING SITE (Outside reef),beside carronade
7)	NOTES	
8)	STORAGE	DRY. ROBERT VARNAM
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	54
1)	REG.NO	54
2)	DATE	03/04/85
3)	NO.	1
4)	DESCRIPTION	COPPER BOLT L.275 mm; D.17 mm
5)	CODE	32
6)	LOCATION	WEST SITE (?)
7)	NOTES	CLEANED WITH CITRIC
8)	STORAGE	DRY. ROBERT VARNAM
9)	PHOTO	MA 2590
10)	DRAWN	YES
11)	Rec. No.	55
1)	REG.NO	55
2)	DATE	03/08/85
3)	NO.	2
4)	DESCRIPTION	ROCK SAMPLES
5)	CODE	17
6)	LOCATION	WEST SITE
7)	NOTES	1 SAMPLE TO WA FOR ANALYSIS
8)	STORAGE	DRY. ROBERT VARNAM
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	56

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1)	REG.NO	56
2)	DATE	03/08/85
3)	NO.	2
4)	DESCRIPTION	ROCK SAMPLES
5)	CODE	17
6)	LOCATION	INSIDE REEF - EAST SITE, BALLAST MOUND (?)
7)	NOTES	NATURAL CALCARENITE AND BASALT - PERS. COMM.R.V.
8)	STORAGE	1 TO WA FOR ANALYSIS ROBERT VARNAM
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	57

1)	REG.NO	57
2)	DATE	03/06/85
3)	NO.	1
4)	DESCRIPTION	IRON ANCHOR
5)	CODE	82
6)	LOCATION	STRANDING SITE (Outside reef)
7)	NOTES	
8)	STORAGE	WEST OF PIER TIL PWD TANK READY. ANODE ATTACHED
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	58

1)	REG.NO	58
2)	DATE	03/12/85
3)	NO.	1
4)	DESCRIPTION	IRON CARRONADE
5)	CODE	81
6)	LOCATION	STRANDING SITE (Outside reef)
7)	NOTES	
8)	STORAGE	CAUSTIC PWD NORFOLK IS.
9)	PHOTO	
10)	DRAWN	
11)	Rec. No.	59

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<REG.NO> 1
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> BRASS BOLT L. 505 MM; D.19 MM
<CODE> 32
<LOCATION> WEST OF PIER
<NOTES> MARK OF CLINCH RING AT ONE END
<STORAGE> OWNER KERRY COOP
<PHOTO>
<DRAWN> YES

<REG.NO> 2
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> BRONZE SPECTACLE PLATE MARKED 'BERWICK'
<CODE> 31
<LOCATION> WEST OF PIER (GULLEY 0)
<NOTES> ORIGIN - SIRIUS (FORMERLY BERWICK)
<STORAGE> OWNER KERRY COOP
<PHOTO> MA 2559,2562A,2562B
<DRAWN> YES

<REG.NO> 3
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> BRONZE PINTLE - ARMS BROKEN
<CODE> 31
<LOCATION> WEST OF PIER (1982)
<NOTES> ARMS APPEAR CAST AROUND PIN.SAMPLES FOR ANALYSIS
<STORAGE> OWNER KERRY COOP
<PHOTO> MA 2354,2362
<DRAWN> YES

<REG.NO> 4
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> BRONZE PLATE WITH HOLE -UNIDENTIFIED FUNCTION
<CODE> 31
<LOCATION> OUTER EDGE OF SURF ZONE
<NOTES>
<STORAGE> OWNER IAN KENNY
<PHOTO> MA 2350A,2362
<DRAWN> YES

<REG.NO> 5
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> COPPER FASTENING BOLT L.115 MM; D. 20 MM
<CODE> 32
<LOCATION> OUTER EDGE OF SURF ZONE
<NOTES> WORN FRAG. PROBABLY FROM BELOW WATER LINE
<STORAGE> OWNER IAN KENNY
<PHOTO> MA 2350A,2362
<DRAWN> YES

<REG.NO> 6
<DATE> 03/01/85
<NO.> 24
<DESCRIPTION> COPPER SHEATHING TACKS L.35 MM FLAT HEADS D.10 MM
<CODE> 32
<LOCATION> OUTER EDGE OF SURF ZONE
<NOTES>
<STORAGE> OWNER IAN KENNY
<PHOTO> MA 2350A,2362
<DRAWN> YES

