Cultural Heritage Agency
Ministry of Education, Culture and Science

The Utrecht

A shipwreck of the Dutch admiralty in the Baía de Todos os Santos, Brazil: its history from battle to archaeological assessment

M.R. Manders, W.F.G.J. Brouwers (Eds.)

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Colophon

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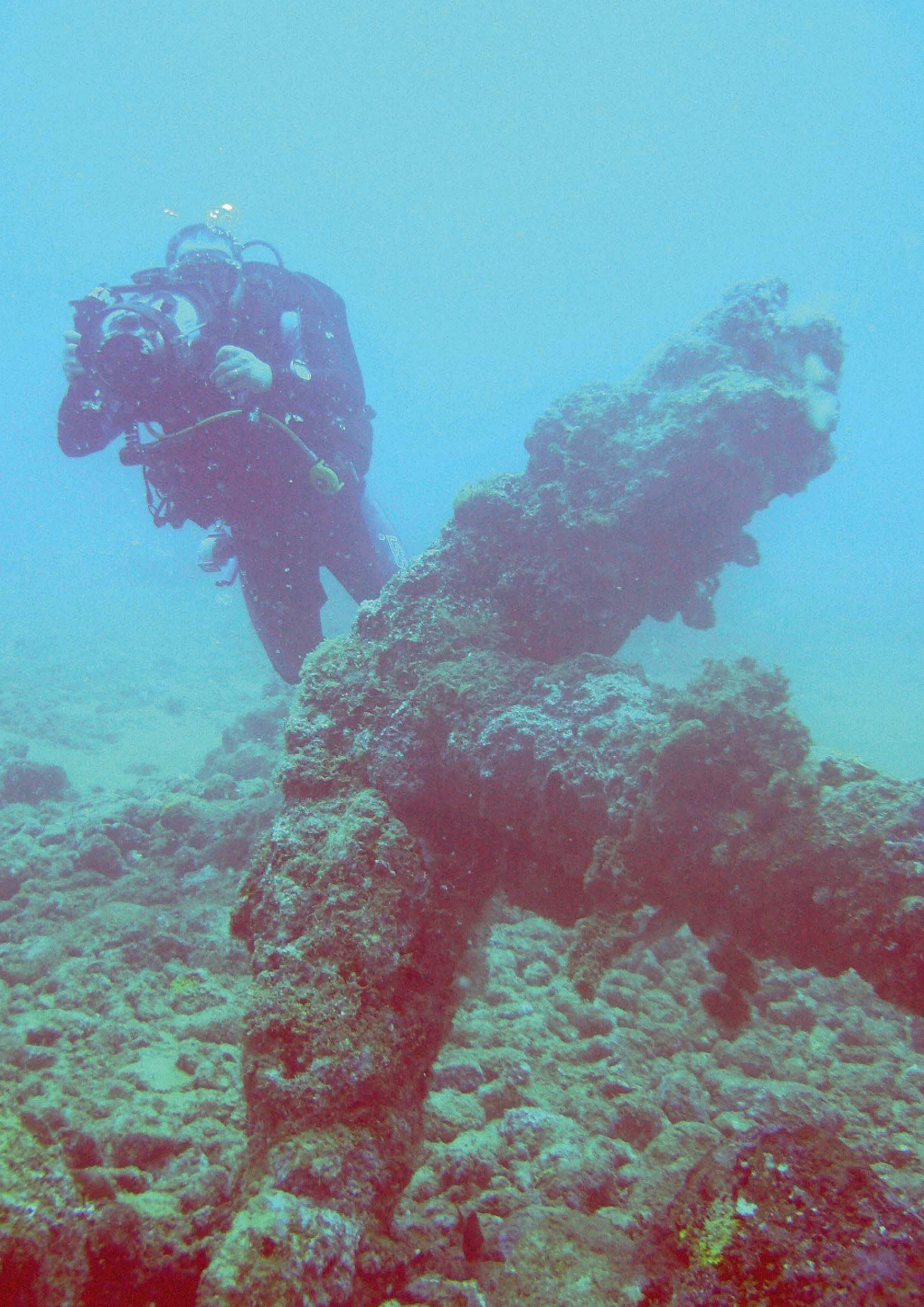


Summary

As a follow up of an initial dive inspection executed by the underwater archaeologists Gilson Rambelli (Brazil) and Martijn Manders (the Netherlands) in 2007, in December 2012, an international team of archaeologists and students carried out research on the Dutch shipwreck, *The Utrecht*, in Baía de Todos os Santos (All Saints Bay), Brazil. This non-intrusive on-site documentation and cultural assessment was carried out as part of the Maritime Programme in cooperation with the Shared Cultural Heritage Programme of the Cultural Heritage Agency of the Netherlands, the Museum of Archaeology and Ethnology of the Federal University of Bahia, Brazil, and the Ship Reconstruction Laboratory of the Nautical Archaeology Program at Texas A&M University, United States of America (USA).

Capacity building and exchange of knowledge are focus points at the Maritime Programme of the Cultural Heritage Agency of the Netherlands. During the two-week research study, the participants of this field school were to be guided through the entire process of diving, observation and archaeological assessment, and included them in every aspect of an archaeological project.

The research study revealed that a substantial portion of the ship's hull still remains at the site, preserved under a thin layer of sediment and ballast stones, including frames, the ceiling and a (possible) triple-planked section of the hull's outer planking. This remarkable state of preservation offers a rare window into early to mid-17th century Dutch shipbuilding practices.

It can be concluded that, although the Utrecht shipwreck site has been greatly disturbed by previous salvage works, it can still yield important information regarding early modern Dutch shipbuilding and seafaring technology. Finally, aside from its value for technical studies, the site offers ideal conditions for planning an underwater trail or in situ exhibition along the UNESCO Diving Trail Programme route. It also offers opportunities for creating awareness among recreational divers and opinion formers in regard to the importance of rigorous archaeological research and the protection of our common underwater cultural heritage. Through international cooperation, education and expertise exchange, the development of this project could become a benchmark for shipwreck conservation in Brazil as well as for capacity building and human resources in underwater archaeology.

fig. Page 4, Fig. 1: Diver investigates the Utrecht site in 2007.

1 Introduction

M.R. Manders

1.1 Background of the research study

In 1621, the Dutch West India Company (*Geoctroyeerde West Indische Compagnie*, WIC) was founded with a two-fold aim: first, to act as a war instrument against Spain and its colonies, and second, to monopolize the trade with Western Africa and the Americas. In Brazil, the Company's business developed around the sugar plantations in the northeast, which depended on slave labour. Brazil was originally colonized by the Portuguese, but from 1630 on, most of the territory was conquered by the Dutch West Indian Company and called New Holland (*Nieuw Holland*).[1] A series of ensuing wars weakened the WIC, and in 1654, Brazil was definitively recaptured by the Portuguese.

The WIC in Brazil called on the Dutch Republic to send military aid. The States General responded, sending a fleet of 12 ships to Brazil in 1647. It was in that fleet that *The Utrecht* came to Brazil.[2]

In September 1648, *The Utrecht* sunk off Itaparica Island in the waters of the state of Bahia, northeast Brazil, after a heavy engagement with the Portuguese vessels, *Nossa Senhora do Rosário* and *São Bartolomeu*. During the early 1980s, the wreck was commercially salvaged. However, it was not until 2007 that underwater archaeologists surveyed the wreck. That survey was followed by an assessment of the wreck site in 2012. The archaeological remains of the combat, preserved under the waves for over 350 years, are now a window to the past and present an opportunity for investigating early modern technology, culture and geopolitics in the Atlantic during this rich period in history.

This report contains: 1) the cultural heritage assessment, as executed according to the Dutch Quality Standards (*KNA Waterbodems 3.1*); and 2) the earlier published preliminary report and find catalogue.[3]

1.2 Reading guide

The report seeks to present the findings of the 2012 fieldwork season at the Utrecht shipwreck site, as part of the ongoing effort to document the site and assess its potential for future research. After the first introductory chapter, the geographical and historical context will be presented in Chapter 2. Chapter 3 will discuss the implementation of the research study, including the find conditions, implementation requirements and methods and techniques used. The results of the fieldwork are presented in Chapter 4, and the syntheses of the research is provided in Chapter 5. Chapter 6 will adress each research question individually. Chapter 7 contains the cultural historical assessment, subsequent advice and final considerations.

Appendix I contains the large artefact catalogue recorded during the 2012 fieldwork. Appendix II presents the small artefact catalogue. Appendix III consists of the research guide to maritime shipwrecks, which was written by the Cultural Heritage Agency of the Netherlands and the National Archive of the Netherlands, to support archival research on Dutch East India Company (VOC) shipwrecks, admiralty shipwrecks and WIC archives in the National Archive.
The most important archives present are the VOC archives (catalogue 1.04.02), the WIC archives (1.05.01.02), those of the Naval Colleges (1.01.46) and the States-general). Appendix IV presents the diving profiles, including a short summary of the workflow each day.

1 H. den Heijer 2013, Geschiedenis van de WIC
2 See Chapter 2 for the historical background of the Utrecht
3 Torres & Castro 2012
fig. Page 6, Fig. 2: Museu Náutico da Bahia, based in the Forte de Santo Antônio da Barra, of which the oldest parts date back to 1583-1587

1.3 Purpose of the research study

The 2012 fieldwork was a non-intrusive on-site documentation and cultural assessment carried out as part of the Maritime Programme of the Dutch Cultural Heritage Agency (*Maritiem Programma van de Rijksdienst voor het Cultureel Erfgoed, RCE*) in cooperation with the Shared Cultural Heritage Programme (*Gedeeld Cultureel Erfgoed*) of the Cultural Heritage Agency of the Netherlands (RCE), the Museum of Archaeology and Ethnology of the Federal University of Bahia, Brazil, and the Ship Reconstruction Laboratory of the Nautical Archaeology Programme at Texas A&M University, USA. Research on the wreck of the Utrecht was carried out in accordance with the Memorandum of Understanding (MoU) Concerning Mutual Heritage, which was signed in 2008 between Brazil and the Netherlands. This Memorandum expired on December 11, 2013.

