

The wreck of the Dutch East Indiaman the *Vergulde Draeck*, 1656

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Introduction

In 1964 the State of Western Australia passed the Museum Amendment Act. This legislation provides for the State, on the recommendation of the Museum, to vest any historic wrecks that sank in Western Australian waters prior to 1900. At present there are five 17th and 18th century East Indiamen and 12 Colonial period wrecks that have been so vested. One of these is the wreck of the Dutch East Indiaman, the *Vergulde Draeck* which sank on a reef 120 km north of Perth in 1656. The wreck was originally discovered in 1963 and in 1964 it was vested under the Museum Act. In January 1972, after several months' preparation, a full scale excavation was started; by the end of April the major part of the excavation was completed, apart from the raising of the cannons and anchors, and the excavation of isolated pockets of wreck material. This therefore is a preliminary report on the excavation together with its historical background.

Historical background

Part of the history of the wreck of the *Vergulde Draeck* and the subsequent search for the survivors has been published in English, by Major (1859) and by Heeres (1899). The following is a brief history of the wreck and the subsequent rescue expeditions, drawn from translations of the Dutch archives in the possession of the Museum and supplemented by material from the above authors.

On 4 October 1655 the *Vergulde Draeck* of the Amsterdam Chamber of the Verenigde Oost-Indische Compagnie (VOC) set sail from Texel, on what was to be her second and

final voyage to Batavia (modern Djakarta) in the East Indies. Her master was Pieter Albertsz and she had a crew of about 193 men, indicating a medium size East Indiaman (she was occasionally referred to in contemporary texts as a yacht). It is recorded that she carried a cargo of trade goods worth 106,400 fl. together with eight chests of silver coin worth 78,600 fl.

After stopping briefly at the Cape of Good Hope, she sailed east following the route to the East Indies established by Henrik Brouwer in 1611. This course followed the Roaring Forties east towards the Southland, and then north to Batavia. On 28 April 1656, the *Vergulde Draeck* struck a reef close to the Southland (see Fig. 1) at the beginning of the first day watch, at a latitude $31^{\circ} 16'$. Seventy-five survivors including the Master and Understeersman reached shore, and all that could be saved from the ship were a few provisions.

The Master, Albertsz, dispatched the Understeersman and six men to obtain assistance from Batavia; the decision to send the Understeersman rather than for the Master to go himself, was possibly made in the light of the terrible fate of the survivors of the VOC ship *Batavia* which was wrecked in 1629 in the Houtman Abrolhos (see Drake-Brockman, 1963). After the ship was wrecked and the survivors had reached shore, the commander of the *Batavia*, Francisco Pelsart, together with the master sailed to Batavia for help, leaving the survivors, with only a small supply of water, to an uncertain fate on a group of small islands. On his return, Pelsart found a mutiny had taken place and 125 men, women and children had been massacred. Thus, with the possibility of a similar situation developing and in terms of his responsi-

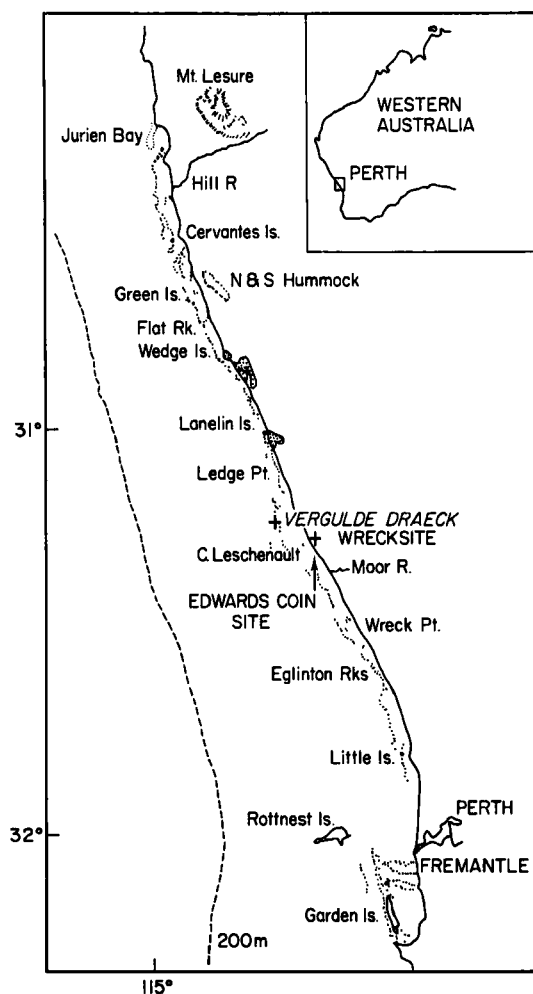


Figure 1. Chart of the coast of Western Australia from Jurien Bay to Garden Island, inset map of Western Australia showing position of chart. Taken from Admiralty Chart No. 1033.

bility as the Master, Albertsz sent the Understeersman in command of six men, who arrived at Batavia on 7 June 1656, 40 days after the *Vergulde Draeck* had been wrecked.

The Commander and Council of the VOC at Batavia acted promptly. The day after the news of the wreck, a yacht, the *Goede Hoop* and the flute, the *Witte Valk* were dispatched to the Southland to search for the wreck and the survivors. The *Witte Valk* was unable to approach land because of rough seas, and four

months later returned to Batavia having found no trace of the survivors. The *Goede Hoop*, however, searched some distance of the coastline and at one point made a landing, which in the events that followed cost the lives of 11 of the crew. She returned one month after the *Witte Valk* on 14 October 1656, also having found no trace of the *Vergulde Draeck* or the survivors. Thus this initial search had been totally unsuccessful.

A year later, following recommendations from Batavia to the Commander Jan van Riebeeck, of the VOC settlement at the Cape of Good Hope, a further expedition to search for the *Vergulde Draeck* was mounted. This time the small flute or flyboat the *Vinck*, outward bound to Batavia, was instructed to call at the Southland and search for survivors. Once again the expedition failed to find any trace of the wreck or survivors (possibly because of the inclement weather and the fact that the first landfall on the Southland was made too far to the north at 20° 07'). The *Vinck* sailed north along the coast and arrived at Batavia on 27 June 1657.

By the end of 1657, the company at Batavia held little hope for the survivors of the *Vergulde Draeck*. Nevertheless, on the slim chance that someone might still be alive, a third expedition was mounted. Two galliots, the *Wackende Boey* with a crew of 40 and the *Emeloort* with a crew of 25, were provisioned for six months. Strict sailing instructions and a code of behaviour were issued, together with orders to chart the coast of the then relatively unknown Southland, and investigate possible trading contacts. Orders were given that a proportion of any money recovered from the salvage of the wreck would be given to the crew as a financial incentive to encourage them in every possible way. It seems, however, that the motives of VOC were more than purely financial, since in the orders it is recounted: '... that it is our opinion that this will not happen (the recovery of the money) in view of the great peril and dangers and since human life we deem more precious ...'.

On New Year's Day 1658 Skipper Auck Pieters Jonck, Master of the *Emeloort*, and Skipper Samuel Volkersen, Master of the *Wackende Boey*, set sail for the Southland. By

2 February the Skipper and merchant of the *Wackende Boey* were complaining that the *Emeloort* was not sailing fast enough, a week later when the *Emeloort* tacked to the south firing a cannon and raising a light in the mizzen shrouds, the *Wackende Boey* sailed on, and from this point the two ships appeared to have acted independently, although they met up on several occasions on the coast of the Southland.

The *Emeloort* sighted the Southland at sunset on 24 February at about latitude 33° 12'. From this point she sailed north along the coast, carrying out soundings and constructing a chart of the Southland (Fig. 2). On 8 March at about 30° 25' a fire was seen on land which, on firing signal guns, was answered by another fire. The following day after further signals and replies, a boat was sent ashore, however, on arriving at the beach the fires were extinguished, and as it was late, the boat returned. The following day the ship's boat was again dispatched and this time made a landing. It appears that aborigines were responsible for the fires, as the search party met up with a group and described their primitive habitation; however, neither traces of the survivors nor wreckage was discovered. The *Emeloort* after cruising in this general area, departed for Batavia, arriving there on 18 March 1658.

The *Wackende Boey* first sighted the Southland at 09.00 hrs on the morning of 23 February at latitude 31° 40' and charted the island now known as Rottneest (Fig. 3). A landing was made on the 24th at 31° 20' where wreckage of what was thought to be the *Vergulde Draeck* was found. On the 27th and 28th further landings were made at 31° 14' and 30° 40' but no wreckage was sighted. On 18 March the ship anchored on the north coast of Rottneest, the island was explored and it is recorded that the ship was scraped below the waterline. On the 20th after sailing north and making a landing at 31° 09' a beam from the *Vergulde Draeck* was recovered. A second landing was made and more wreckage was found. On the evening of the 22nd as Volkersen recounts '... Since it was very fine lovely weather ...' the boat was sent ashore again. During the night a SSW gale blew up and on the following day it was assumed that,

as the boat had not returned, it must have sunk (sic). The ship then managed, with great difficulty, to beat off the lee shore and make for the open sea. Five days later the *Wackende Boey* again passed the spot where the boat with 14 men, including the Uppersteersman, had last been seen, firing signal guns to no avail. It was then decided to sail on to Batavia as it was assumed that the boat and crew were lost, presumed drowned. At dusk on 28 March a fire was seen on shore and on firing a signal gun another fire was lit. This was assumed to be 'the work of Christians' either of the ship's boat or the survivors of the *Vergulde Draeck*, presumably because it was different from other fires so far sighted. The ship hove to during the night; they could not land as they had neither boat nor gig and the site was not a suitable anchorage. In the morning the ship was found to have drifted to the north, and it appears she continued on to Batavia without investigating these signals, which must have been significant since they 'had never observed such a fire before ...' This fire was quite clearly, from the records of Uppersteersman Abraham Leeman van Santwigh, the one that he and crew of the boat had lit. On 10 April 1658 the *Wackende Boey* arrived at Batavia, having left 14 men behind, under very dubious circumstances, and indicating, on a superficial examination of the records, gross negligence on the part of Volkersen.