<REG.NO> 7
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> COPPER SHEET WITH RIVETS
<CODE> 32
<LOCATION> OUTER EDGE OF SURF ZONE
<NOTES> SIMILAR TO CU CAULDRONS FROM 'PANDORA' & 'BOUNTY'
<STORAGE> OWNER IAN KENNY
<PHOTO> MA 2350B,2362
<DRAWN> YES

<REG.NO> 8
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> PART OF BRONZE PINTLE PIN L.165 MM;MAX D. 72 MM
<CODE> 31
<LOCATION> OUTER EDGE OF SURF ZONE
<NOTES>
<STORAGE> OWNER IAN KENNY
<PHOTO> MA 2350B,2362
<DRAWN> YES

<REG.NO> 9
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> PART OF BRONZE PINTLE L.166 MM;MAX D.70 MM
<CODE> 31
<LOCATION> OUTER EDGE OF SURF ZONE
<NOTES>
<STORAGE> OWNER IAN KENNY
<PHOTO> MA 2350B,2362
<DRAWN> YES

<REG.NO> 10
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> COPPER FASTENING BOLT L.580 MM;D.27 MM
<CODE> 32
<LOCATION> OUTER EDGE OF SURF ZONE
<NOTES> ONE END HAMMERED TO HOLD WASHER (OR CLINCH RING)
<STORAGE> OWNER IAN KENNY
<PHOTO> MA 2350A,2352,2362
<DRAWN> YES

<REG.NO> 11
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> BRONZE RUDDER CHAIN - SHACKLE AND 2 LINKS
<CODE> 31
<LOCATION> OUTER EDGE OF SURF ZONE (WITH KENNY MATERIAL)
<NOTES> ONE LINK HAS PROVISION FOR OPENING
<STORAGE> OWNER PETER ELY
<PHOTO> MA 2354,2361,2362
<DRAWN> YES

<REG.NO> 12
<DATE> 12/04/83
<NO.> 1
<DESCRIPTION> STONEWARE JAR SHERD,LOWER WALL & BASE. D.CA.180 MM
<CODE> 21
<LOCATION> OUTER EDGE OF HIGH REEF,INSHORE FROM BROKEN ANCHOR
<NOTES> SIMILAR JARS ON 'PANDORA'
<STORAGE> OWNER IAN KENNY
<PHOTO> MA 2362
<DRAWN> YES

NORFOLK ISLAND CATALOGUE

<REG.NO> 13
<DATE> 12/04/83
<NO.> 1
<DESCRIPTION> LEAD SHEET FRAGMENT
<CODE> 34
<LOCATION> EDGE OF SURF ZONE
<NOTES>
<STORAGE> OWNER IAN KENNY
<PHOTO> MA 2356
<DRAWN> YES

<REG.NO> 14
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> BRONZE GUDGEON ARM L.137 CM WITH 7 HOLES
<CODE> 31
<LOCATION> OUTER EDGE OF SURF ZONE
<NOTES> PROBABLY LOWEST GUDGEON ON STERNPOST
<STORAGE> OWNER IAN KENNY
<PHOTO> MA 2350A,2351,2362
<DRAWN> YES

<REG.NO> 15
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> BRONZE HORSESHOE PLATE - BENT
<CODE> 31
<LOCATION> ? SIRIUS SITE
<NOTES> ONE OF PAIR BOLTED EITHER SIDE OF KEEL
<STORAGE> PIER STORE NORFOLK IS.
<PHOTO> MA 2355,2362
<DRAWN> YES

<REG.NO> 16
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> BRONZE PINTLE,BROKEN.JAWS BENT. L.79 CM. W.26 CM
<CODE> 31
<LOCATION> ? SIRIUS SITE
<NOTES> PIN BROKEN AT BASE,D.N/A. ONE OF THREE LOWEST POSN
<STORAGE> PIER STORE NORFOLK IS.
<PHOTO> MA 2355,2362
<DRAWN> YES

<REG.NO> 17
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> BRONZE GUDGEON,COMPLETE.L122 CM;W25 CM;P'HOLE D7CM
<CODE> 31
<LOCATION> ?SIRIUS SITE
<NOTES> SECOND LOWEST POSITION ON STERNPOST CF 'PANDORA'
<STORAGE> PIER STORE NORFOLK IS
<PHOTO> MA 2355,2362
<DRAWN> YES