Besides the archaeological research and assessment carried out at the site, the project also had an instructional dimension. The Maritime Programme of the Cultural Heritage Agency of the Netherlands aims to build a strong foundation for knowledge, research, policy, cooperation and education regarding all archaeological heritage resulting from the relationship between man and water. The two-week research study was designed to guide participants of this field school through the entire process of diving, observation and archaeological assessment, and include them in every aspect of an archaeological project.

This training was executed and financed jointly with the Dutch "Shared Cultural Heritage Programme".[4] This programme seeks to build capacity in ten focus countries with whom the Netherlands cooperates in order to ensure responsible management of cultural heritage - including at sites that are part of Dutch history. The Dutch Government also claims ownership of government-owned ships and shipwrecks. These include the wrecks of the Dutch East India Company (VOC), Dutch West India Company (WIC) and the admiralty. This claim of ownership is not a practice that is exclusive to the Netherlands. Many other (maritime) nations also consider their ship (and wrecks) as sovereign areas. Effectively it does not mean that the Netherlands claim every single object back and that it has to be transported to the Netherlands. The primary focus of the Netherlands' Cultural Heritage Agency is not to claim but to set up responsible management of underwater cultural heritage sites in general and to help build a framework for that.[5] Thus, the training programme can be seen as a further step in the development of Brazil's underwater cultural heritage management.

4 http://projects.maritiemprogramma.nl/en/projects/ Consulted on January 22, 2016

5 http://www.maritiemprogramma.nl/magazine/MP01/eng/magazine_04_eng.htm. Consulted on January 22, 2016

fig. Page 9, Fig. 3: The historic centre of Salvador de Bahia is listed as an UNESCO world heritage site since 1985


NZZ-8519

2 Geographical and historical context

W.F.G.J. Brouwers & M.R. Manders

2.1 Geographical context

The Utrecht sank in the Baía de Todos os Santos, Brazil, the second largest bay on the coast of Brazil, measuring 1223 km² (Fig. 5). Several rivers flow into the bay, including the large Rio Paraguaçu. The wet winters and dry summers have a major influence on the water circulation inside the bay. During summer, the lack of fresh water coming from the rivers allows for more tropical water to enter the bay, thereby increasing the salinity. In winter time, the salinity of the water drops as a result of the increase of fresh water. There are 91 islands in Todos os Santos, the largest of which is Itaparica at the bay's entrance. The remains of the Utrecht shipwreck lie on the seabed, at a depth of 21 to 24 metres, 5 nautical miles (9.3 km) from Itaparica Island and 10.1 nautical miles (18.7 km) from the city of Salvador, at coordinates 13° 7' 50,447"S and 38° 39' 14,549"W.

2.2 Historical context

The WIC in Brazil

After several attacks by the WIC in 1624 and 1628, the Dutch managed to conquer a part of northern Brazil in 1630, centred around Recife. From the outset, the colony of New Holland was on the defence. One of the main reasons was that the Dutch Protestants never won the hearts and minds of the Catholic Brazilians of Portuguese descent. Under the governorship of Johan Maurits van Nassau-Siegen (1637-1643), a short period of prosperity set in. Maurits propagated a policy of tolerance towards Catholics and Jews. Under his protection, the first Jewish synagogue of the new world was established in Recife. However, the policy of tolerance was very short lived. Although New Holland had thrived politically under Maurits, most of his council members in the WIC thought differently. Maurits was forced to resign in 1643.

Following his departure, the Protestant hardliners regained the upper hand in Brazil. From that point on, the Brazilians revolted time and again against the Dutch. In the last years, the WIC territory had been relegated to the city of Recife, which was permanently under siege. Faced with this crisis, the WIC in Brazil called on the Dutch Republic to send military help. The States General responded, sending a fleet of twelve ships to Brazil in 1647 under the command of Admiral Witte Corneliszoon de With.[6]

2.2.1 Witte Corneliszoon de With in Brazil

The Dutch rescue fleet arrived on 28 March 1648. At the time, Admiral Witte de With was one of the Netherlands' most remarkable naval heroes. De With's forthright manner and habitual bluntness in criticizing anything or anyone he pleased were his greatest handicaps. Despite those traits, his reckless courage in battle was admired by friend and foe alike. All the same, he was often court-martialled. After the Brazilian expedition in which *the Utrecht* was lost, he was even imprisoned and accused of insubordination and desertion.

In 1647, Witte de With was made admiral of a fleet of twelve ships, 1200 sailors and 6000 soldiers. The expedition fleet was sent to Brazil on the orders of the States-General to assist the West India Company. However, it arrived too late. The Dutch colony in Brazil had been reduced to Recife, which was surrounded by Portuguese rebels. The West India Company was beyond rescue. To his great frustration, Witte de With was placed under the command of the High Council (West India Company) of Brazil, which he regarded as incompetent. De With and the West India Company simply did not get along.

The High Council wanted to attack the Portuguese by land and break the siege of Recife. De With protested at what he felt was a disastrous mission, but ultimately obeyed orders. His marine force was not deployed on sea. Instead, his soldiers and sailors were added as infantry to fight on land. In just two short days, the Dutch army was ambushed and defeated by the rebels. The besieged Recife was not relieved. Meanwhile, more bad news arrived. De With had received word of a large Portuguese fleet on its way from Rio de Janeiro to Angola to conquer Luanda, the main slave entrepôt on the African West coast, which had been conquered by the WIC in 1640. De With wanted to intercept and attack the

6 Boxer, 1973: 200

fig. Page 10, Fig. 4: View of Bahia de Todos os Santos, 1665

Portuguese fleet, but the High Council would not give permission. As a result, Luanda was re-conquered by the Portuguese. De With's fleet was then deployed – to little avail – to cruise off the Brazilian coast and capture merchant vessels.[7]

2.2.2 The battle of Itaparica 28 September 1648

Four months passed with little action.
On 28 September, Witte de With was patrolling with a squadron of seven ships off Baía de Todos os Santos, when they saw two Portuguese men-of-war approaching Bahia around noon. De With's squadron had long awaited such a confrontation. The two ships, the *Nossa Senhora de Rosário* and the *São Bartholomeu*, were both armed with 32 guns. In his typical sardonic fashion, De With commented that the ships were there mainly to treat Portuguese nobles to a pleasure cruise.[8]
The Portuguese ships tried to outrun the Dutch and reach the harbour of Salvador de Bahia. The Dutch flagship *De Brederode* (49 guns) and three

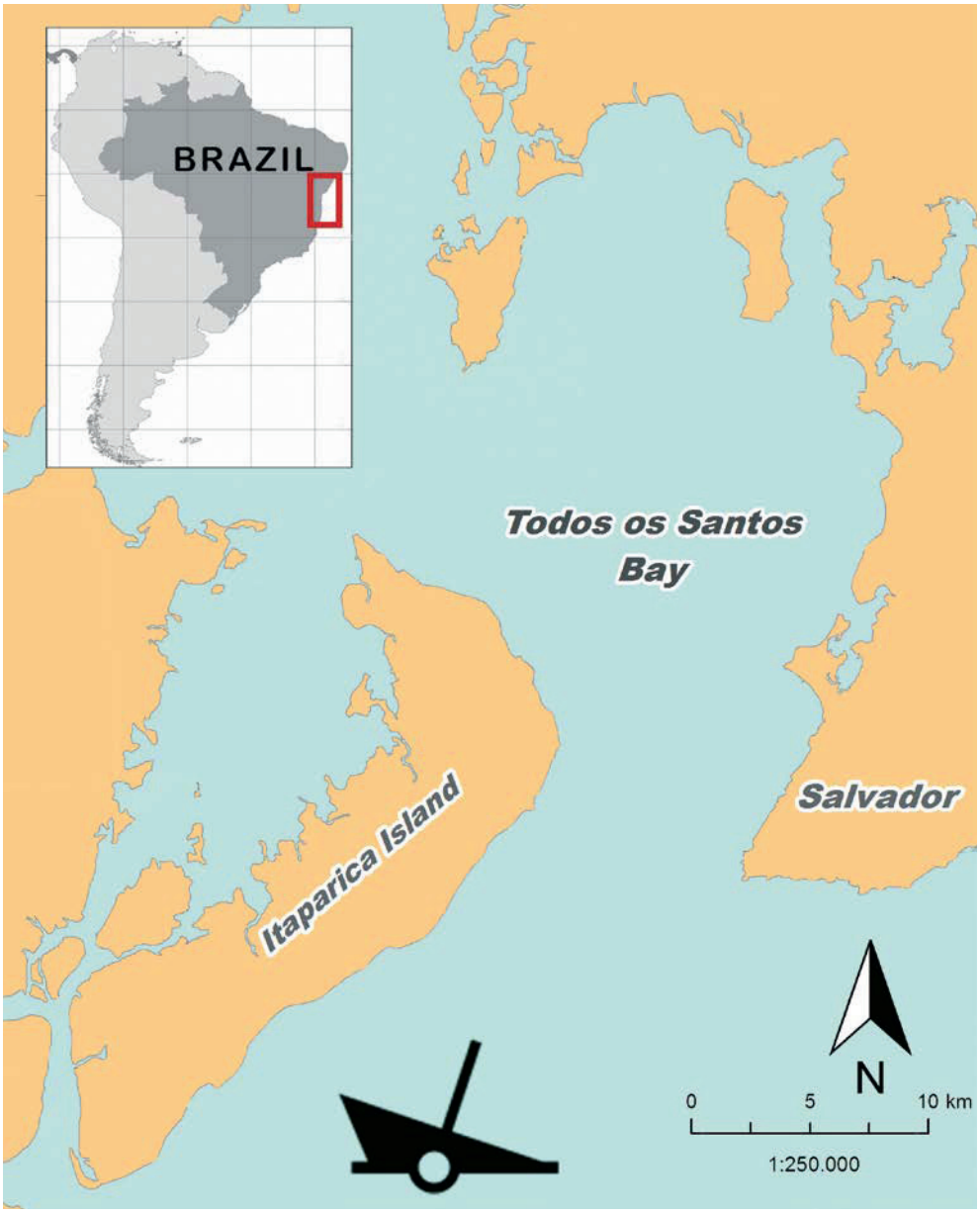


Fig. 5: Map of Todos os Santos Bay, showing the location of the Utrecht site

7 Brouwers 2014, Hoboken 1955
8 Breeman van der Hagen, 1662

Fig. 6: Battle Witte de With in 1637 against Dunkerque privateers

other Dutch vessels (the *Utrecht*, *Huys van Nassau*, the *Overijssel*) engaged the Portuguese ships.
De With immediately ordered his ship, *De Brederode,* to attack, with the aim of boarding the *Rosário*. Although the rigging of the two ships became entangled, they managed to break free of each other.
De Brederode had sustained severe damage and had to abort the engagement.[9]
De With's battle was over.