From the journal of Abraham Leeman for the evening of 22 March (the day of the loss of the boat), we find a difference in opinion over the weather conditions between the Master Volkersen: 'very fine lovely weather' and the Uppersteersman Leeman: 'the sea is rising so fast ashore that I am afraid for bad weather'. In spite of Leeman's warning the Master again sent him ashore (the second time that day). Being unable to land because of the SSW gale, the boat anchored for the night. In the morning because of the strong winds the boat ran before the wind, lost her rudder and could only be roughly steered with the oars. Eventually the boat was cast over a reef and swamped, luckily escaping major structural damage. After repairing the boat and collecting seal's meat and water they continued sailing along the coast. On the 28th, the *Wackende*

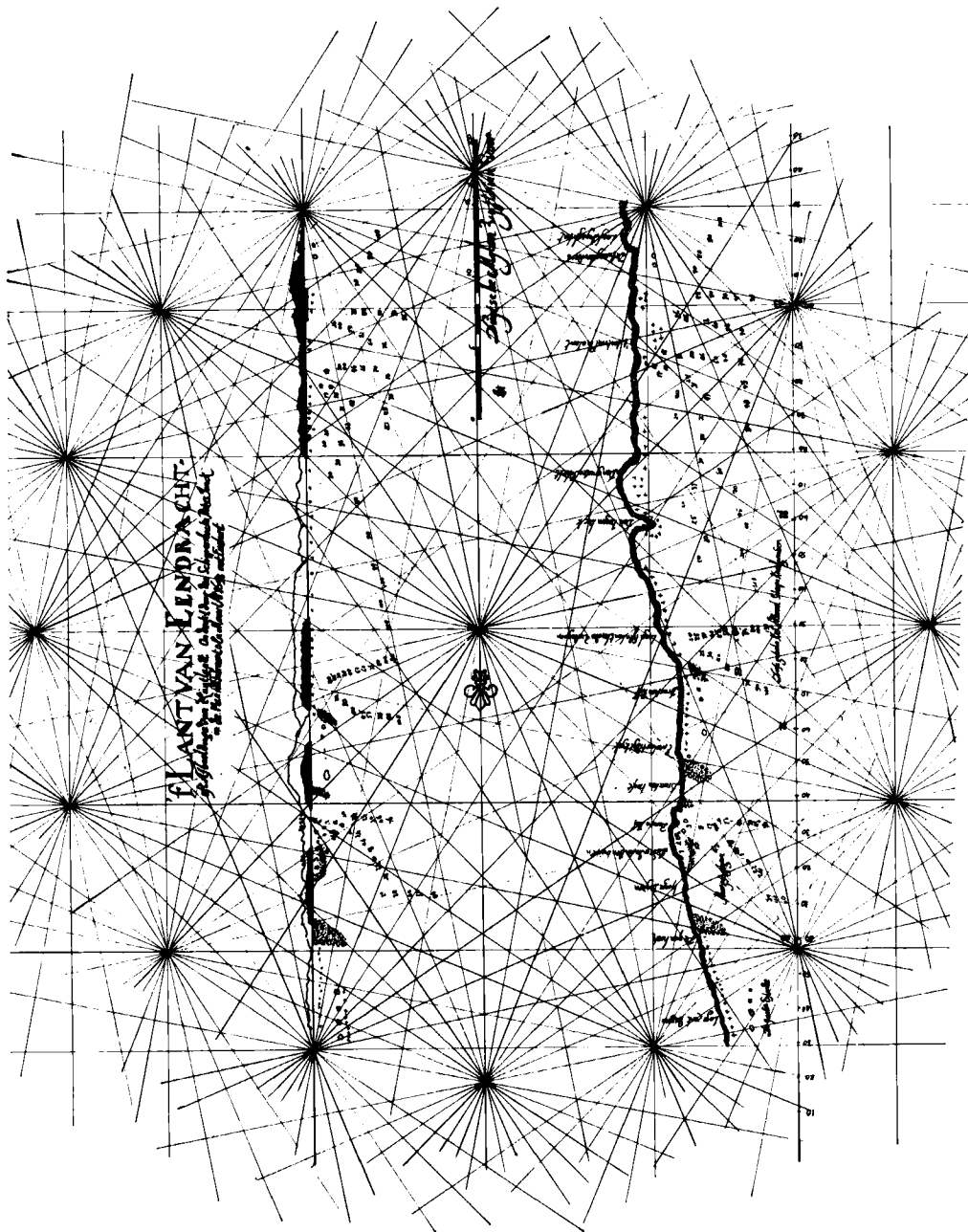


Figure 2. A drawing by the Master of *Emeloort*: Auck Pieters Jonck's chart of Eendracht's Land in the Southland. Note 'Drecken Riff' at 31° 10'. Soundings in fathoms, scale in Dutch mylen (15 to a degree).

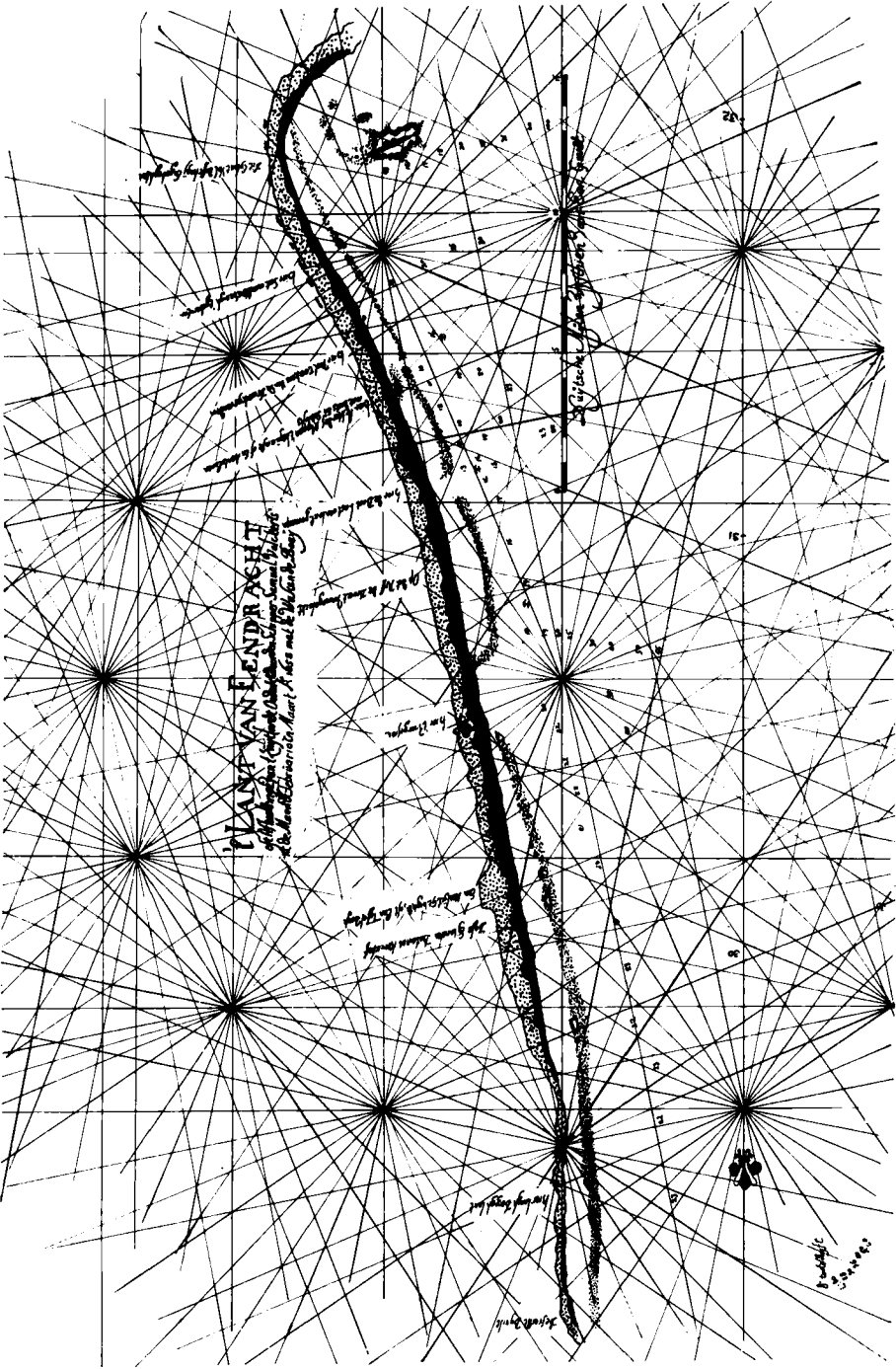


Figure 3. A drawing by the Master of *Wackende Boey*: Samuel Volkert's Land in the Southland. Note 'Op det Rif de Draeck verongeluckt' (on this reef the Draeck perished) at 30° 55' approx. Also the island now known as Rottnest is correctly charted with reefs in Gage Roads.

Boey was sighted, and a signal fire was lit. A cannon was then fired from the ship which was answered on shore with a second fire. Thus the description of the events on the shore by Leeman exactly tallies with Volkersen's journal, so there is no doubt that this is the same event. Due to bad weather Leeman could not put out in the boat, so that in the morning, as recorded above, the ship was gone.

Leeman and the boat's crew remained at that spot for 11 days hoping that the *Wackende Boey* would return. On 8 April they set sail for Batavia with provisions of seal's meat, sea-weed and ten gallons of drinking water. On the journey three crew died of thirst and for 15 to 16 days before reaching Java they had been forced to drink seawater and their own urine. On reaching the coast of Java five men were sent ashore to collect food and water to reprovision the boat, but having satisfied their own needs with food and water, they refused to do any more. A total of seven crew that were able to swim were sent ashore and they all acted in a similar manner. As the weather conditions deteriorated in the afternoon Leeman decided to depart. It is truly remarkable that Leeman and the three remaining crew did not abandon the boat and thus alleviate their thirst and hunger. The following day (30 April) the boat was wrecked in the surf some miles along the coast, due to the exhausted state of the crew and their depleted numbers. After struggling through the Javanese jungle, these four men eventually arrived in Batavia on 23 September 1658, 185 days after being marooned on the Southland, a truly remarkable feat of endurance, courage and determination.

The masters of the *Emeloort* and *Wackende Boey* were ordered to be examined by the High Fiscal of India, since they had disobeyed the sailing instructions and Volkersen had deserted 14 of his crew in dubious circumstances. It was assumed at this point that there was almost no hope that the survivors of the *Vergulde Draeck* could still be alive. However, it is interesting to note in the correspondence from Batavia that it was left to the discretion of the Heeren XVII (the Directors of the VOC in the Netherlands) to issue instructions for a galliot to call in at the Southland 'in case any-

body can be found'. In fact no further expeditions were mounted, although the *Elburg*, commanded by Jacob Pieterszoon Peereboom, touched at the south-west coast of the Southland in 1658 at latitude 31° 30' S.

Events leading to the discovery

For nearly 200 years the documents relating to the *Vergulde Draeck* remained in the State Archives in Holland. In the intervening years, the Southland had been explored and by the early 19th century the British had started to settle the continent. One of the settlements was the Swan River Colony, on the coast of Western Australia, only about 120 km south of the wreck of the *Vergulde Draeck*. The publications of Major (1859) and Heeres (1899) in English stimulated much speculation as to the position of the wreck of the *Vergulde Draeck*.

In 1931, a young boy, A. Edwards, found about 40 silver coins in the sand-hills just north of Cape Leschenault (31° 19'). These coins caused much excitement at the time as their dates ranged between 1619 and 1655, thus indicating that they could belong to the survivors of the *Vergulde Draeck*. The coins consisted of about 24 Mameita-Gins, a Japanese coin of the Keicho period (1601 to 1685, probably prior to 1650) and about 16 Ducatons and half Ducatons of the Spanish Netherlands ranging from 1637 to 1655 (Fig. 4).

The first substantiated report of the discovery of the wreck of the *Vergulde Draeck* came on 13 April 1963. A group of skin-divers from Perth were spear-fishing on a reef about 12 km south of Ledge Point when the remains of a wreck were sighted. A superficial examination of the site revealed cannons, anchors, ballast bricks and elephant tusks, thus clearly indicating an old wreck, and possibly the *Vergulde Draeck*.