<REG.NO> 18
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> BRONZE GUDGEON,ARMS L32 & 45 CM;W24 CM;PH D 7 CM
<CODE> 31
<LOCATION> ? SIRIUS SITE
<NOTES>
<STORAGE> PIER STORE NORFOLK IS
<PHOTO> MA 2355,2362
<DRAWN> YES

<REG.NO> 19
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> BRONZE GUDGEON,BROKEN.ARMS L30 CM;W24.5 CM;PH D7CM
<CODE> 31
<LOCATION> ? SIRIUS SITE
<NOTES> EACH ARM HAS TWO HOLES FOR FASTENINGS
<STORAGE> PIER STORE NORFOLK IS
<PHOTO> MA 2355,2362
<DRAWN> YES

<REG.NO> 20
<DATE> 02/09/73
<NO.> 1
<DESCRIPTION> IRON ANCHOR,MINUS STOCK & RING.S4.62M;FS2.62 M
<CODE> 82
<LOCATION> SIRIUS SITE
<NOTES> RAISED BY SS 'HOLMBURN'.TREATED WAM 09/76 TO 03/79
<STORAGE> NORFOLK IS PWD
<PHOTO> MA 2354,2363
<DRAWN> YES

NORFOLK ISLAND CATALOGUE

<REG.NO> 21
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> IRON CANNON,SIX POUNDER,GEO III,BR.ARROW,L1.97 M
<CODE> 81
<LOCATION> SIRIUS SITE (REF.N.I.ADMIN REPORT 1924)
<NOTES> NO.2 OF PAIR.TREATED WAM 09/76 - 03/78
<STORAGE> ADMINISTRATION BUILDING NORFOLK IS.
<PHOTO> MA 2356,2362
<DRAWN> YES

<REG.NO> 22
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> COPPER/BRASS NAIL (OR SPIKE) L107 MM;D12 MM
<CODE> 32
<LOCATION> ?SIRIUS SITE
<NOTES> TAPERED SQUARE END
<STORAGE> PIER STORE NORFOLK IS
<PHOTO> MA 2355
<DRAWN> YES

<REG.NO> 23
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> COPPER/BRASS NAIL L152.5 MM;SQ.SHANK 6 X 6 MM
<CODE> 32
<LOCATION> ?SIRIUS SITE
<NOTES>
<STORAGE> PIER STORE NORFOLK IS
<PHOTO> MA 2355
<DRAWN> YES

<REG.NO> 24
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> UNIDENTIFIED BRONZE OBJECT, NAVIGATION INSTR.?
<CODE> 31
<LOCATION> ?SIRIUS SITE
<NOTES>
<STORAGE> PIER STORE NORFOLK IS
<PHOTO> MA 2573
<DRAWN> YES

<REG.NO> 25
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> BRONZE KEEL STAPLE
<CODE> 31
<LOCATION> SLAUGHTER BAY, INSIDE REEF 8 - 10 FT WATER
<NOTES>
<STORAGE> PIER STORE NORFOLK IS
<PHOTO> MA 2355
<DRAWN> YES

<REG.NO> 26
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> UNIDENTIFIED COPPER OBJECT - POSS. KEEL STAPLE
<CODE> 32
<LOCATION> SLAUGHTER BAY, INSIDE REEF 8-10 FT WATER
<NOTES>
<STORAGE> PIER STORE NORFOLK IS
<PHOTO> MA 2355
<DRAWN> YES

<REG.NO> 27
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> COPPER SHEET WITH RIVETS D10-11 MM
<CODE> 32
<LOCATION> SLAUGHTER BAY, INSIDE REEF 8-10 FT WATER
<NOTES>
<STORAGE> PIER STORE NORFOLK IS
<PHOTO> MA 2355
<DRAWN> YES

<REG.NO> 28
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> COPPER SHEET WITH RIVETS D18-20 MM
<CODE> 32
<LOCATION> SLAUGHTER BAY, INSIDE REEF 8-10 FT WATER
<NOTES>
<STORAGE> PIER STORE NORFOLK IS
<PHOTO> MA 2355
<DRAWN> YES