After the evolution of short manoeuvres, the Dutch ships *Utrecht* (30 guns) and *Huys van Nassau* (40 guns) flanked *Nossa Senhora do Rosário*. In danger of being captured, the captain of the *Rosário* decided to blow up his own vessel in an attempt to damage the two enemy ships before being overpowered.[10]
Shortly afterwards, De With watched at two cable lengths' distance as the ships were blown to smithereens. *The Utrecht* and *Nossa Senhora de Rosário sank* and the *Huys van Nassau* was severely damaged.

Though the battle was a victory for Witte de With, it was not the triumph he had hoped for. Both the *Nossa Senhora do Rosário* and *Utrecht* sank, and today their remains lie roughly 200 metres apart on the seabed.
The *Huys van Nassau*, severely damaged after the explosion, drifted away and was eventually captured and refitted by the Portuguese admiralty under the name of *Fortuna*.[11] The second Portuguese ship, *São Bartolomeu*, was boarded by the *Overijssel* (28 guns) while trying to sail back to port and, after a bodily combat, both captains were killed and *São Bartolomeu* was taken by the Dutch. The human losses in this battle were severe, totalling circa 400 Portuguese and 150 Dutchmen.[12]

2.2.3 Departure from Brazil

After the battle in Baía de Todos os Santos (All Saints Bay), relations between De With and the High Council of the West India Company deteriorated. The Portuguese fleet had not been defeated, the capital, Recife, was still under siege and supplies were rapidly running out.
The fleet sent from the Netherlands to offer assistance had brought the Company no relief.
In 1649, the situation looked just as hopeless as it had two years earlier, to the growing irritation of all concerned.
Given the deterioration in the relationship, the High Council refused to supply De With's fleet. Dissatisfaction was rife among the soldiers and sailors, and the threat of mutiny loomed. To make matters worse, after months in the tropics, the ships were in poor condition. Their hulls had been attacked by shipworm, and their sails and rigging were rotting, and could not be replaced in Brazil. Witte de With faced a terrible dilemma: if he were to do nothing, the fleet would simply perish from lack of maintenance and sustenance.[13]

9 Ibid., 166
10 Ibid., 168
11 Guedes, 1993: 87; Hoboken, 1955: 126
12 Ibid

De With decided to return to Holland on his own initiative. The High Council sent a fast ship to Holland to give its own account of events. It was none too complimentary towards the admiral, and he was arrested upon arrival in Holland. His accusers maintained that the gallows were too good for him, according to what they had read in the letters from Brazil. He faced no fewer than 250 charges. Ultimately, however, the whole affair simply blew over. De With was absolved of all blame and merely ordered to pay the costs of his trial and imprisonment.

De With's imprisonment is often regarded as part of a political battle waged by Orangeist faction leader, Willem II, Prince of Orange, who was trying to put the Republicans out of commission. De With is believed to have championed the anti-Orangeist faction, although this cannot be verified by any sources. Once again, luck was on de With's side: the sudden death of Willem II heralded a period free of stadtholders, and the pressure was off. The Golden Age continued in all its glory, and the heyday of the "De With boys" began.[14]

2.2.4 *The Utrecht:* type and construction

The Utrecht (*De Uytrecht*) was built for the Amsterdam Admiralty in 1633.[15] During the same period, there was one other active ship called *the Utrecht* (namely, a frigate in the same building list). This second *Utrecht* was built in 1638 for the Admiralty of Rotterdam. It measured 100 Rotterdam feet (28.23 metres: the Rotterdam foot measures 0.2823 metres), and had 22 cannons.[16]

The first *Utrecht* was 120 Amsterdam feet long (34 metres: the Amsterdam foot measures 0.2831 metres).[17] It had one deck and 30 cannons on board. The cannons were made of cast iron, some of which can still be seen in situ and at least one bronze cannon was lifted in the 1980s.[18]

It is not completely clear what this type of ship was called. In the 17th century, several terms were used for the same ships. The term ship (Dutch: *schip*) was frequently used for larger warships. *Schip* was also sometimes used for yacht and frigate, and generally meant warship. One interesting source of documentation about ship types is a memorandum by Admiral Tromp listing the sizes and types of ships needed in the Dutch fleet after 1648 (when the war with Spain ended): *'s Lands vloot van 60 schepen. Van welcke 60 schepen de meeste helft wel kloecke, bequaeme scheepen te wesen, gemonteert van 30 tot 40 stucken. Twee ofte 3 weynich kloecker, om de vlaggen te voeren. Den noot vereysschende, een goet gewelt in zee te brengen. En de resterende lichte schepen en fregatten, gemonteerd van 16 tot in de 20 stucken canon, om te gebruycken op vaerwaters, daer lichter en vlotgaende schepen werden gerequireert.*[19]

... Light ships and frigates with 16 to 20-some cannons. Elias concludes: *"To distinguish from earlier frigate-yachts, we can call these (new and bigger) frigate ships the best frigate ships. The difference between the two types lies mainly in the size."*[20]

The Utrecht, a smaller type man-of-war, could be called a frigate (*fregat–jacht*). In the 17th century, these frigate-yachts became increasingly larger. Typologically speaking, frigates and yachts are very difficult to distinguish from each other. They can be recognized by the fact that they did not draw much water and were very manoeuvrable, in comparison to other ship types of the same era. This means that they were especially suitable for shallow waters. It is for this reason that many of these ships were used during expeditions as scouting ships. A frigate had a flat transom, one or two continuous decks and half-decks. Frequently, these vessels featured three masts: a main mast, a foremast and mizzenmast. The last one in the aft of the ship had a lateen sail; the others were squared rigged.

13 Brouwers, 2014
14 http://www.maritiemprogramma.nl/magazine/MP01/eng/magazine_001_eng.htm. Consulted on January 22, 2016
15 See for the two Utrecht ships appendix II in Elias 1933. The ship list of 15 June 1636
16 Ibid
17 National Archive Netherlands. Resolutions Admiralty of Amsterdam 5 February 1635, inventory no 1381, 403
18 Elias 1933, note 8 and 9
19 Elias, 1933: 74
20 Elias, 1933: 57: "Ter onderscheiding van de vroegere "fregat-jachten" kunnen wij deze "gefregatteerde'' schepen gevoeglijk "fregat-schepen" noemen. Het onderscheid tusschen beide typen schijnt wel voornamelijk hierin te hebben bestaan, dat de fregat-schepen grooter waren dan hun voorgangers de fregat-jachten."

2.2.5 Building tradition

It took at least until the second half of the 17th century before ships in the Netherlands were standardised and built according to written construction plans.[21] Until then, it was the master shipbuilder who designed the ship based on experience and the customer's requirements. As a result, form and sailing performance varied from ship to ship.

Around the middle of the 17th century, warfare at sea changed definitively from one-on-one battles to line battles.[22] The earlier strategy of entering ships usually resulted in man-to-man combat. In those situations, a bigger, taller ship had the advantage. In a line battle, ships had to move at more or less the same speed and their cannon power had to be managed along an entire line. This made standardisation in construction enormously important. It was for this reason that ship builders began to construct ships in classes.

The first books on Dutch shipbuilding – not surprisingly – were published in the second half of the 17th century. Nicolaes Witsen (1671) wrote about the shipbuilding methods in and around Amsterdam,[23] where the "shell-first" method was predominant. A few decades later, Cornelis van Yk (1697) followed up with a book on ship-building methods in the Rotterdam area, where the "frame-first" method was preferred.[24]

2.2.6 The Portuguese ships involved

The Portuguese men-of-war involved in the battle, *Nossa Senhora do Rosário* and *São Bartolommeo*, were originally sent to Brazil in October 18 1647, as part of *the Armada Real do Mar Oceano*. Placed under the command of António Telles de Menezes, governor-general of Brazil, this naval fleet was charged with the task of relieving Bahia. According to British historian Charles R. Boxer, the fleet consisted of eight galleons, two frigates, three armed merchant ships, and two caravels, or fifteen sails total, carrying 462 gentlemen volunteers, 2350 soldiers and 1000 sailors. These numbers, however, differ