The identification and recovery work carried out prior to the 1972 excavation

The first material raised for record purposes after the discovery was an elephant tusk (later

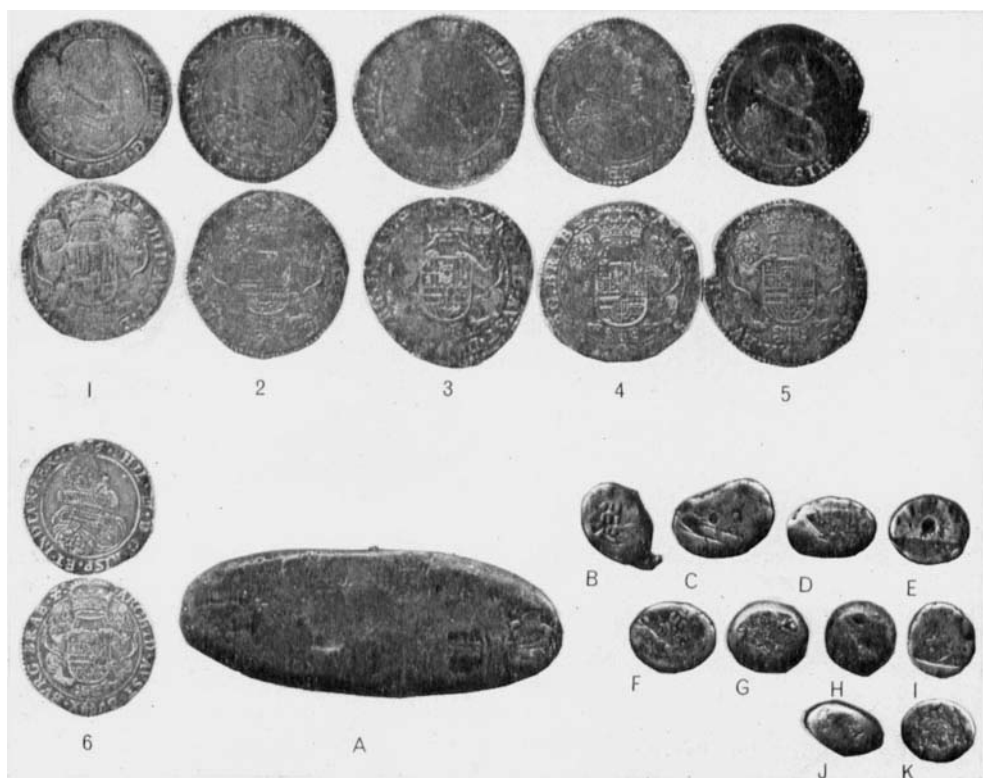


Figure 4. Photograph of the Edwards Collection. 1-5, Ducatons: 1, 1640, Phillip IV, Brabant Brussels mint; 2, 1637, Phillip IV, Z^e Brabant Brussels mint; 3, 1655, Phillip IV, Z Brabant Brussels mint; 4, 1638, Phillip IV, Z^e Brabant Anvers mint; 5, 1638, Phillip IV, Z^e Brabant Brussels mint. 6, Half Ducaton, 1637, Phillip IV, Z^e Brabant Anvers mint. A, Cho-Gin; B-K, Mameita-Gins. Scale 1:2.

identified as African) and some ballast bricks. In the months following the discovery, a large amount of material was recovered. Unfortunately there are no accurate records of what exactly was raised. From newspaper articles, the list includes four complete 'Bellarmine' jugs and numerous pottery fragments, several elephant tusks (out of a total noted on the site of about 300), a sounding lead, a pair of scissors, lead, ballast bricks, wood, a whetstone, a bronze mortar (Fig. 5), bearing the inscription 'Amor Vincit Omnia' (Love Conquers All) and many coins. By 7 May 1963 a total of 231 coins, mainly reals of eight, had been recovered bearing dates 1644, 1653 and 1654, giving strong support to the theory that this indeed was the wreck of the *Vergulde Draeck*. Two large objects, an iron cannon and an anchor, were also raised;

the cannon bore the inscription 'AVOC' on the breech, indicating the Amsterdam Chamber of the VOC.

On 14 October 1963 there appeared in the local newspapers a report that blasting had taken place on the wreck site. This was the first of several reports that were to appear in the newspapers in the following months. Since it was clear that the situation was getting out of control, and unique and valuable historical material was being destroyed, it was at this point that the State Government intervened. It claimed that in view of the immense historical value of this wreck all historic wrecks should become State property, be properly excavated and available for everyone to see. The Museum was given the responsibility of protecting and excavating these wrecks.

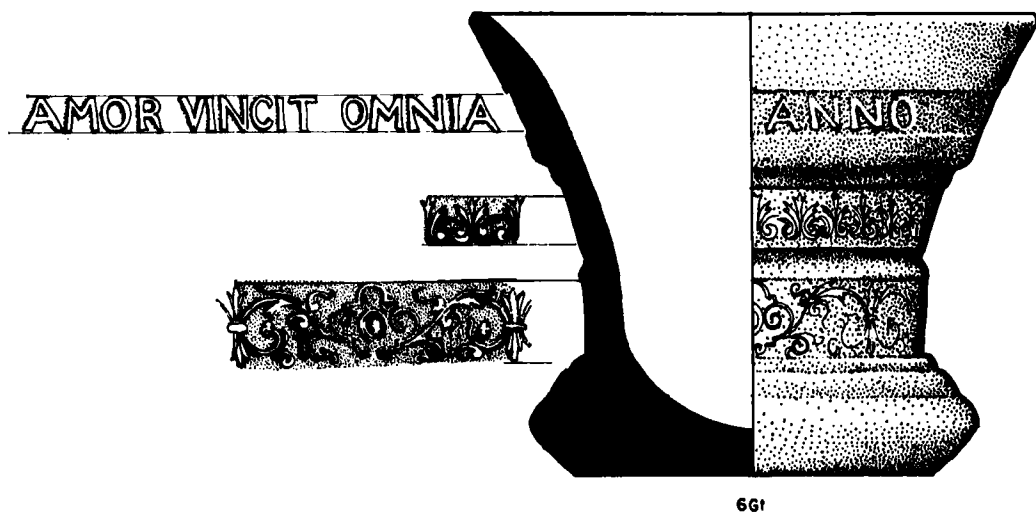


Figure 5. Bronze mortar inscribed AMOR VINCIT OMNIA ANNO (date obscure). Scale 1:2.

The 1972 excavation

The site

The wreck of what is now assumed to be the *Vergulde Draeck* lies on a reef 5.6 km (3.5 miles) west of the coastline of Western Australia, 12 km (7.5 miles) SSW of Ledge Point in latitude 31° 13' south, longitude 115° 21' east (Fig. 1). The reef extends about 450 m in a north-south direction, and the wreck site is located about 100 m from the northern end, on the seaward or western side.

The reef is limestone with numerous solution holes, caves, tunnels, and gullies. Except on the sand-shingle floors of these caves, it is extremely difficult to distinguish the wreck material from the bedrock. The more obvious wreck indications are five anchors and 12 iron cannons, which more or less delineate the wreck site (see Fig. 6). In some cases these cannons lie on the top of the reef (2–3 m deep) and in other places in deeper parts of the site (6 m).

From the point of view of excavation, this is a difficult site to work, since it is exposed to the Indian Ocean swell. However, under all but the most extreme swell conditions it is possible to dive on the site. This is especially true at the base of the reef where the seabed rises from about 8 to 2 m in a steep face; here divers are protected from the strong surge

and can work in comfort. As a general rule, provided divers remain close to the seabed and do not work on the upper levels of the reef they will be perfectly safe. It is the danger to the surface craft and to the divers on the surface (should their diving equipment fail) that precludes any work on this site with swells more than about 2 m that are breaking further than 75 m out from the reef. It is of course the break that is the danger to anything or anyone on the surface.

In view of the shallow water involved (less than 10 m over the whole site) hookah diving equipment was used which allows three divers to work continuously on the site all day, and on good days 20 man hours in the water was not unusual.

The main limitation to underwater work is exposure to the cold. However, in the summer months of the 1972 excavation, a well-insulated diver could spend over eight hours a day in the water without undue discomfort.

The excavation

During the excavation, the diving team was based at Ledge Point in the Museum Field Station, where all basic facilities were available. Three boats were used for the work: a 6.5 m work boat with a large-capacity road

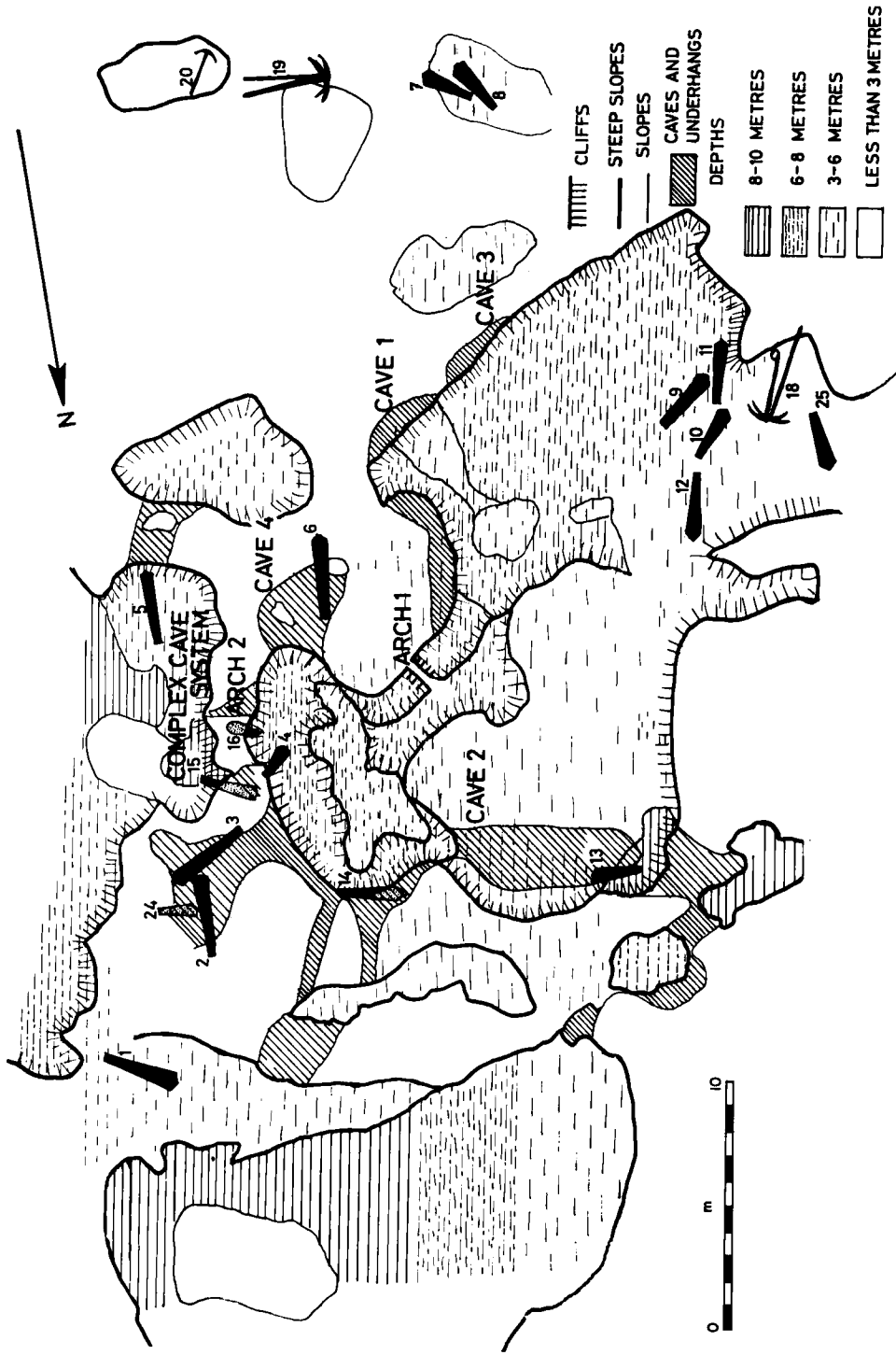


Figure 6. Plan of *Vergulde Draeck* wreck site. Main reef formation depth 1-2 m. From the original survey by J. Cowen, G. Brenji, R. Sonnerman and W. Anderson in 1966.

drill air compressor for running the airlifts; a 5 m high-speed fibre-glass boat which was used for running the hookah unit; and a 4.5 m aluminium dinghy which was used for lifting large objects and for carrying bulk wreck material, such as concretions and ballast bricks, back to Ledge Point. The hookah was mounted on a separate boat to prevent fumes and carbon monoxide from the airlift compressor contaminating the divers' air supply.