<REG.NO> 29
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> BRASS TRIGGER GUARD
<CODE> 32
<LOCATION> SLAUGHTER BAY, INSIDE REEF 8-10 FT WATER
<NOTES> CAST. SMALL CROWN MARK - UNIDENTIFIED
<STORAGE> PIER STORE NORFOLK IS
<PHOTO> MA 2355
<DRAWN> YES

<REG.NO> 30
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> BRASS TRIGGER GUARD
<CODE> 32
<LOCATION> SLAUGHTER BAY, INSIDE REEF 8-10 FT WATER
<NOTES> CAST
<STORAGE> PIER STORE NORFOLK IS
<PHOTO> MA 2355
<DRAWN> YES

<REG.NO> 31
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> WROUGHT IRON ANCHOR, 1 FLUKE BROKEN; S 2.765 M
<CODE> 82
<LOCATION> CASCADE BAY (RICK SWANSBOROUGH)
<NOTES> OLD PLAN LONG-SHANKED ANCHOR
<STORAGE> CASTAWAY HOTEL GARDEN, NORFOLK IS
<PHOTO> NO
<DRAWN> YES

<REG.NO> 32
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> IRON ANCHOR, ADMIRALTY PATTERN W/IRON STOCK
<CODE> 82
<LOCATION> BALL BAY NORFOLK IS
<NOTES> S 2.67 M
<STORAGE> OWNER BORRY EVANS
<PHOTO> COL. PRINT MS
<DRAWN> YES