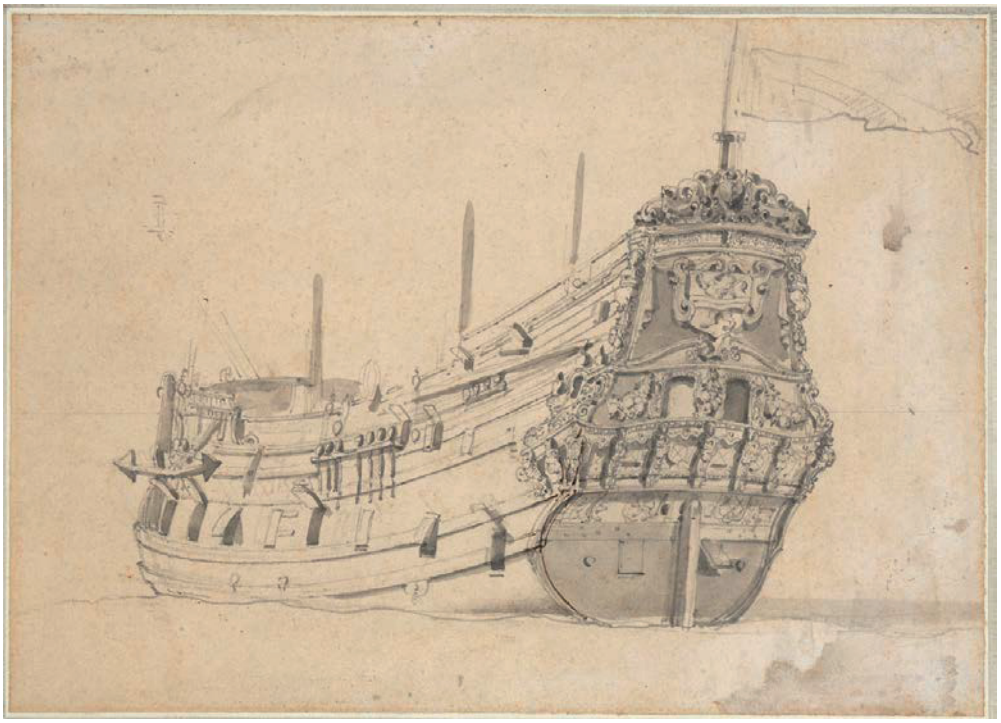


Fig. 7: Frigate *De Overijssel*

21 Beylen, 1970: 31
22 See also Diekerhoff, 1967: 85
23 Witsen, 1671
24 Yk, 1697

from those published by the Brazilian naval historian, Max Justo Guedes, who claims this Armada was composed of nineteen ships, (eleven of which were galleons), one urca, two naus, two frigates, two caravels and one patacho.[25]

Although designations and types of these ships are difficult to assert at this time, the available sources indicate that the *Rosário* was a newly built English frigate, captained by Frei Pedro Carneiro. It featured somewhere between 28 and 32 guns, and was manned by 250 to 300 sailors and soldiers. *São Bartolomeu* was Dutch built and mounted between 32 and 35 guns, under captain, Francisco Pereira Brandão. Captain Gillissen of the *Huys van Nassau* stated that it was a *Hoornse Straatvaerder*.[26] *Straetvaerders* (translation: "strait cruisers") were heavily armed merchant ships that traded in the Mediterranean. They owe their name to the fact that their route took them through the Strait of Gibraltar. If the São Bartolomeu was indeed a *straatvaerder,* it was probably a *fluytship*. According to Witse, *straetvaerders* were usually fluytships ("*Straets-vaerders zijn veeltijts fluiten*") and were heavily armed because of the threat of Barbary corsairs in North Africa. With that said, the *Straetvaerder* depicted to the right in Figure 8 is not a *fluyt*, but a *pinas*. The vessel depicted on the left is a *fluyt* called a *French vaerder*.[27]

The Portuguese maritime historian António Esparteiro has classified *Nossa Senhora do Rosário* as a nau, not a frigate. As a nau of 32 guns, however, the *Rosário* would have probably been a larger three-masted merchant ship with secondary fighting capabilities, somewhat fuller than the frigate. As a mid-17th century frigate of 32 guns, however, she would have been a three-masted vessel for speed and manoeuvrability, lower sheer. In addition, she would have been well-armed, somewhat smaller than the nau and designed for swift missions.

Nossa Senhora do Rosário is referred to as a frigate by Francisco Varnhagen, Boxer and Justo Guedes. The *São Bartolomeu*, like the *Rosário*, is referred to in documents by Justo Guedes and Boxer as a frigate. Varnhagen, however, refers to the *São Bartolomeu* as a galliot.[28] These are typical research questions in nautical archaeology, to be addressed using archaeological, documentary and iconographic sources. The *Rosário*, which lies only 200 metres away from *the Utrecht,* can still be investigated in the future to answer these questions. However, the *São Bartolomeu* did not sink at Itaparica and is, therefore, not part of this archaeological resource.

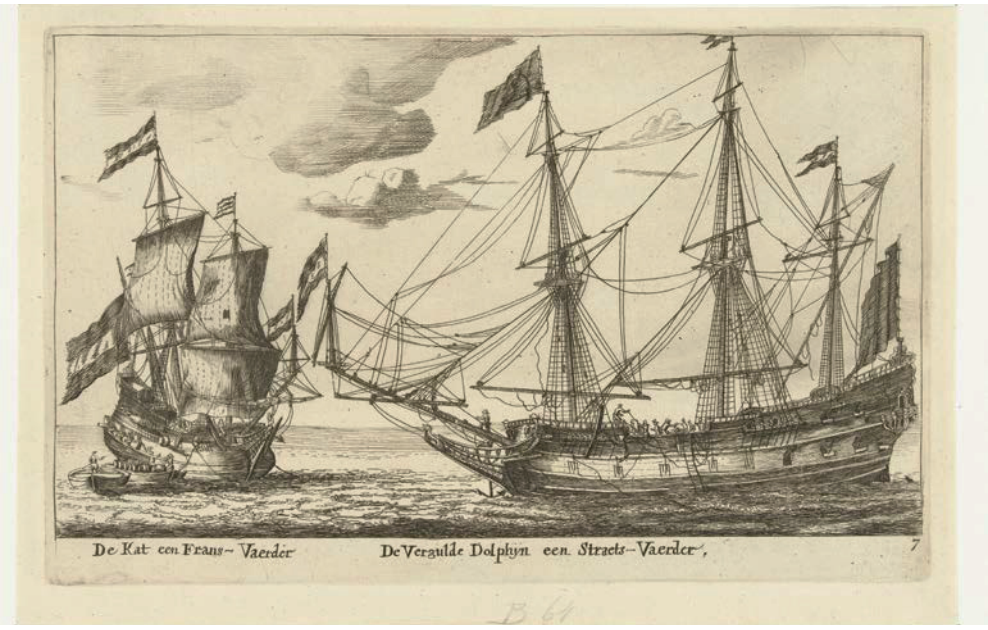
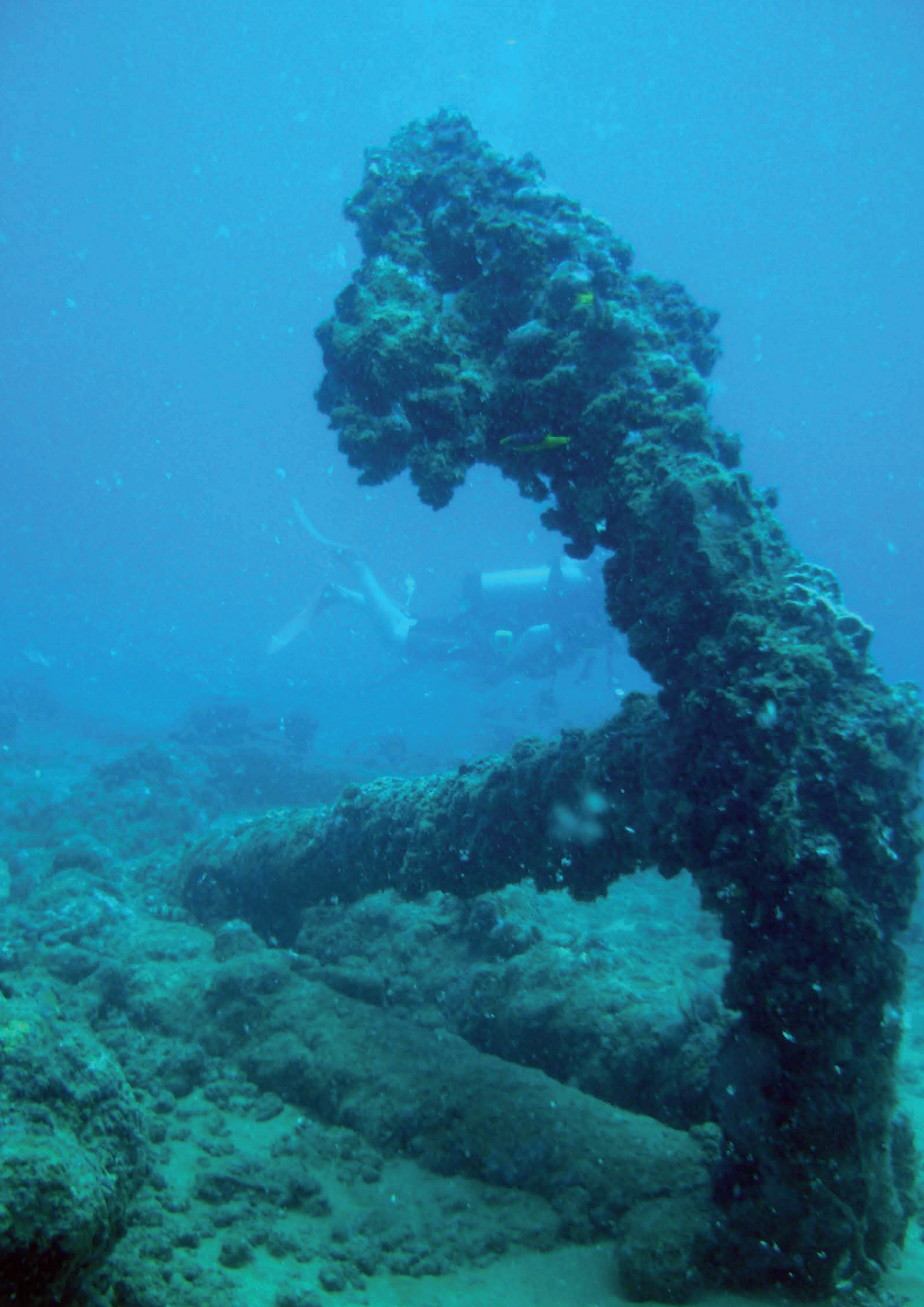


Fig. 8: *De vergulde Dolphijn een Straet-Vaerder*

25 Boxer, 1973: 190; Guedes, 1993: 56, 57 and endnote (997)
26 Hoboken, 1955: 119; WIC OC. 64
27 Witsen, 1671, 53
28 Varnhagen, 1874: 350; Boxer, 1973: 190; and Guedes, 1993: 57 and endnote 997

fig. Page 17, Fig. 9 Archaeologists exploring the Utrecht site during the 2007 research



3 Implementation of the research study

J. Opdebeeck, R. Torres & T. Coenen

3.1 Find conditions

Before the initial dive survey was conducted in 2007, no archaeological research had been done on *the Utrecht*. However, the site was subjected to extensive salvage work during the 1980s. Despite all these works, no publications, site plans or artefact analyses were published by the companies that mined the site for artefacts. A single sketch, however, was produced, probably during interventions undertaken in 1981 and published on the internet (Figure 11).[29] It outlines a significant portion of the wooden remains, cannons, anchors and other features in the Utrecht site, showing large undisturbed areas. Seventeen cannons and six anchors can be distinguished in the drawing, as well as a large structured hull section, and what is believed to be the ship's keelson.