A mooring was established 100 m west of the wreck site, and a permanent air hose arrangement was linked to the airlifts on the site. Two types of airlifts were used: one, a rigid 7 m tube 0.15 m in diameter with an air box on the lower end at the anchoring point. Attached to this end was a further 4 m of flexible tubing with a constriction on the working end to prevent blockage. The second type was an entirely flexible tube 0.12 m in diameter, and 12 m long, anchored about 5 m from the working end. The air supply pipe was fed in through the working end to about the anchoring point; the end of the air supply pipe was blocked off and about 50 small holes were burnt into the plastic tubing to give an emulsified air supply. It was found that at a depth of 7 m and with air supply of about 1.2 m³/min (approx. 40 ft³/min) there was sufficient suction to be able to run a single airlift with enough power to remove rock spoil at high speed and of a size equal to that of the tube diameter. If the two airlifts were run simultaneously, the suction was sufficient to remove sand and light gravel. The spoil from the discharge end of the airlifts was directed into a large hole just over the top of the reef (see Fig. 6) and in suitable sea conditions this material was sorted through by hand for artefacts which had been accidentally sent up the airlift.

Material that was too large to be dealt with by the airlift, and wreck material such as concretions, ballast bricks, etc., was collected in calico bags (each bag when full of, say, ballast bricks, would weigh about 20 kg). When about 20 bags were full, these were attached to a lifting balloon of 500 kg lifting capacity. The balloon was then raised, and the bags loaded on board the aluminium boat. Small robust wreck artefacts such as pottery

or coin, recovered during airlift and general collection work, were placed in bags carried by individual divers, whereas delicate materials such as leather, or rope, were placed in large sealed jam jars. At the end of the day all this material was brought aboard the boats.

The first phase of the excavation was to determine how much of the site had been disturbed, how deep the wreck deposit extended and if there was any structure or stratification present. An area in the south-west corner of the site about 1 × 2 m was selected for a test excavation (Fig. 7:13.1). The surface deposits were found to consist of loose jumbled ballast bricks and lumps of broken concretion. Below this was a sand layer containing loosely scattered ballast bricks. Bedrock was reached at a depth of about 0.15 m where animal bones and the remains of the staves of a wooden barrel were found. Since the bones have the marks of butchering it was concluded that this was possibly the remains of provisions such as salt beef. Apart from the very deepest levels, no stratigraphy was noted nor was there any indication of the ship's structure. Examination of other areas on the wreck site indicated a similar situation. Since looting is usually carried out without an airlift it is not surprising that the surface deposits consist of large quantities of rubble and spoil. This situation arises because after removing surface artefacts, looters generally dig pits into deeper levels, depositing the spoil around the edge of the pit. These pits are quite quickly filled by natural processes. This looting continues until the whole surface of the site is covered with a thick layer of rubble and spoil. On this site the disturbed layers usually extend to a depth between 0.5 and 1.0 m. The Museum had been conducting a fairly limited surface collection for several years, working in a systematic manner in carefully controlled areas. However, the work of looters, often using explosives, and the effects of severe storms have confused much of this work. It was therefore concluded that detailed and systematic recording of individual items on this site was unnecessary at this point.

The first priority was therefore to remove the surface layers of disturbed material and to try and uncover undisturbed levels. In the

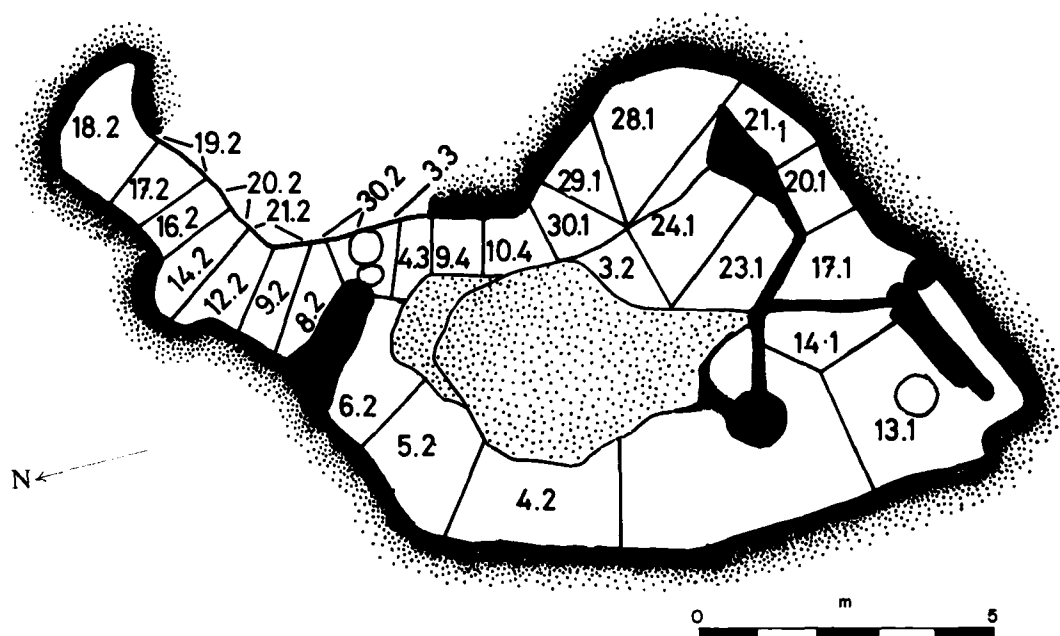


Figure 7. Progress of excavation: areas outlined represent extent of excavation on date indicated in centre of area.

following weeks teams of divers cleared the superficial material, often bringing back as many as 40 bags of ballast bricks a day. The airlifting was carried out in an EW trench about 2 m wide, extending from the western limit of the disturbed material (13.1) east through Cave no. 1 (see Fig. 7) to the base of the underhang (21.1). The results of this first phase confirmed the initial findings that the superficial levels were severely disturbed. However, in levels undisturbed by looters very little structure or stratification was noted. In the eastern area of the trench (17.1) some ship's structure was found. However, the timbers were badly broken up and almost unrecognisable. In some cases pottery and other small artefacts were found above and below the ballast brick layer. This tended to indicate that the ship broke up violently and her wreckage was thoroughly mixed up.

It was therefore decided to continue the excavation, recording only the significant material, by sketching the approximate position (± 1 m) and depth at which it was found, on the accurate plan of the site.

In the second phase the concretion between

Cave no. 1 and the large lump was removed (23–24.1). This area was then excavated down to bedrock and the excavations extended along the underhang to the north up to the large lump (30.1). Excavation then moved to the west of this lump, (4.2) extending this work through the 'trench' to the end of the main deposit (18.2). The various lumps obstructing the excavation to the east of the large lump were then removed and the large lump was broken up into manageable pieces.

Various caves were inspected but in all cases only a superficial layer of sand, gravel and ballast brick was observed. Excavation of these caves was abandoned because of the dangers and difficulties involved with the very strong surge.

Two cannons were raised, the first no. 12 (see Fig. 19) and the second the badly damaged cannon no. 16, for research into methods of treating and conserving iron cannons. A limited programme is now under way to collect the few remaining loose artefacts on the site. A survey of the whole reef is planned to check whether there are any other wreck deposit

areas, and a hydrographic survey of the area around the wreck site to attempt to determine where exactly the ship struck the reef.

Distribution of finds

The distribution of finds is shown in Fig. 8, ceramics; Fig. 19, brick and ferrous material; Fig. 14, non-ferrous and glass material, and Fig. 18, miscellaneous.

Trying to find a pattern in the distribution of material is difficult because:

1. It is likely that the ship broke up in a complex manner and material was therefore distributed at the time of the wreck in a confused pattern.
2. The subsequent action of the sea and of severe gales possibly caused a redistribution of the lighter material.
3. The effects of looting and blasting have been to add confusion to the already complex stratification and distribution over the whole wreck site.

The one outstanding pattern that can immediately be recognised is that of the coin. These are exclusively confined to the north and main section of the trench. This has been the area most heavily worked by looters, but due to the weight of the individual coins, they have not been moved significantly by wave action, and therefore indicate something of their original distribution.

With the ceramic material, it is likely that any intact stoneware jugs that were lying in superficial levels of the sand-ballast brick areas had been removed by looters. It is interesting to note that apart from a few jugs in superficial levels, the majority were recovered from either deep levels or in-filled underhangs.

The large amount of animal bones recovered during the course of the excavation was invariably associated with the remains of wooden barrels. This presumably is part of the ship's victuals: salt beef and pork. Other bone remains include fish and, possibly, chicken. Several pewter bottle tops were found in two main groups associated with the remains of square glass bottles. Over 250 clay pipes were found in the remains of a wooden

box in the trench. These were obviously cargo as they retained their original head-to-tail stacking arrangement. The remains of a box of tools (files and punches) were found closely associated with a set of wooden handles.

It has been suggested that the numbers of brass and copper cauldrons, cooking pots and ladles may represent the galley area (north end of the large lump). However, it should be emphasized that this material is deeply embedded in the iron billet concretion. It is possible that the area is a galley area, especially as stacked bricks have been found there, and all the vessels appear to be associated with cooking. It is, however, possible that these objects were trade goods and at this point it is perhaps premature to speculate.

Apart from such isolated associations and tenuous patterns, little of significance can be drawn from the pattern of distribution at this stage. It is hoped that further analysis and work on the site may provide more information.

The finds

The coins. A total of 7881 coins were recovered during the excavation. These are now being cleaned in the Museum Conservation Laboratory. We can make an estimate of the missing coins from details of coins recovered prior to the Museum Act and held in private collections. (Data supplied by Mr S. J. Wilson.)

All coins recovered from the wreck site are from Spanish Metropolitan and Colonial Mints and their composition is shown in Table 1.

We know that the ship carried 78,600 guilders, and it is known that in 1626 silver Spanish reals of eight weighed 17 engles 25 aces (27.454 g) and were valued at 2 guilden 8 stuyvers (48 stuyvers). (See: Heeren Staten Generael de Vereenighde Nederlanden: *Beeldenaer ofte Figure-boeck dienende op de Nieuwe Ordonnantie van der Munte*, 's-Gravenhage 1626.)

Thus 78,600 guilders = 32,800 reals of eight which from the proportions in Table 1 give a total in reals of eight, four, two and one of 45,950 coins.