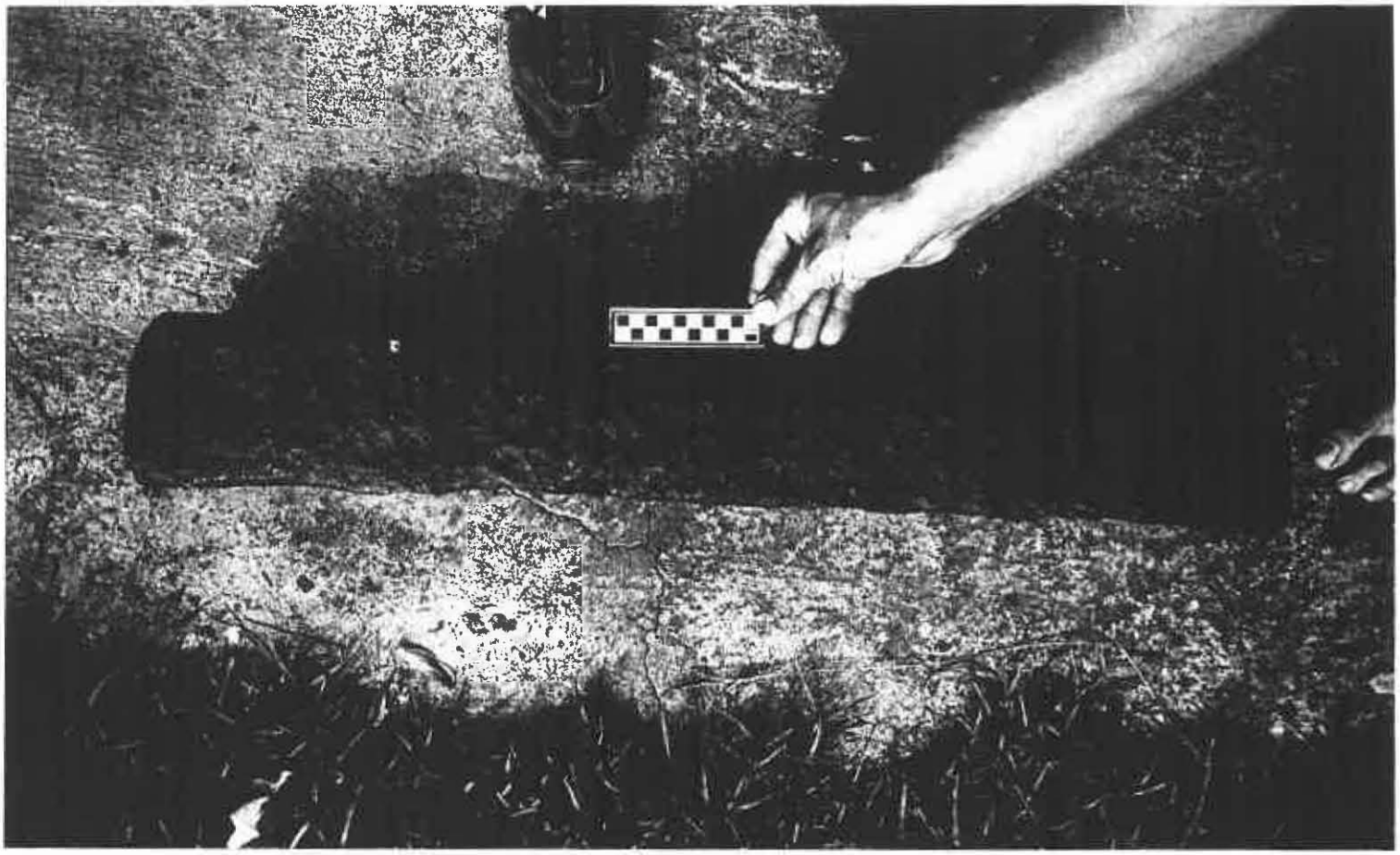

Figure 41. Iron ballast from residence of Bev McCoy.

<REG.NO> 33
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> COPPER BOLT W/RT.ANGLE BEND L705 MM;D22 MM
<CODE> 32
<LOCATION> WEST OF PIER
<NOTES>
<STORAGE> OWNER KERRY COOP
<PHOTO> MA
<DRAWN> YES

<REG.NO> 34
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> BRASS BOLT L275 MM;D19 MM
<CODE> 32
<LOCATION> WEST OF PIER
<NOTES>
<STORAGE> OWNER KERRY COOP
<PHOTO> MA
<DRAWN> YES

<REG.NO> 35
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> BRONZE PINTLE L604 MM;W176 MM;PD MAX 74 MM
<CODE> 31
<LOCATION> WEST OF PIER,NEXT TO BOMMY 210 FROM DECK SUPPORT
<NOTES>
<STORAGE> OWNER JOHN NOBBS (RAISED 1982)
<PHOTO> MA 2561
<DRAWN> YES

<REG.NO> 36
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> IRON BALLAST 825 X 140 X 125 MM
<CODE> 84
<LOCATION> ? FOUND ON OWNER'S PROPERTY
<NOTES> USED AS AN ANVIL. FAINT BROAD ARROW IMPRESSION
<STORAGE> OWNER BEV MCCOY
<PHOTO> MA 2561
<DRAWN> YES

<REG.NO> 37
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> UNIDENTIFIED BRONZE OBJECT , NAVIGATION INSTR ?
<CODE> 31
<LOCATION> SIRIUS SITE, OUTSIDE REEF IN LINE W/ROAD
<NOTES>
<STORAGE> OWNER KARL DAVIES, BOUNTY MUSEUM, NORFOLK IS
<PHOTO> MA 2561
<DRAWN> YES

<REG.NO> 38
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> BRONZE GUDGEON STRAP L875 MM
<CODE> 31
<LOCATION> SIRIUS SITE,OUTSIDE REEF IN LINE WITH ROAD
<NOTES> 5 HOLES FOR FASTENINGS
<STORAGE> OWNER KARL DAVIES, BOUNTY MUSEUM,NORFOLK IS
<PHOTO>
<DRAWN> YES

<REG.NO> 39
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> BRONZE SHIP'S BELL,NO INSCRIPTION
<CODE> 31
<LOCATION> ? SHIP WRECKED OFF NORFOLK IS
<NOTES> GIVEN TO OWNER BY SIR CHARLES ROSENTHAL 1946
<STORAGE> OWNER BYRON BURRELL
<PHOTO> MA 2573
<DRAWN> YES

<REG.NO> 40
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> IRON BALLAST WITH BROAD ARROW STAMP
<CODE> 84
<LOCATION> SIRIUS SITE,OUTSIDE LAGOON IN LINE WITH ROAD
<NOTES> CF NI 36
<STORAGE> OWNER KARL DAVIES, BOUNTY MUSEUM, NORFOLK IS
<PHOTO> MA 2561
<DRAWN> NO