Another site plan produced by recreational divers in 2001 shows the distribution of existing cannons, anchors and ballast pile (Figure 12).[30] Like the 1981 plan, six anchors are shown at the site, but nineteen guns can be distinguished in the drawings. In 2008, technical divers who had searched for the *N.S. do Rosário* wreckage laid a cable connecting the two sites and recorded the presence of more cannons, anchors and ballast concentrations in the debris field in between the two wrecks (Figure 13).[31]

Previous research in this project consisted of:
1) an initial dive survey in 2007;
2) a review of the historical and nautical backgrounds behind the combat;
3) an inventory of publications, site plans, photos, videos and remaining artefact collections related to the site;
4) a reconstruction of the scope and chronology of the interventions carried out.

Despite the extensive official and unofficial salvage works that took place at *the Utrecht* site since its discovery in the 1980s, numerous large artefacts, such as anchors and cannons, can still be seen at the site, as well as the ship's ballast and a substantial portion of the hull. These known objects, as well as observations made in the first scientific dive survey in 2007 by Dutch and Brazilian archaeologists, indicate the site's

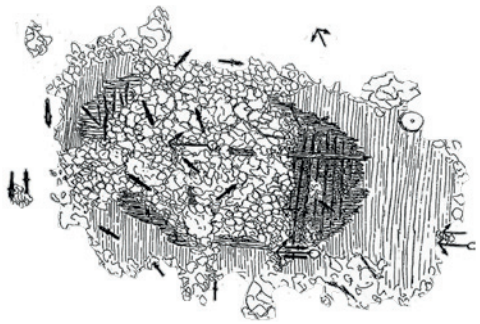


Fig. 12: Site plan of the Utrecht site, possibly produced in 1981 by Tony Kopp

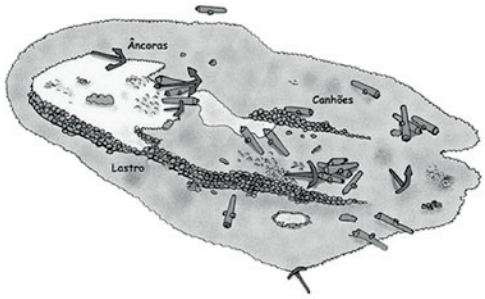


Fig. 12: Site plan of the Utrecht site, produced in 2001 by Maurício de Carvalho

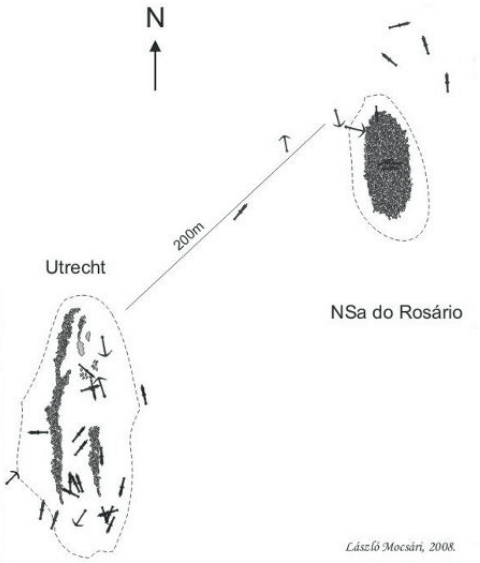


Fig. 13: Site plan produced in 2008 by Lázló Mocsári, showing the *Nossa Senhora do Rosário* site in relation to *the Utrecht*

29 http://treasurediver.tripod.com/cgi-bin/id17.htm. Consulted on January 22, 2016
30 http://www.naufragiosdobrasil.com.br/naufutrech.htm. Consulted on January 22, 2016
31 A video has been produced and made available at: http://www.youtube.com/watch?v=U64-Ln4znAM. Consulted on January 22, 2016

fig. Page 18, Fig. 10: One of the anchors of the Utrecht site, found in 2007

enormous potential for answering questions, e.g. on Dutch West Indies seafaring and shipbuilding.

3.2 Implementation requirements

Under the Memorandum of Understanding Concerning Mutual Heritage, which was signed in 2008 between Brazil and the Netherlands, only non-intrusive research was allowed at the site. As a result, excavation of parts of the Utrecht was not allowed.
The data that is being collected for an archaeological assessment of the Utrecht will not only be useful for recommendations, but also for establishing baseline measurements for future monitoring.

3.3 Research questions

- What is the location of the site?
- What conditions and features characterise the seabed in which the site is located?
- What are the dimensions of the site?
- What objects are still preserved in/on the seabed and in what categories of materials do the existing artefacts fall?
- Are any construction details of the ship visible at the site?
- What is the state of preservation of the archaeological objects?
- To what extent has the Utrecht site been disturbed since the first salvage operations in the 1980s?
- What are the threats to the site?
- What measures can be used to protect the site in situ?
- Is it possible to identify this wreck as the "Utrecht", which sunk in 1648?
- What is the cultural historical value of the site?

3.4 Methods and techniques

3.4.1 2012 Field season

The fieldwork was carried out from 10 to 18 December 2012. Operations were based at the city of Salvador, capital of the state of Bahia, the largest in the northeast region of Brazil. Workdays typically started at 5am with the crew boarding the boat *Necton* in the protected harbour of Porto da Barra, by the foot of the seventeenth-century Fort of Santa Maria.

Once the equipment and personnel were on board, it usually took two hours to reach the wreck site. This time was spent organising the equipment and conducting a final briefing on the day's activities (Figure 14). During that time of the year, northeast winds blow calmly in the morning, picking up just before noon as the wind shifts east, reaching up to 15 knots. As a result, working on the site was limited to two dives each morning. Underwater operations started at 7 AM daily and were performed until around noon.

Back in the hotel, work continued every day in a specially designated meeting room, where a master plan was being completed as work progressed at the site. Afternoons were also dedicated to transcribing filled diving slates, consolidating spreadsheets, buying needed supplies, fixing equipment and discussing the next day's activities.

3.4.2 Dive profiles

The operational diving team consisted of seven divers with varying scientific diving experience in archaeological projects. In total, seven days were spent at the site, totalling 45.5 hours under-water. Dives were performed with regular scuba open circuit equipment with compressed air, or EANx 36 for officially certified divers. The EANx 36 gas was created by topping up the air in the dive tanks with pure oxygen (O_2). This method results in (small) differences in the oxygen content for the different tanks. As no

O2-analyser was present, the variations in O2 content gave rise to some unreliability in terms of dive planning. To synchronise times in and out of the water, and take account of the unreliable EANx 36 content, it was decided to plan all dives with a compressed air (21% oxygen) gas mixture.

Diving profiles were planned using US Navy dive table-based algorithms with individual diving computers for back-up. Since the site has a maximum depth of 24 metres, a maximum bottom time was set at 40 minutes for the first dive without a mandatory decompression stop and 17 minutes for the second dive. After all dives, a safety stop of 3 minutes was performed at 3m depth. The small volume capacity of the diving tanks (11 litres), the distance of the site from shore, combined with sometimes considerable water current, resulted in an average bottom time of 30 minutes for the first dive. In light of that, it was decided during fieldwork to switch to dive computers as the primary devices for planning and monitoring residual nitrogen, and to use dive tables for back-up, which enabled extended bottom times during the second dives every day.[32]

3.4.3 Mapping and recording

The main goal of this season was to accomplish an archaeological assessment of *the Utrecht* site. This meant mapping the distribution of anchors, cannons and ballast, as well as documenting naturally exposed timbers and assesssing the state of preservation of the site. All measurements were recorded in metric units. The underwater work comprised the following operations:

1. site overview and sketch;
2. artefact tagging;
3. positioning of the baseline;
4. positioning of the datum points network;
5. measuring the datum points network;
6. individual artefact measurements;
7. positioning of artefacts by direct measurement;
8. recovery of baseline, datum point markers and artefact tags from the site.

Fig. 14: Dive team ready to get in the water

[32] See appendix IV for the dive profiles

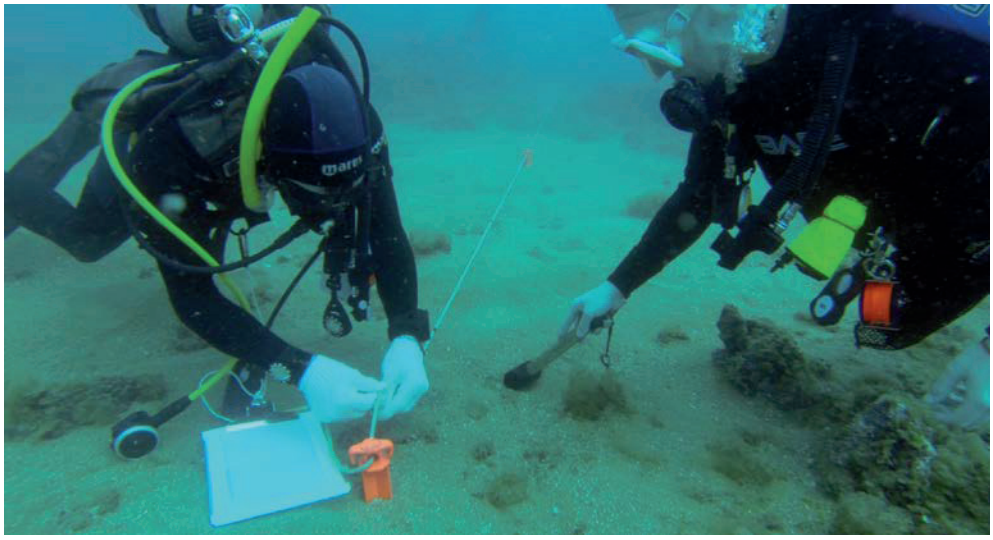


Fig. 15: Deploying the baseline

The first dives focused on getting the team acquainted with the site and comparing the actual distribution of artefacts and features with early sketches of the wreck site (1981 and 2001). A preliminary sketch of the actual situation was also made, so it could be used as a reference point for organising upcoming diving operations. The estimated position and number of objects were also recorded using this reference sketch.