This calculation is based on the following assumptions:

1. The value of a real in 1626 was the same as that in the 1650's (1 real of 8 = 48 stuyvers).
2. The ratios given from the sample (6% of total) in Table 1 for reals of eight, four, two and one are representative of total coinage on board the ship.
3. The figure of 78,600 guilders given in the archives is correct.

TABLE 1

Mint	Real of 8	Real of 4	Real of 2	Real of 1
Burgos	1	0	0	0
Granada	4	2	1	0
Madrid	9	7	3	0
Mexico	1231	605	518	5
Potosi	145	15	4	0
Seville	27	27	16	0
Santa Fe	16	4	2	0
Segovia	19	10	18	0
Toledo	6	4	3	0
Unidentifiable	53	35	24	0
Total	1517	709	589	5
Per cent	53.7	25.1	20.85	0.35

N.B. Four counterstruck coins.

A tabulation of all the known coins from the *Vergulde Draeck* is given in Table 2.

TABLE 2

Estimate of coins recovered from the Vergulde Draeck

	Numbers
Held by Museum, not yet examined, being cleaned	7881
Held by CIB, not yet examined, cleaned	1700
Private collections registered by Museum (Table 1)	2824
Damaged coins melted by Perth Mint (estimate)	7500
Coins illicitly sold (estimate)	2000
Approx. known total recovered	21905
Estimated total on board	45950
To be accounted for	24045

The missing coins may be accounted for by some or all of the following reasons:

1. Coins held in illicit collections.
2. Coins taken off the *Vergulde Draeck* by the survivors.
3. Erosion of coin on site, in time due to abrasive action of sand, gravel, etc.

This analysis is obviously superficial (the estimate of the total number of coins is based on a 6% sample), but it is hoped as more of the coins are cleaned and catalogued, it will eventually reach about 27%, thus giving a more significant sample.

The Edwards Collection (Fig. 4). It appears from contemporary accounts of the collection, rubbings and the collection now held by Mr A. Edwards that there were 14 coins of the Spanish Netherlands. These were all ducats or half ducats and are broken down in the following way:

- | | |
|---|--|
| 1. 1 Ducaton 1655 of
Brabant, Brussels mint | } in Edwards
Collection |
| 2. 1 Ducaton 1637 of
Brabant, Brussels mint | |
| 3. 1 Ducaton 1638 of
Brabant, Anv. mint? | |
| 4. 1 Ducaton 1638 of
Brabant, Brussels mint? | |
| 5. 1 Ducaton 1640 of
Brabant, Brussels mint | |
| 6. ½ Ducaton 1636 of
Brabant, Anv. mint | |
| 7. 1 Ducaton 1653 of
Brabant, Anv. mint | } rubbings of
the
Edwards
Collection
made in
1938 by
Mr P. E. C.
de Mouncey |
| 8. 1 Ducaton 1631 of
Brabant, Anv. mint? | |
| 9. ½ Ducaton 1637 of
Brabant, (?) mint | |
| 10. ½ Ducaton 1636 of
Brabant, Brussels mint | |
| 11. 1 Ducaton dated 1613 of
Austria | } reported in
collection
in <i>West
Australian</i> ,
February
1931 |
| 12. 1 Ducaton dated 1635 | |
| 13. 1 Ducaton dated 1648 | |
| 14. ½ Ducaton dated 1647 | |

The other coins consist of one Cho-Gin and 23 Mameita-Gins of the Keicho period (1601-1695). Coin 1 is obviously critical in associating this collection with the *Vergulde Draeck*. Further investigation is required to

determine the 1655 issue date of the Brussels mint, since if this was after the departure date it clearly indicates that the hoard is not connected with the *Vergulde Draeck*.

The ceramic materials (Fig. 8)

Salt-glaze stoneware. The Museum has 44 complete stoneware jugs from the *Vergulde Draeck* of which 30 were recovered during the 1972 excavation. Clearly the material is too extensive to deal with here in depth, as there is much analysis and conservation work still

TABLE 3	
Stoneware jugs	
Jugs with no masks or seals	11
Bellarmino jugs with a mask but no medallions	6
Bellarmino jugs with a mask and one medallion	9
Bellarmino jugs with a mask and three medallions	11
Total	37

jugs have been exposed to on the wreck site. One curious finding, when measuring the

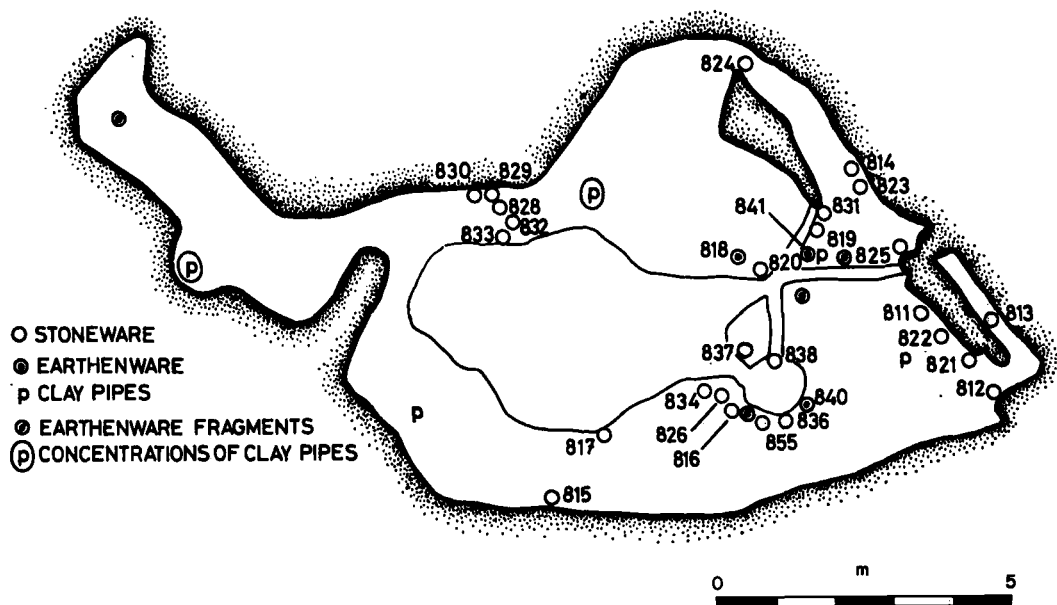


Figure 8. Distribution of ceramics (numbers refer to registration numbers).

to be done. However, some preliminary findings can be indicated. Out of the 37 jugs so far examined, Table 3 gives the breakdown of the distribution of masks and medallions.

The majority of the medallions are either the 'rose bar and heart', floral or heraldic (4; 2 being of the Amsterdam city coat of arms). There is a surprising variation in the execution of the masks and the various basic types are shown in Figs 9 and 10. The quality of the glaze is also variable. This may partially be due to the varying amounts of erosion the

capacities of the jugs, was that two examples had flaws in the fabric and were found to leak very badly. These flaws were obviously due to faulty manufacture, due possibly to pieces of wood in the clay.

Several authors have discussed the use of the term 'Bellarmino' (Hume, 1958; Holmes, 1951) and it is not necessary to expand this theme here. However, Holmes discussed the debasement of the mask in the early 17th century and it is interesting to note the variations in styles ranging from naturalistic (Fig.

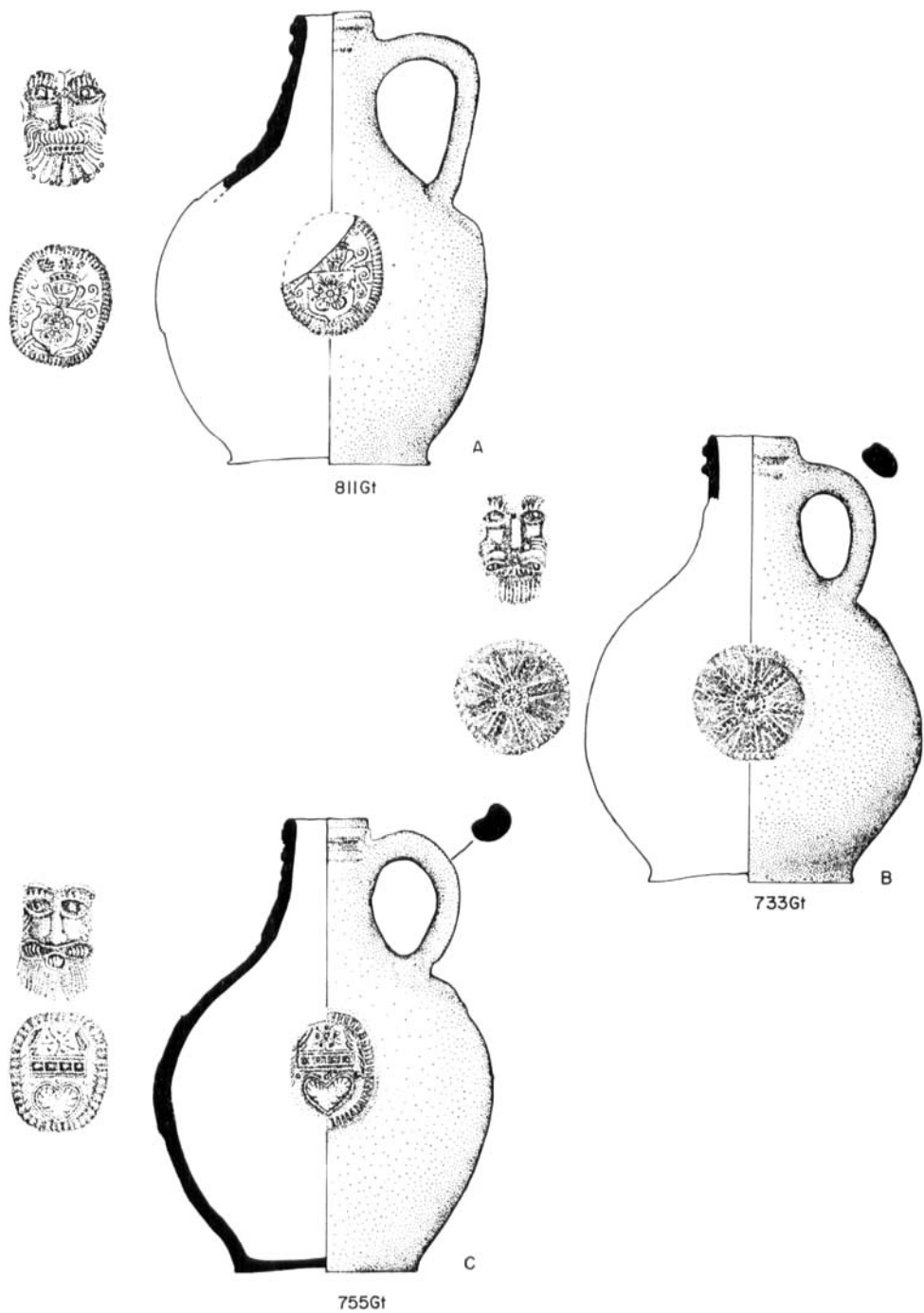


Figure 9. Salt-glazed stoneware Bellarmine jugs: A, 3 medallions crowned shield with rose; B, 3 medallions rosette; C, 3 medallions rose crown and heart. Scale 1:4.