NORFOLK ISLAND CATALOGUE

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<REG.NO> 41
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> IRON CANNON,SIX POUNDER,GEO III,BR.ARROW L1.975 M
<CODE> 81
<LOCATION> ?SIRIUS SITE (REF. N.I.ADMIN.REPORT 1924)
<NOTES> NO.1 OF PAIR.H27 CARRON 1803? ON LH TRUNNION
<STORAGE> ADMINISTRATION BUILDING,NORFOLK IS.
<PHOTO> MA 2574
<DRAWN> YES

<REG.NO> 42
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> IRON CANNON,ERODED.L1.72 M;BD113 MM.
<CODE> 81
<LOCATION> BTB FROM 'BOUNTY'
<NOTES> NO VISIBLE MARKS
<STORAGE> PIER STORE NORFOLK IS.
<PHOTO> MA 2361
<DRAWN> YES

<REG.NO> 43
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> BRONZE STRAP,BENT,FUNCTION UNIDENTIFIED
<CODE> 31
<LOCATION> ? SIRIUS SITE
<NOTES> POSS,SIMILAR PURPOSE AS DOVE-TAIL ON EXT. LWR.HULL
<STORAGE> PIER STORE NORFOLK IS
<PHOTO> MA 2355,2362
<DRAWN> YES

<REG.NO> 44
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> BRONZE CHAIN LINK
<CODE> 31
<LOCATION> OUTER EDGE OF SURF ZONE
<NOTES>
<STORAGE> OWNER JOHN LAWKING
<PHOTO> MA 2354,2362
<DRAWN> YES

NORFOLK ISLAND CATALOGUE

<REG.NO> 45
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> COPPER (OR BRONZE) NAIL HEAD.SHAFT 18 MM
<CODE> 32
<LOCATION> OUTER EDGE OF SURF ZONE
<NOTES> SHAFT HAMMERED TO FORM HEAD OF RUDDER FASTENINGS
<STORAGE> OWNER JOHN LAWKING
<PHOTO> MA 2354,2362
<DRAWN> YES

<REG.NO> 46
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> COPPER SHEATHING TACK
<CODE> 32
<LOCATION> OUTER EDGE OF SURF ZONE
<NOTES>
<STORAGE> OWNER JOHN LAWKING
<PHOTO> MA 2354,2362
<DRAWN> YES

<REG.NO> 47
<DATE> 03/01/85
<NO.> 1
<DESCRIPTION> COPPER FALSE KEEL STAPLE
<CODE> 32
<LOCATION> OUTER EDGE OF SURF ZONE
<NOTES>
<STORAGE> OWNER JOHN LAWKING
<PHOTO> MA 2354,2362
<DRAWN> YES

47 OF 47 RECORDS PRINTED OR 100.00 %

Appendix 7. Dive Master's Report Paul Brown.

During the 1985 season a total of 111 dives were made with 113 hours underwater. These figures can be broken down for the 3 sites.

Stranding Site	- 31 dives	-	32 hours underwater
Western Site	- 54 dives	-	54 hours underwater
Lagoon Site	- 26 dives	-	27 hours underwater

Diving on the initial stranding site was made difficult due to it being in the surf zone. The main danger was being thrown onto the reef by the breakers or surge.

The western site was also difficult being in between the rocks to the west of the pier. The rocks form part of the main reef with a channel blown in it to provide a passage into the boat harbour. This means that conditions are similar to the main site with breakers and surge.

The lagoon site is calm at most tides with a tidal run on tide changes. The gutter between the reefs is only able to be dived at low tides or calm days.

Due to the breakers and/or surge on the first two sites diving was not carried out if there was therisk of injury to the divers. Diving was then carried out in the lagoon.

When diving on main and western site an inflatable and boat tender with radio contact to shore was used. First aid equipment was on hand as well as the expedition doctor and transport. Most of the divers have first aid training so anyone could use the equipment in an emergency.

Recommendations:

I could find no fault with the running of the dives other than having to chase divers to get details of dives from them. On future expeditions, divers should make a note of dives, times, depth as well as site and give these to the divemaster so as to make it easier to organise divers for the next day or team, as the divemaster may not be able to get to all dive sites during the day.