The sketch was also used by the entire team in their critical examinations of the archaeological plan of operations. The position of the baseline and datum points were discussed and determined. In this first stage, attempts were also made to establish the extent of the preservation of wooden remains under the sediment. By using a thin metal rod, the wreck site was probed to find buried structural remains. This method was unsuccessful, as the sediment contained a great deal of hard pieces, such as coral, which rendered the probing rod ineffective.

The second stage of the project was to label the objects, unfold a baseline onto the site, and position the datum points to build a framework for trilateration measurements. Artefacts and datum points were labelled using plastic tags secured with plastic zip ties. Cannons and anchors were labelled with the letters C and A, respectively, followed by an identifier number, such as C1 for cannon 1, and A5 for anchor 5. Datum points, in turn, were labelled with the letter D, followed by another letter as an identifier, such as DA for datum A. The baseline (B-L) consisted of a measuring tape fastened along a sinkable nylon cable, aligned with the main axis of artefact distribution, extending 41.81 metres in a nearly true north-south direction (Figure 15). Both ends of the B-L were made to coincide with datum points DA (northern end) and DB (southern end), while the other datum points (DC to DG) consisted of tagged iron rods placed carefully in convenient positions around the site. The network was thus complemented by internal points placed on the highest tip of two anchors belonging to the wreckage (DH at A2 and DI at A5). These 9 datum points formed the framework covering the whole site.

Positioning of artefacts and features was obtained by the direct survey method (D.S.M.), using fibre glass measuring tapes for distances (1 cm accuracy) and a dive computer for depths (10 cm accuracy). Depth measurements were taken during short measuring sessions using the same dive computer (UWATEC Aladin Ultra) to keep consistency and minimise the effect of tidal variation. Depth readings at the base of datum A were recorded before and after each measurement session to function as a vertical datum and reference for tide correction.[33]

A total of 186 direct distance measurements, plus 59 depth measurements were taken and compiled in an Excel spreadsheet. After each morning's diving session, the measurements

[33] Local astronomical tidal variation averaged 2 metres during fieldwork, semi-diurnal (Source: http://www.marinha.mil.br/. Consulted on January 21, 2016

were further processed in the afternoon with Site Recorder 4 SE for tridimensional statistical adjustment.[34] Questionable measurements were discarded and put on the agenda to be re-measured the following day.
Individual artefacts were also measured in situ, using flexible fibre glass measuring tapes and folding rulers (Figure 16). Aside from the cannons and anchors located on the seafloor, several places at the site manifested structural wooden remains of the wreck. The location of those structures and their internal dimensions were also recorded. Pictures and videos were taken regularly as the work progressed, and a video was compiled as an overview of the site.

Once adjusted, positions were exported in X, Y and Z coordinates to produce the site plan. Because of the extent of the wreck site, it was decided to use a one-to-fifty conversion for the site plan. A paper master plan was first drawn with contributions from all the team members during fieldwork, consolidating the results of preliminary data analyses, team discussions and interpretations. This was then scanned and scaled into a GIS environment, using ArcGIS 10.1 software, and tied to adjusted coordinates derived from D.S.M..

Cannons, anchors, ballast and exposed wood presented in the master plan were digitalised and recorded with supplemental information from the video overview. The result was a geographic database, where each feature is related to other information. The information provided consists of: the artefact ID; an indication of whether measurements, photos and videos were taken; general observations; and links to representative pictures of the artefact or feature (see Appendix I).

Fig. 16: Archaeologists recording individual artefacts

[34] Total RMS residual (difference between expected and actual value: maximum error) 0,034 m

4 Results

R. Torres, J. Opdebeeck, T. Coenen & M.R. Manders

In situ observations showed that, despite the disturbance resulting from nearly 30 years of official and unofficial interventions, a substantial portion of the ship's cannons, anchors, ballast and timbers remains preserved. The main concentration of artefacts runs in a true NE-SW direction, measuring approximately 50m long by 20m wide. This stretch is surrounded by a zone of interest with more scattered artefacts, loose concretions and smaller heaps of ballast stones dispersed across an area of approximately 2,000 m².

4.1 Site plan

See figure 19 on page 26.

4.2 Iron cannons

During the 2012 assessment, a total of 16 iron cannons were found that are associated with the site. Of these, 15 were largely complete and 1 was broken in two pieces. Their preservation status varied due to different levels of corrosion (see Appendix I). Two cannons (C7 and C14) were found further afield from the main concentration of artefacts, in the E and NE quadrants, towards the location of *Nossa Senhora do Rosário* wreck site.

4.3 Anchors

Five largely complete anchors and two fragments were mapped and individually measured. The two fragments were a fluke (A6) and a part of an arm (A7), found in the SW quadrant that may belong to the same anchor (Figure 18 and Appendix I).

4.4 Ballast

The observed ballast is composed of rocks varying from coarse gravel to cobbles of unidentified composition. The main concentration is distributed in two prominent semi-lunar shaped mounds covering the west flank of the large concentration of artefacts, a configuration resulting from relocation during early salvage operations (Figure 20). A smaller concentration of rocks intermixed with coral concretions can be found along the site's centre axis, layering over observable hull structures. A large part of the ballast stones must have been replaced (moved aside) during salvage operations in the eighties.

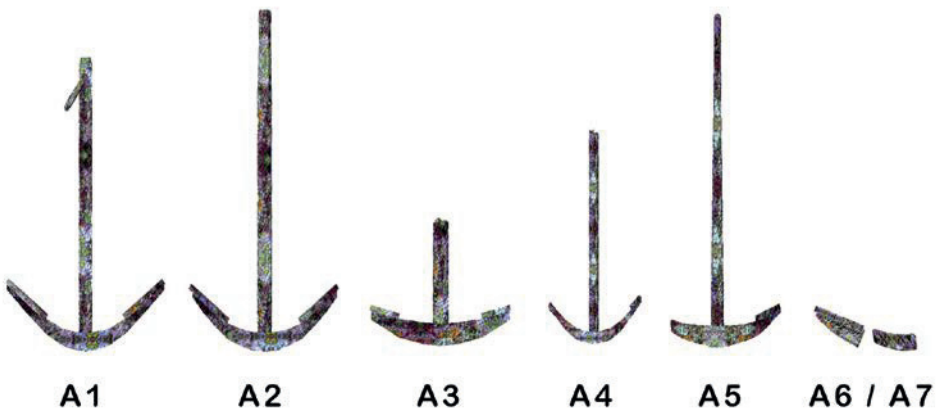


Fig. 18: 3D Anchor models were made, using a virtual model program software Autodesk Maya3D 2012 and displayed in scale. It should be kept in mind that – although real measurements were used, the shape is roughly modelled and may not exactly resemble the original form.

fig. Page 24, Fig. 17: One of the students that assisted in the project is measuring one of the cannons on site.