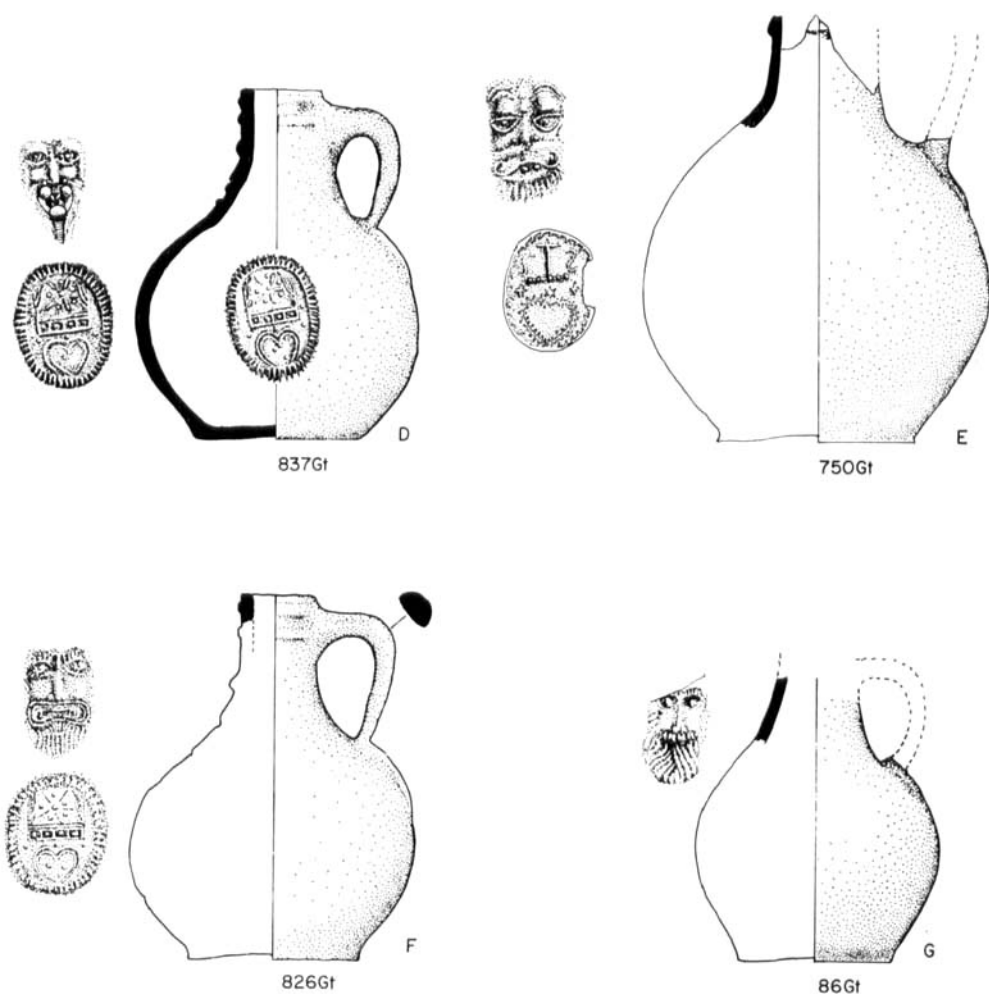


Figure 10. Salt-glazed stoneware Bellarmine jugs: D, F, medallions rose crown and heart; E, 1 medallion cross stars and heart; F, 1 medallion rose crown and heart; G, no medallions. Scale 1:4.

9A) through to animalistic forms (Fig. 10D, F). The general impression on examining the collection is the variation in quality of the jugs. Some are well executed, regular, with carefully made masks and seals and good quality glaze, whilst others are crudely made, wry-necked, dented with crudely executed masks and seals and poor quality glaze. For mask on Fig. 9A type V mask (cf. Moorhouse, 1970: fig. 22, no. 266); the medallion on Fig. 9B (cf. Hurst, 1963: fig. 28, no. 256); medallions on Figs 9C and 10D, F (cf. Hurst, 1963: fig. 28, nos. 254, 255 & 257); mask on Fig. 9C (cf. Hurst, 1963: fig. 28, no. 248); Holmes type VII.

A small stoneware drinking cup (Fig. 11A) with cobalt blue bands was also recovered.

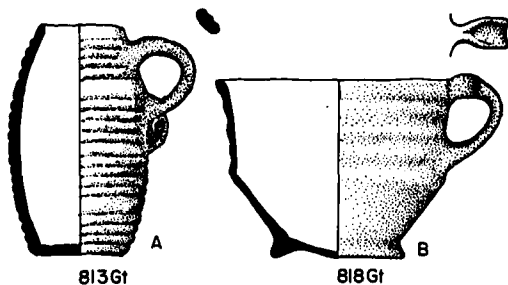


Figure 11. A. Salt-glazed stoneware drinking cup with blue cobalt stripes on wide bands. B. Earthenware drinking cup. Scale 1:4.

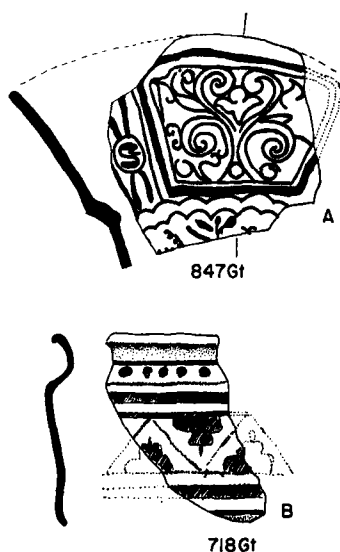


Figure 12. Delftware: A, part of plate; B, part of ointment jar. Scale 1:4.

Earthenware. Three semi-complete examples of earthenware vessels were recovered during the excavation:

1. A pipkin or three-legged bowl.
2. A drinking cup (Fig. 11B), similar to one illustrated in Van der Heide (1956: fig. 24).
3. A three-legged skillet or pouring pan.

Numerous small earthenware fragments of these three basic types were found on the site.

Delft ware. Two examples of blue Majolica or Delft ware recovered from the site are illustrated in Fig. 12A, B.

Clay pipes. Seven types of clay pipe were recovered from the wreck site. The largest group was over 250 clay pipes with four fleur-de-lis and cog-wheel patterns on stem with RP maker's mark (Fig. 13A). With this group were isolated examples of pipes with CT maker's mark and no pattern and pipes with three large fleur-de-lis and no makers' marks. These pipes were recovered from the remains of a wooden box with pipes stacked head to tail in a regular fashion. The original packing has disappeared but the remains of some form of seed pods (?) in the bowls of some of the pipes may indicate packing or alternatively some form of tobacco. The box was located in the trench in section 14.2 (Fig. 7) and is indicated in Fig. 8.

Other types represented are crude flower (rose?) patterns on bowl with (Fig. 13B) and without stamens, similar to Oswald (1970, fig. 59, nos. 67 and 77), plain unadorned and unmarked pipes (Fig. 13D). The most interesting pipe is a 'Sir Walter Raleigh' pipe showing the head of Raleigh on the bowl with his body extending down stem where a crocodile is in the process of eating him (Fig. 13C). This design is taken from the legend that Sir

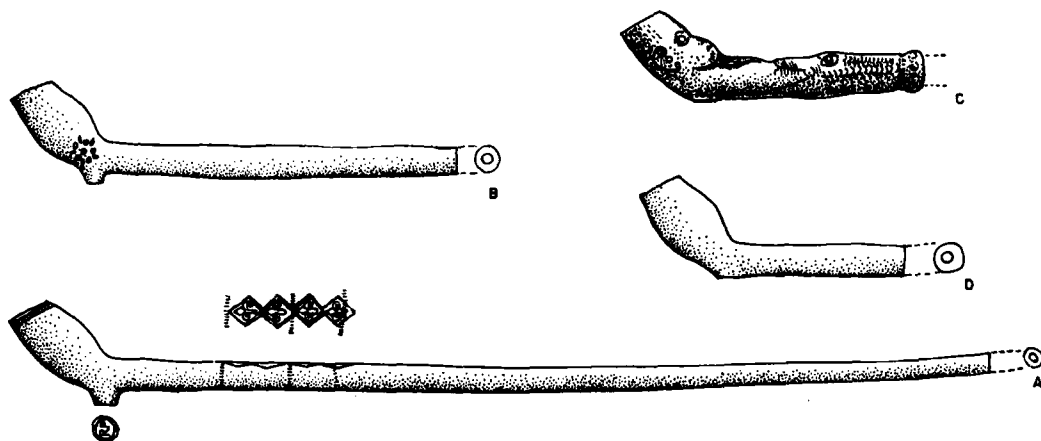


Figure 13. Clay pipes: A, RP maker's mark, four fleur-de-lis incised; B, no maker's mark, rose with stamens; C, Sir Walter Raleigh pipe; D, plain pipes. Scale 1:2.

Walter Raleigh was once eaten by a crocodile which then proceeded to spit him out since he was too poisonous with nicotine (similar to Oswald, 1970: fig. 59, no. 79).

Non-ferrous material (Fig. 14). Two mortars (Figs 5 and 15) were discovered on the site (not on the 1972 excavation) and are important for identifying the wreck site. No. 6Gt was discovered in the early work on the site

lower stem and is riveted to the base, thus holding the whole together.

A large group of brass and copper utensils were found around the large lump. Several cauldrons of brass with copper legs perhaps had handles as well since there are indications of copper rivets on the sides of the vessels. A group of three brass colanders (?) (Fig. 16B) were found in the same general area with three

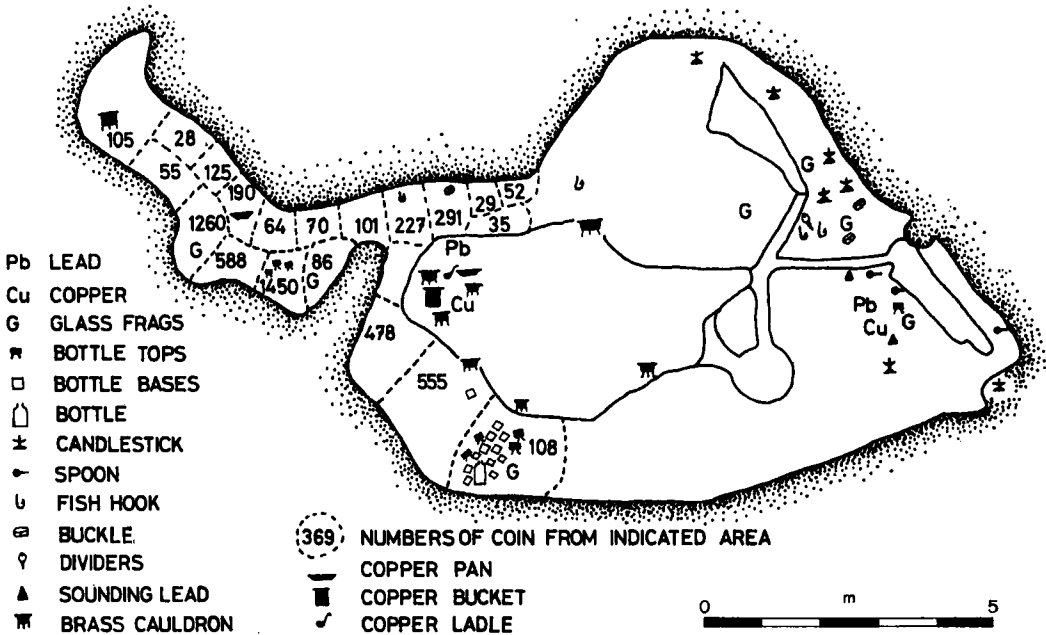


Figure 14. Distribution of non-ferrous and glass material.

at the base of cannon 6 and is in poor condition; the larger is in better condition and bears the mark of the Amsterdam Chamber of the VOC and the date 1654, the year before the *Vergulde Draeck* sailed for Batavia. Both mortars bear the same inscription: AMOR VINCIT OMNIA ANNO but in 6Gt the date is obscure. Several brass or bronze keg taps were discovered on the site: the best is illustrated in Fig. 16A and shows a fleur-de-lis with maker's stamp AS. A large group of brass candlesticks was found on the site. They are turned and rather crudely made in four parts: base, lower stem (hollow), wax-tray and holder (see Fig. 16C). The holder has a long pin which passes through the tray and

copper pans which originally had handles, a copper bucket with its handle missing and a copper ladle also with the handle missing.