Name	Main Site No. of Dives	Western Site No. of Dives	Lagoon Site No. of Dives
Graeme Henderson	6	5	2
Patrick Baker	5	3	1
Tom van Leeuwen	6	6	
Myra Stanbury	1	1	
Ian MacLeod		1	
David Millar		3	5
Karyn Atkison	2	3	5
Paul Brown		6	1
Paul Clark	1	2	2
Mark Staniforth	2	7	5
Terry Arnott	4	5	2
Mike Simpson		2	
James Tavener	1	3	
Neil Tavener	1		
Byron Adams		2	

Name	Main Site No. of Dives	Western Site No. of Dives	Lagoon Site No. of Dives
Barley Christian		2	
Kerry Coop		1	
Mike Johnson	1	1	
Ken Jackson		1	
Morgan Evans			1
Steve Richards			1
Peter Ely			
Steve Nobbs	1		

Appendix 8. Public Lectures and Media Talks

Monday	18 February	:	1030 hrs. Henderson, Amess and MacLeod spoke on radio with announcer Cathy Le Cren about the expedition.
Wednesday	20 February	:	2000 hrs. Henderson gave piblic lecture on 'Shipwrecks of Norfolk Island and Australia', in the Isola Bella restaurant at the Castaways Hotel.
Monday	25 February	:	1030 hrs. MacLeod spoke on radio about conservation.
Monday	25 February	:	1500 hrs. MacLeod spoke to the school about the expedition.
Tuesday	26 February	:	1900 hrs. MacLeod gave a workshop on conservation at the school.
Tuesday	26 February	:	2000 hrs. Baker gave a lecture on the expedition at the Garrison Restaurant.
Wednesday	27 February	:	2000 hrs. MacLeod gave a public lecture on conservation at the Castaways Hotel.
Friday	1 March	:	0800 hrs. MacLeod and Stanbury spoke on radio about Conservation and Maritime Archaeology.
Saturday	2 March	:	2000 hrs. We showed the Pandora film at the Castaways Hotel.
Wednesday	6 March	:	1700 hrs. Arnott gave a lecture to the local scouts.
Wednesday	6 March	:	2000 hrs. We showed the Pandora film at the Castaways Hotel.

Appendix 9. Shipwrecks at Norfolk Island

a) At Kingston:

1. Iris. Sydney yacht. Wrecked October 19 ? as a result of a wind change when lying close inshore at Kingston.

2. Renaki. Three masted auxilliary schooner, operated by US Navy when she was wrecked in June 1943, going up on top of the reef on the east side of the pier. Built 1924, 255 tons, 112 feet by 27 feet by 8.55 feet, 2 cylinder engine.
Vol. 2 No.34 of the Norfolk Islander has good pictures of her.

3. Mary Hamilton. Whaler, of 218 tons, barque rigged, under command of Captain Barker with 21 crew, vessel valued at £7400. April 1873 called to load wood and water. Stuck a rock near Nepean Island and was holed. Jacob Christian and other islanders manned the pumps and helped the crew to run the vessel ashore 'near the jetty' at Kingston, where, two days later heavy surf split her in two. The remains were sold for £6. 2. 0.

4. Sirius. Wrecked east of where the pier is now.

5. Friendship. A two masted schooner of 89 tons, wrecked on the reef near the landing place in July 1835. All the cargo was landed safely. The vessel was later washed over the rocks into the 'boat harbour', but there were still hopes she might be repaired.

b) Elsewhere:

1. Warrigal. Last seen off Phillip Island in April 1918, carrying timber.
Wood ketch, 78 tons, built 1901 on Brisbane Waters by Ric Davies.
91 feet by 22 feet by 7.4 feet.
Registered Melbourne 1909
Official number 112538

2. HoHo. Yacht stranded at Cascade. Got off.

3. LFB Norfolk. Burnt February 1947 at Headstone near Mission Chapel.

4. LFB Blue Fin. Wrecked at Cascade May 1946.

5. Bitten. Lost at Cascade.

6. Diout. Schooner or brigantine from New Caledonia with cattle, parted her chain and drifted on the rocks at Cascades and became a total wreck at about 2.50 am on 20 May 1873. Cattle on board.

c) 1. Fairlie. Wrecked at Norfolk February 1840. Frank Clune reference.

2. Rangi. Yacht sank in 1950. Mast at R.S.L. Club.

3. Matai. Aluminium fishing boat wrecked Agusut 1967 by high seas.

4. A gun once kept at the Mini Golf centre was said to be from a whaler wreck.