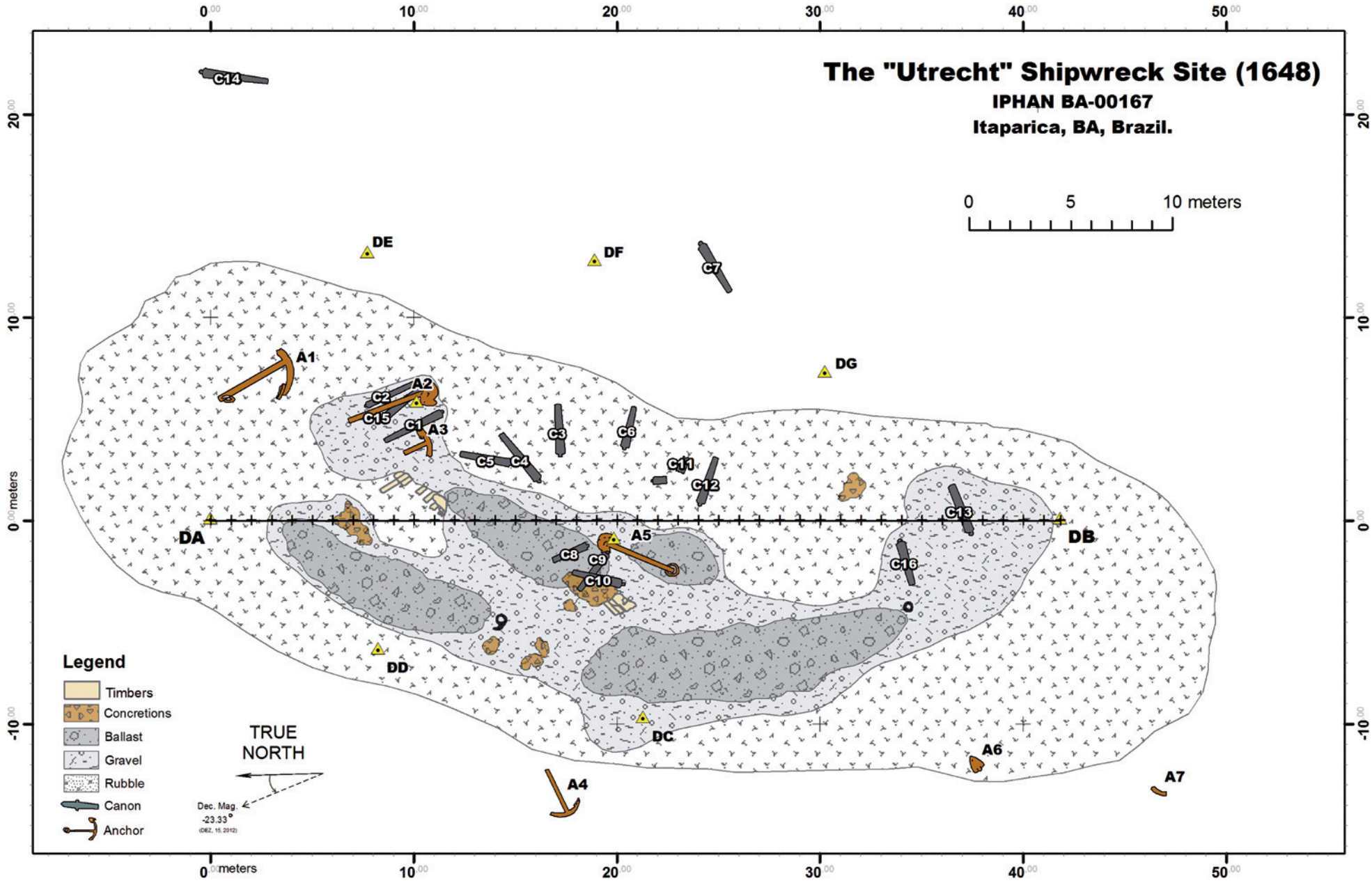


Fig. 19: Siteplan of The "Utrecht" Shipwreck Site (1648), produced during the fieldwork in 2012

4.5 Construction

Four sections of naturally exposed hull timbers were found during survey, provisionally referred to here as H1, H2, H3 and H4 (Figure 20). Considering the distance between the two pieces of evidence situated farthest apart, the extant hull remains are at least 15m long. However, at this stage it is not clear whether those remains comprise a whole articulated structure or scattered hull fragments. In this non-intrusive survey, timbers were not further exposed. This made it impossible to get a 100% identification of all the structural parts recorded. More information on the actual extent of hull remains and positive identification of construction features should come from (prospective) excavations during future fieldwork. A list, together with other relevant details of the recorded timbers is provided in Table 1.

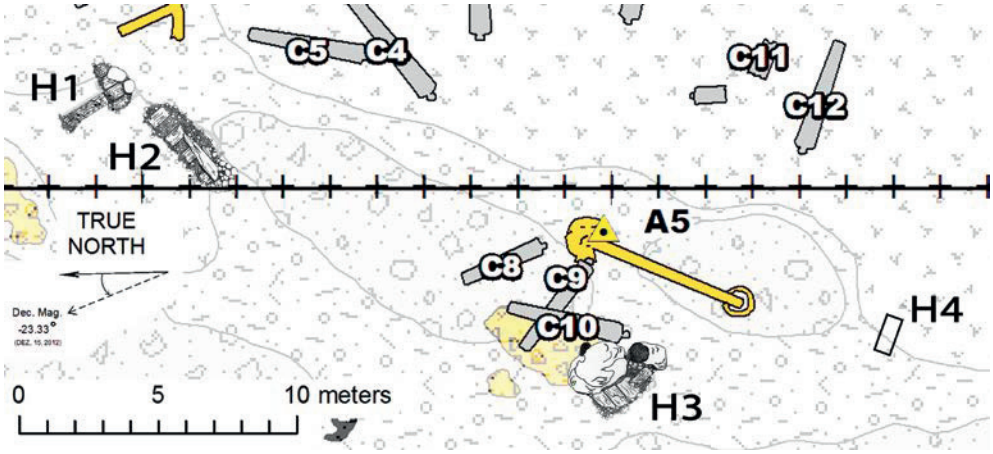


Fig. 20: Orientation of Wooden Structures

Table 1: List of recorded timbers

Structure	Timber	Orientation	Possible Function	Width (cm)	Thickness (cm)	Fastenings
H1	**T1**	NW/SE	FRAME	--	--	TREENAIL (1)
	T2	NW/SE	FRAME	--	--	TREENAIL (1)
	T3	NW/SE	FRAME	20	--	TREENAIL (3 + 2) Ø 3cm
	T4	NW/SE	FRAME	--	--	--
H2	**T5**	NW/SE	FRAME	20	>15	--
	T6	NW/SE	FRAME	--	--	--
	T7	NW/SE	FRAME	21	--	TREENAIL (1)
	T8	NW/SE	FRAME	20	--	--
	T9	NE/SW+	CEILING	20	7	--
	T10	NE/SW	CEILING	--	--	--
H3	**T11**	NE/SW	PLANKING	25	7	--
	T12	NE/SW	PLANKING	--	--	--
	T13	NE/SW	PLANKING	--	--	--
	T14	NE/SW	KEEL	>50	8	--
	T15	NW/SE	FRAME	--	--	--
H4	**T16**	NW/SE	FRAME	± 15	--	TREENAIL (1 + 1?)

The northern most recorded evidence (H1) consisted of four closely spaced timbers (frames: T1, T2, T3 and T4) oriented NW/SE (Figure 21). The longer timber (T3) presents a discontinuity at approximately 30cm from two boulders sitting on top of it, indicating the existence of a fracture or (probably) a scarf (Figure 22). Three wooden treenails were recorded on T3, spaced circa 30cm apart, and two more were observed in close-up photographs. The frame is over 25 cm thick and also has a scarf. At least one of those treenails runs through this connection between two frame elements. Treenails were also observed in T1 and T2.

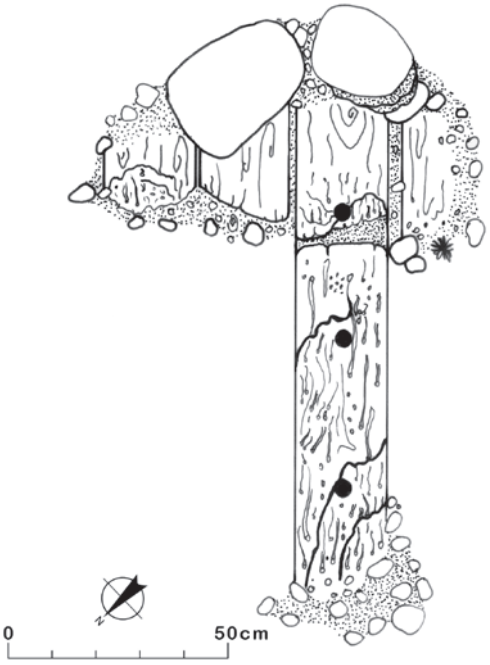


Fig. 21: Plan of H1 timbers

Fig. 22: Detail of discontinuity at T3

The H1 frames may be connected to another set of hull timbers (H2) exposed 60cm south-westwards. Four of them are widely spaced (18 to 25 cm apart from each other) and also oriented NW/SE (T5, T6, T7 and T8). The frames are transversely overlaid by two planks (T9 and T10) and probably part of the ship's ceiling planks. T9 is 7 cm thick and shows a total exposed length of 80cm (Figure 23). However, due to the fact that the frames in H2 have spacings and those in H1 have none, their related position should be investigated in future research.[37]

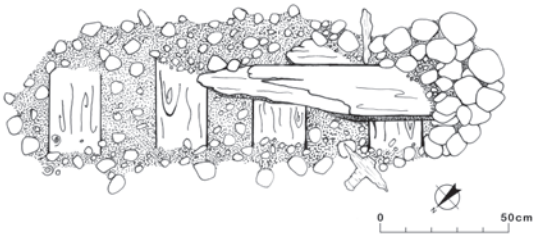


Fig. 23: Plan of H2 timbers

[37] This may mean that the frames of H1 were exposed around the bilge, whereas those of H2 were not. Yet, other explanations are also possible

A third exposed hull fragment (H3) projects from down under a large amorphous concretion near C10 in the A5 complex of artefacts (Figure 24). It consists of four timbers (T11, T12, T13 and T14) running in a NE/SW direction, transversely overlaid by a heavily deteriorated timber (T15). T14 has been identified as the keel and is more than 50 cm wide. It was observed that shell plank T12 connected to the keel (in one observed rabbit). T13 is another plank on top of it. It is not certain, however, whether this one was also placed into a rabbit (Figure 25). The area was far too deteriorated to clarify this. It is certainly an area that needs to be investigated more closely in future fieldwork. T15 is another shell plank and is 7 cm thick.

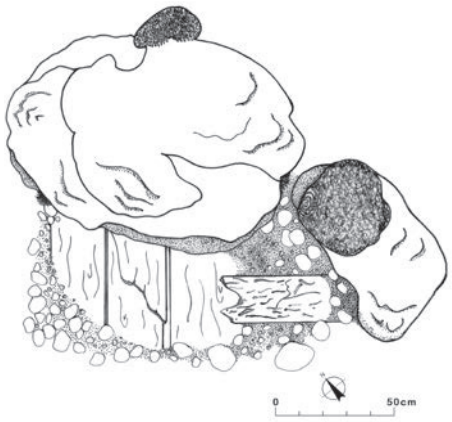


Fig. 24: Schematic drawing of H3

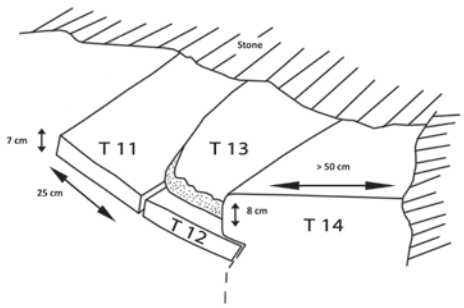


Fig. 25: Schematic drawing of H3: keel, rabbit and shell planks

The southern most exposed wood fragment (H4) was found to the south of the A5 ring (Figure 20). Despite that, no measurements were taken; its NW/SE orientation and apparent dimensions are consistent with other exposed sections of the ship's presumed framing timbers.