A brass(?) rosary medallion (Fig. 17) was found in among a concretion of cannon-balls. The medallion was associated with about 14 beads, presumably part of the rosary. The obverse shows a portrait of the Madonna (?) crowned with an IHS seal supported by winged cherubs. Around the periphery is the inscription V.G.D. PRO VENZANO SENIS. On the reverse are two saints crowned by a seated figure and cherubs (faces with wings). The saints are indicated by the inscription S. BERNARDINS and S. CATHARINA and S.H. at the base. This is pre-

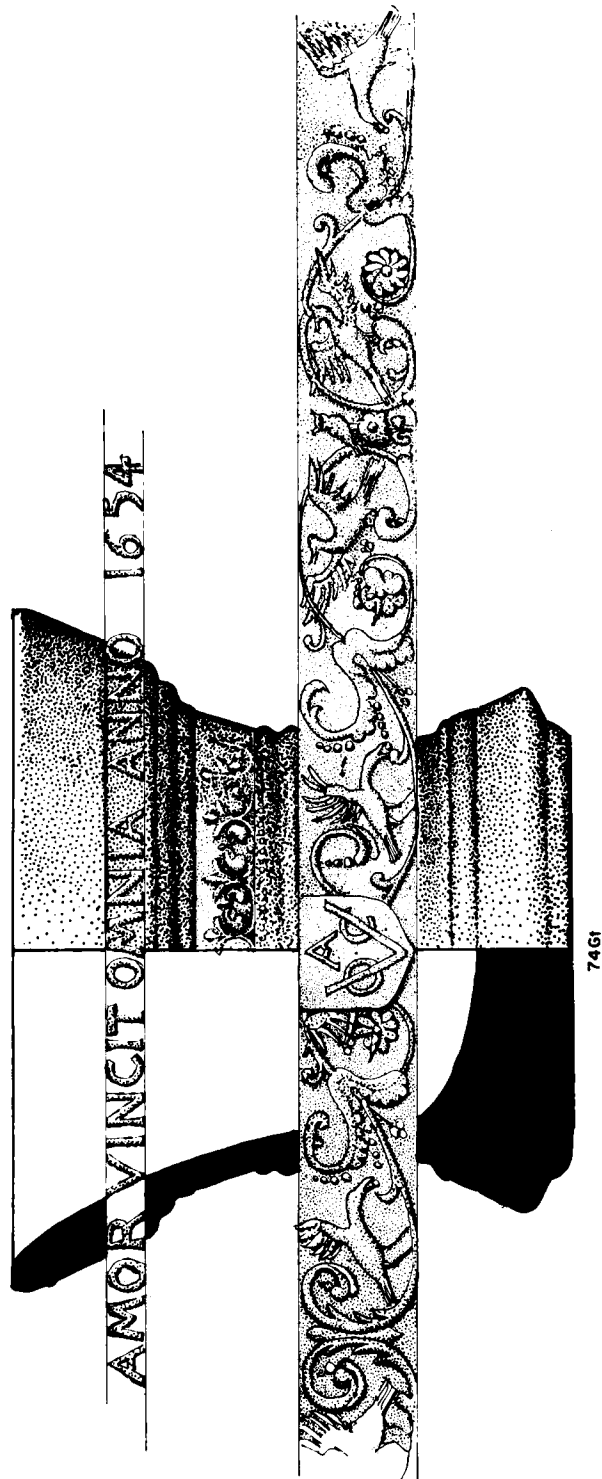


Figure 15. Bronze mortar with AVOC shield, AMOR VINCIT OMNIA ANNO 1654. Note small owl to right of shield. Scale 1:2.

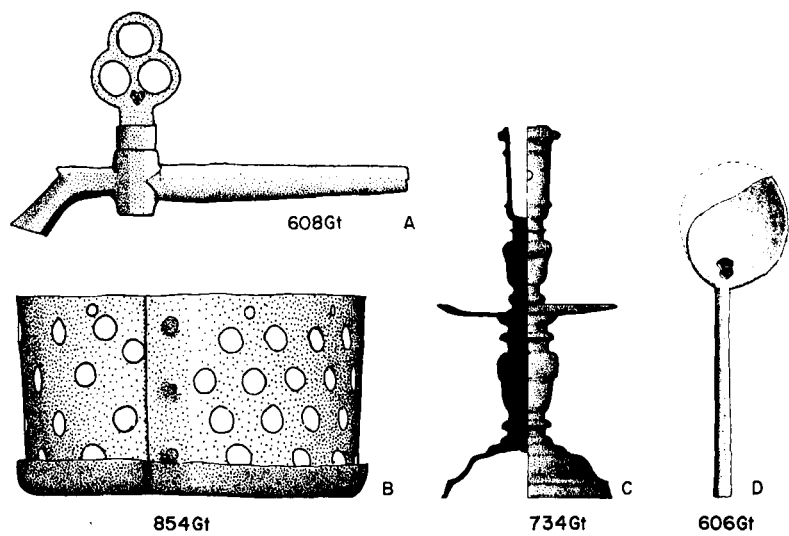


Figure 16. A. Bronze-brass tap with maker's mark AS and fleur-de-lis. B. Brass colander. C. Brass candlestick. D. Pewter spoon with Tudor rose and crown with PV stamped on it. Scale 1:4.

sumably part of a Catholic rosary medallion and it is interesting to note that the wearing of rosaries was banned in the United Netherlands and officially Catholics were not

allowed to hold an official post or legally worship in public or private. The Heeren XVII were often petitioned by *predikanten* of the True Christian (Calvinist) religion in Batavia about the non-observance of the anti-Roman Catholic regulations and stated in 1654 that it was impossible to prevent Roman Catholic priests from going out East in disguise. It is also of interest that the Governor General at Batavia at this period was Johan Maetsuyker, a highly suspect Catholic sympathizer. For a fuller discussion of the Roman Catholic problem see Boxer (1965: ch. 5).

It is noteworthy that one of a group of pewter spoons has a Star of David graffito on the back of the bowl. These spoons (Fig. 16D) have a Tudor rose crowned with the initials PV in the crown. The significance of the Star of David is obscure; it could have been that the owner was Jewish.

Two groups of case glass bottles were found on the site associated with pewter screw tops. In one case almost the whole bottle survives. Several lead seals were also found. Most bear an indecipherable inscription but in one case ROMENI X can be deciphered.

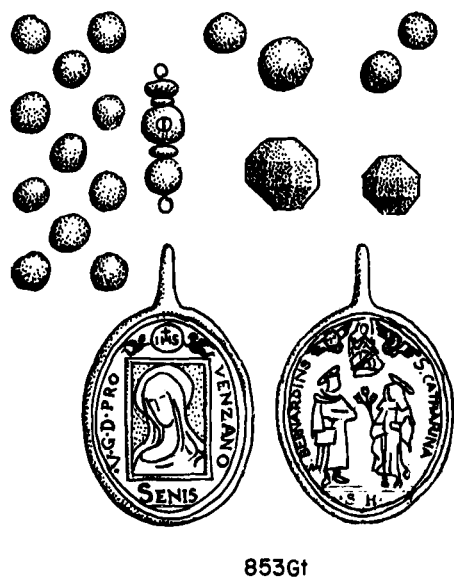


Figure 17. Brass (?) rosary medallion and beads. Scale 1:1.

Miscellaneous finds

Bones (Fig. 18). The amount of bone recovered from the site was quite surprising. [This

was mainly associated with wooden barrels. Various types of bone were recorded. However, at present they are undergoing treatment at the Conservation Laboratory and are not available for study. From the initial records, shank, shoulder and ribs were noted, many

was recovered from the site. The only identifiable material is a rib, some planking and possibly a knee.

Several groups of wooden and bone handles were found, one group closely associated with a box of iron punches and files.

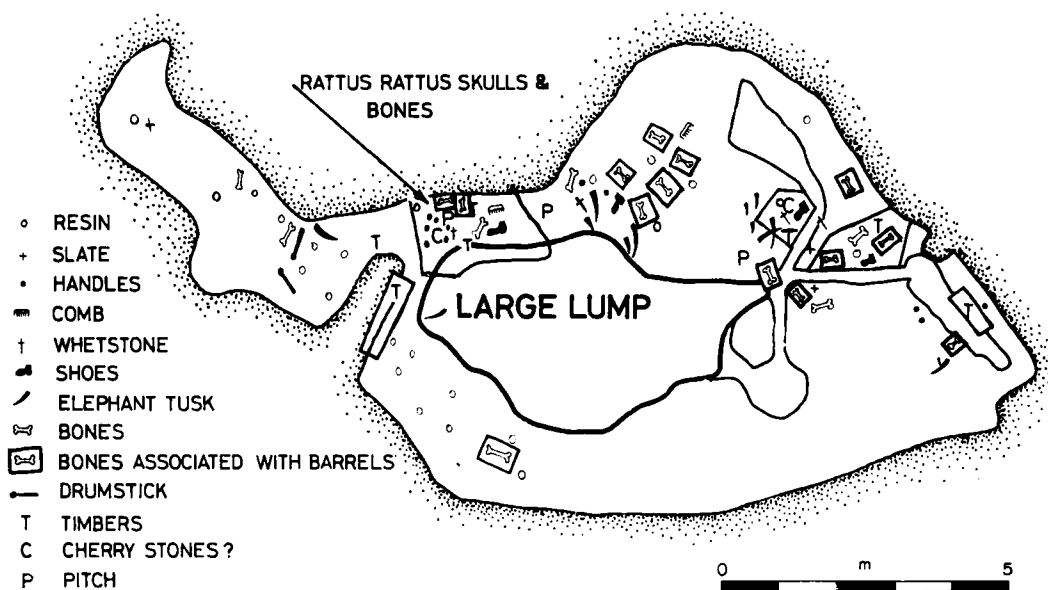


Figure 18. Miscellaneous finds.

bearing butchering marks. This was presumably ship's provisions of salt beef and pork; some chicken bones (?) were also noted. Only the bottom half of the barrels were found and each barrel was associated with a particular type of bone, i.e. ribs, legs, etc. Other material may include fish bones.

Two skulls of what have been identified as *Rattus rattus* were found together with a lower jaw and some skeletal material. This discovery introduces an interesting question as to the first introduction of *Rattus rattus* to Australia. It is questionable whether enough rats could have deserted the sinking ship to establish a breeding colony on the West Australian coast (it being about 5 km from the site to the shore). However, it does suggest that rats had an opportunity of coming ashore from this and other wrecks as well as vessels engaged in survey along the coast.

Wood. Much fragmentary ship's structure

The remains of about 14 barrels were recorded associated with bones (see above), also two wooden barrels containing iron nails were recovered.

Included in the miscellaneous finds are a pair of wooden drum-sticks, 13 elephant tusks, wood and bone combs, a large number of cherry (?) stones, leather shoes, slate, schist whetstones, pitch, and a large amount of resin.

The source of the elephant tusks represents an interesting problem. It is known that the *Zeewijk* which was wrecked on a reef off the Abrolhos Islands, Western Australia, in 1727, was carrying elephant tusks (see Edwards, 1970). These were almost certainly collected illegally at the Cape for private trade. However, in 1656 the Cape had only been in existence for four years and it is doubtful if a large trade in elephant tusks was established. It is possible that the tusks were exported from the Netherlands.

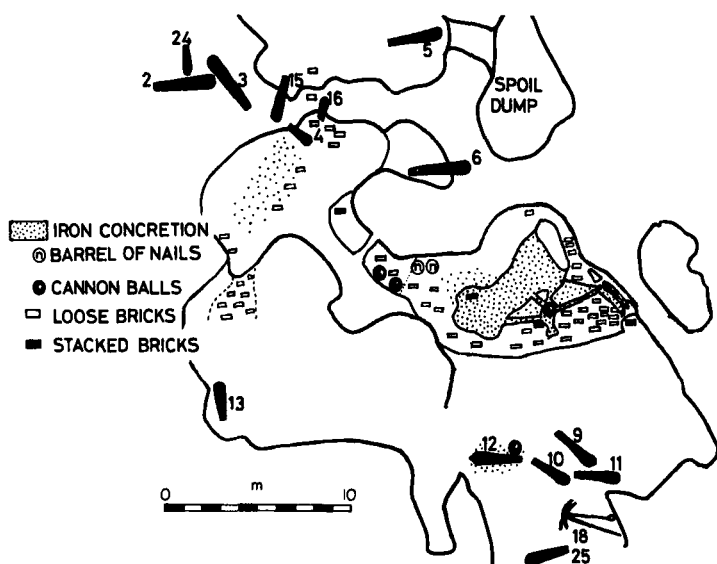


Figure 19. Distribution of brick and ferrous material.

Iron material (Fig. 19). The large lump (Fig. 19) in the centre of the excavation area consists of iron billets. It is difficult to estimate the weight of this material but the volume would be in the order of 8 m^3 , indicating a mass of approximately 50 tons. The billets are about $0.01 \times 0.003 \text{ m}$ in cross-section, their overall length has not yet been determined.

Large numbers of cannon-balls have been recovered, and examples of bar-shot. The cannon no. 25 was raised in 1963; no. 13 was raised by the Museum in 1969 and bore the AVOC inscription carved crudely near the touch-hole and 1D and 48 moulded on the trunnions. Cannon nos 12 and 16 were raised during the 1972 excavation but neither had any form of inscription.

Bricks (Fig. 19). About 10 m^3 of bricks have been recovered from the wreck site. These are crudely made bricks and represent part of the ship's ballast. Some groups of bricks were found cemented together in a regular manner, these possibly represent part of the galley.

Conclusions

This paper is a preliminary report on the findings of the excavation of the *Vergulde Draeck*.

There is a considerable amount of work to be done not only on the conservation of the material but also on research. It is hoped that in the future, groups of material will be published in a fully documented form.

From the excavation it can be shown that the site has suffered from the work of looters. However, due to the highly disturbed nature of the site it is unlikely that this has seriously affected the overall findings. It is my opinion that little of the ship's structure survived the break-up of the ship. This is reinforced by the contemporary report of Volkersen who found wreck material scattered along 60 km of the coastline. The excavation has revealed a wealth of general cargo, ship's fittings, provisions, specie, presenting a considerable field for research. Little is known of Dutch East Indiamen of the first half of the 17th century, and it is hoped that further work on the material and the archives will help to improve our understanding of this particular period. An excavation of the Dutch East Indiaman *Batavia* (1629) is planned in 1973. This site should be particularly interesting as the vessel was the flagship of the Fair Fleet of 1628 and therefore may be a vessel much larger than the *Vergulde Draeck*. Comparison of material from the two sites will undoubtedly throw further light on 17th-century East Indiamen.

It is clear that nautical archaeology is a

rapidly expanding field of study, and that the study of East Indiamen is becoming an important part of this field. The East Indiamen of the 18th century are easier to study than those of the 17th century, since much of the documentary evidence exists in the Algemeen Rijksarchief and for European waters the contemporary records (cf. Marsden (1972) on the wreck in 1749 of the *Amsterdam*). For the 17th century, and particularly the first three quarters, many of the archives have been destroyed. For example in the case of the *Vergulde Draeck* we have no clear idea of the type of ship, or her cargo. Archaeological excavation of ships of this period will help to fill these gaps.

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References

- Boxer, C. R., 1965, *The Dutch Seaborne Empire 1600–1800*. History of Human Society Series. London.
- Drake-Brockman, H., 1963, *Voyage to disaster*. Sydney.
- Edwards, H., 1970, *The wreck on the Half Moon Reef*. Australia.
- Heeren Staten Generael Der Vereenighde Nederlanden, 1626, *Beeldenaer ofte Figuer-boeck op de Nieuwe Ordonnantie van der Munte*. 's-Gravenhaghe.
- Heeres, J. E., 1899, *The part borne by the Dutch in the discovery of Australia 1606–1765*. Royal Dutch Geographical Soc. London.
- Heide, G. D. van der, 1956, *Zuyder Zee archaeology*, A reprint from *Antiquity and Survival*. The Hague.
- Holmes, M. R., 1951, The so-called Bellarmine Mask on imported Rhenish stoneware. *Antiquaries' J.*, 31: 175–9.
- Hume, N., 1958, German stoneware Bellarmine—an introduction. *Antiques*, 74: 439–41.
- Hurst, J. G., 1963, A mid-17th century group from the Parsonage House. In E. W. Holden, Excavation at the deserted medieval village of Hangleton. *Sussex Arch. Coll.*, 101: 54–181.
- Major, R. H., 1859, *Early voyages to Terra Australis*. Hakluyt Society. London.
- Marsden, P., 1972, The wreck of the Dutch East Indiaman *Amsterdam* near Hastings, 1749. *Int. J. Naut. Archaeol.*, 1: 73–96.
- Moorhouse, S., 1970, Finds from Basing House, Hampshire (c. 1540–1645), Part 1. *Post-Med. Arch.*, 4: 31–91.
- Oswald, A., 1969, Marked clay pipes from Plymouth, Devon. *Post-Med. Arch.*, 3: 122–42.
- Wilson, S. J., 1964, The significance of coins in identification of old Dutch wrecks on the Western Australian Coast. *Numismatic Circ.*, Sept.

Periodical notes (continued from Vol. 2, No. 1, March 1973)

- Göttlicher, A., 1971, Anmerkung zum Modell einer phönikischen Bireme. *Das Logbuch*, 7: 29–30, 8 figs.
Description of Phoenician ship model from the *Modelbaurevue* (1967).
- Green, J. N., 1971, Cape Andreas, survey of a tile wreck. *Prospezioni Archeologiche*, 6: 61–4, 4 figs.
Survey of seabed in north-west Cyprus in 1970 using photogrammetry, probe, metal detector and proton-magnetometer. In bibliography refers to:
- Green, J. N., *Cape Andreas expedition report* 1969. Res. Lab. Arch., Oxford, 1969.
- Green, J. N., Cape Andreas: a preliminary report (1969). *Underwater Association Report*, 1970.
- Green, J. N., *Cape Andreas: an underwater archaeological survey*. 23rd Colston Symposium, Bristol, 1970.
- Harland, J. H., 1972, The early history of the steering wheel. *Mariner's Mirror*, 58: 51–68, 26 figs.
Appearance of the wheel in 18th century and its development throughout the 19th century.
- Hoskins, H. & Huston, J., 1971, Finding artefacts with sonar. *Mélanges de préhistoire, d'archéocivilization, et d'ethnologie offerts à André Varagnac* (Paris): 437–454.
The technical report of 1966 field trials of an Edgerton 'mud penetrator', describes surveys of sites in Holland, Italy and Greece. The sonar traces are reproduced, and comments added. Appended is a bibliography on high resolution seismic reflection profiling.
- Joncheray, J. P., 1972, La recherche archéologique subaquatique en France: perspectives et réalisations. *Archéologia*, 48: 8–15, illus.
Development of nautical archaeology, its history, recent excavations, methods, resources and bibliographic sources.
- Jones, G. D. B. & Little, J. H., 1971, Coastal settlement in Cyrenaica. *Journal of Roman Studies*, 61: 64–79, 6 pls.
A survey of coastal sites with plans and air photos. Many of the sites have ancient harbours, some dating from the Greek settlements in 6th century BC. It contains a full archaeological background for future harbour surveys.
- Lewis, J. D., 1971, Marine Archaeology Symposium at Bristol, England. *Archaeology*, 24: 361–2.
- McCann, A. M., 1972, A fourth century BC shipwreck near Taranto. *Archaeology*, 25: 181–7.
Wreck named from chapel 'La Madonnina'. No ship remains but three pyramidal stone anchors, amphoras, and a lamp help to give a date around 350 BC.
- McGowan, A. P., 1972, A paddle-tug in a museum: an exercise in patience and imagination. *Museums Journal*, 72: 3–6, illus.
Salvage and reconstruction of the Manchester Ship Canal paddle-tug *Reliant* in the National Maritime Museum.
- McKerrell, H., Roger, E. & Varsanyi, A., 1972, The acetone/rosin method for conservation of waterlogged wood. *Studies in Conservation*, 17: 111–25, 10 figs.
Discusses the problem of conservation of sound waterlogged oak, and, in particular, the limitations of polyethylene glycol impregnation is briefly considered. The development of a new process involving dehydration with acetone and impregnation with rosin is described.
- McKerrell, H. & Oddy, A., 1972, The conservation of waterlogged wood using dewatering fluids: an evaluation. *Museums Journal*, 71: 165–7.
A criticism of the effectiveness of the treatment of waterlogged wood with Ferromede dewatering fluid based on initial evaluation in the research laboratories of the British Museum and the National Museum of Antiquities of Scotland.
- McNulty, R. H., 1971, Common beverage bottles: their production, use and forms in seventeenth and eighteenth century Netherlands. Part 1. *Journal of Glass Studies*, 13: 91–199, 67 figs.
Illustrates a number of different types.
- Marstrander, S., 1970, Rock carvings in Østfold, Skjeberg. *Norwegian Archaeological Review*, 3: 89–112, 11 figs.
Abstract of S. Marstrander's book, *Østfolds Jordbruksrister Skjeberg* (Oslo, 1963), with comments by G. Gjessing, C. A. Moberg, H. Thrane and A. Hague. Many ship-figures discussed and illustrated.
- Marstrander, S., 1971, Reply to the comments on 'Rock carvings in Østfold'. *Norwegian Archaeological Review*, 4: 51–6.
Refutes view that Scandinavian ship-figures have a connexion with Mediterranean Bronze Age ship forms.
- Marsden, P., 1971, Archaeological finds in the City of London, 1967–70. *Trans. London & Middlesex Archaeological Society*, 23: 1–14, 9 figs.
Deals with the Blackfriars Wrecks II, III & IV.
- Marsden, P., 1972, The wreck of the Dutch East Indiaman *Amsterdam*. *Mariner's Mirror*, 58: 5–26, illus.

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