4.6 3D site plan

Tridimensional coordinates and individual artefact measurements were also used to create a 3D site plan, using the 2012 Autodesk Maya3D software. In order to create the tridimensional site plan, all cannons, anchors, and wooden structures were reconstructed individually using measurements collected during fieldwork. The next step was to locate these artefacts in the three dimensional virtual environment. To complete this, X, Y and Z coordinates extracted from adjusted positions on Site Recorder were located within the software's blank virtual 3D field to be used as tie points. It proved possible to position the cannons correctly using 2 points, whereas anchors required 3 points to define their spatial position. The locations of the wood structures were based on positions derived from the 2D site plan, previously positioned by off-sets taking from the baseline.

Once the artefacts were placed, the tie points could be deleted and the surrounding environment, i.e. ballast piles, sea bottom, and sea surface, was artificially created. Photographs from different views of the site, the 2D site plan and logbook notes were used as references. Textures of artefacts, bottom sediment and ballast stones were synthesized and patterned from actual pictures taken during underwater recording sessions. Subsequently, they were applied on the different artefacts for rendering purposes. Thus, the reconstructed textures do not represent the actual textures of the objects. Finally, virtual cameras were positioned on the 3D realm, allowing the establishment of different angles for site overview animations. The 3D animation of the siteplan can be viewed on the MACHU WIS platform of the Maritime Programme.[38]

[38] A 3D animation has been produced and made available at MACHU WIS, see tab specials: http://machuproject.eu/machu_cms/?ql=e9

5 Interpretation

M.R. Manders, R. Torres, T. Coenen & J. Opdebeeck

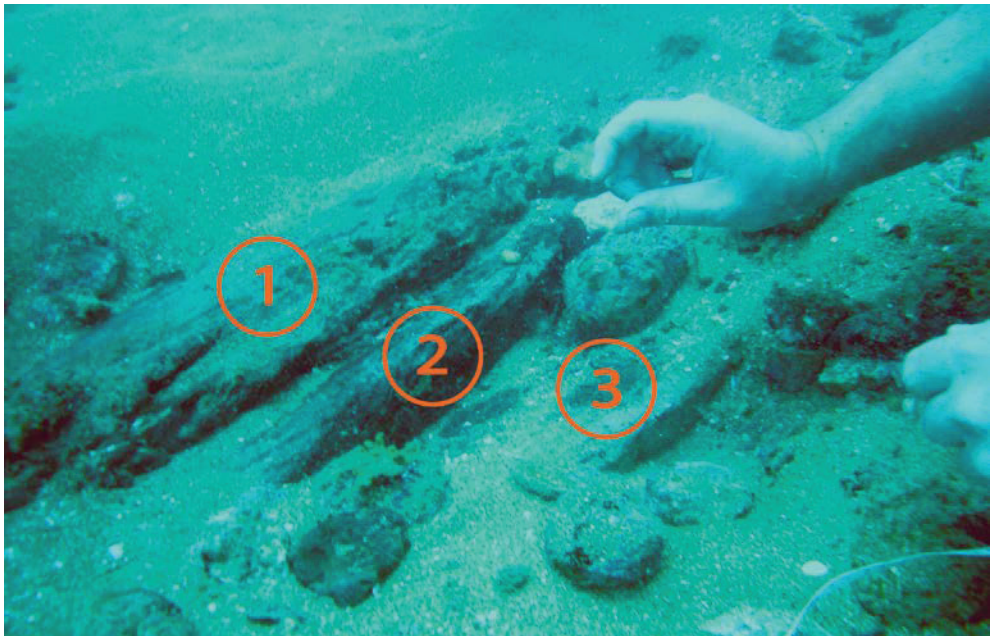


Fig. 27: Evidence of the ship's triple layered outer planking, as observed in 2007

On the seabed in the Baia de Todo os Santos in Brazil, the hull of the Admiralty ship De Utrecht is still available for archaeological research. It is for a large part covered by sediment and ballast. 16 canons and a total of two fragments and five complete anchors are also present and visible on the site. This amount of anchors may sound excessive for one vessel, but anchors were vitally important to ships. When the small, approximately 60-ft long yacht, De Hoorn (wrecked 1615, Argentina) was sold in the East Indies, it was equipped with a staggering total of nine anchors. That number included many large anchors, as well as "daily anchors," "throwing anchors" and "drags."[39]

Heavy bow anchors did not always hang on the bow. Sometimes they were moved to the hold. This may have been done during long journeys in deep waters, in areas they were not very useful, or perhaps to clear the space for combat purposes. The heavy anchors of the supposed Dutch East Indiaman, De Rob (toponym BZN 3, wrecked 1640, the Netherlands) were also found in the hold.[40] The position of the heavy anchors on the Utrecht site may indicate that these were also stored. However, future research is needed in order to clarify this. Four hull fragments were exposed and visible when in 2012 the non-intrusive assessment was executed. These fragments consist of frames and ceiling planks. One exposed hull fragment (H3) projects from down under a large amorphous concretion (Figure 25). It consists of four timbers (T11, T12, T13 and T14) of which one is the keel of the ship (Figure 27). As indicated by the overlapping of the planks T12 and T13, this may well have been a section of the ship's double layered outer planking. This feature had already been observed during the investigation carried out in 2007, when another naturally exposed section revealed that the outer hull of the Utrecht consisted of three layers of wood. The observation showed two thick layers of oak and one thin layer of pinewood (Figure 31).

Future research on the Utrecht has yet to confirm the three layers of wood at different locations throughout the hull remains. Samples need to be collected in order to identify the wood species and to do extensive dendrochronological research in order to identify provenance and different building stages (including repairing) of the ship. Following sampling, further study of the construction of the identified keel is needed to determine whether both of the first layers of outer skin planking were most likely installed when the ship was originally built, or whether the second layer was added afterwards. Specifically, examination of the fastenings of the different layers of planking will contribute to our knowledge of shipbuilding and the method of using three layers of planking on ships. It has become clear

39 Spruit & Manders, 2007: 39
40 Vos, 2012, 160
fig. Page 30, Fig. 26: The positions of all cannons and anchors were mapped with the triangulation-method.

that the wreck still consists of enough structure to execute and intrusive campaign in order to investigate the interesting hull construction and to learn more about ship protection in the tropics.

VOC ships had an extra layer of pine wood sheeting as a sacrificial layer against deterioration caused by shipworms. Usually this was a thin layer nailed on the original skin planks. The nails had broad heads. When these corroded in the salty environment, the corrosion would create an extra layer on the wood's surface that would be impenetrable to shipworms. In between the thin sacrificial layer and the original wood planks, a matting was applied consisting of cow hair and tar. [41]

It is entirely possible that, because of the long journeys many ships took through tropical waters (VOC, admiralty and WIC ships), shipbuilders constructed not just one sacrificial layer, but two thick full shell layers. This measure would protect the original layer of oak - the ship's real foundational construction - from deteriorating or weakening. It should be borne in mind that losing that last inner layer of shell planking would mean losing the ship and jeopardising the health and safety of its crew.

Shipworm (*Teredo navalis*) was a real threat to ships. We know from many historical sources that ships got lost (e.g. Expedition of Columbus, 1493) or sent back (e.g. Witte de With's 1648 expedition in Brazil) because the hull was seriously affected. Developing methods to protect the ships was a logical thing to do.

If a sacrificial pine wood layer was added on top of these two full shell plankings, the ship would have three layers of wood under the waterline. The second layer of shell planking could be made out of pine or oak. Oak was observed in *the Utrecht* ship remains (by visual inspection in 2007); pine was mentioned in the historical resources on the *Eendracht*, the expedition ship of Schouten and Lemaire (1615-1616).[42]
In the 17th century, extra hull plankings were attached for reasons other than mere protection against shipworm. They also protected the ship against ice and enemy fire. In addition, they reinforced the ship's structure with extra strength, stability and stiffness. When *the Utrecht* was outfitted for the trip, it was already known that the ship would be at sea for a very long time, and mainly in warm tropical waters. In light of that, it would not have been deemed excessive to reinforce the ships' hull with the extra layers. Very probably, the ship would have sailed much slower than a vessel with only one layer of hull planking.

41 Spruit & Manders, 2007: 55
42 De Boer, 1923: 204
fig. Page 35, fig 28: A large part of the ballast of the Utrecht was moved aside during the salvage operations in the 1980s


SUN DIVE

6 Answers to the research questions

J. Opdebeeck, W.F.G.J. Brouwers, T. Coenen, M.R. Manders & R. Torres

What is the location of the site?
The Utrecht shipwreck is located just outside the Todos os Santos Bay, 18.7 km from the city Salvador de Bahia, and 9.3 km from the island of Itaparica.

The coordinates are:
The Utrecht: 38°39'W 13°7' S
The *Nossa Senhora do Rosário*: 38°39'W 13°7'S

What conditions and features characterise the seabed in which the site is found?
The seabed around the site consists mostly of coarse sand and coral fragments with banks of living coral in between.

What are the dimensions of the site?
The main concentration of *the Utrecht* ship lies in an elongated area running in a NE-SW direction and measuring 50m by 40m. Around this concentration are more scattered artefacts, loose concretions and smaller ballast heaps.

However, if the site is considered a testimony to a historical battle, the wreck of the *Nossa Senhora do Rosario* should also be included in the location. The Rosaria lies 220m from *the Utrecht* wreck site. Together, the two wreck sites comprise an archaeological area containing historical remains that is roughly as large as 30,000 m², or 3 hectares.

What objects are still preserved in/on the seabed and in what categories of materials do the existing artefacts fall?
The objects on the seabed include heaps of ballast stone, 16 cannons, 7 anchors and fragments of anchors, some exposed wood and concretions. Aside from these archaeological remains, a number of more recent artefacts were found, which can probably be linked to the salvaging operations 30 years ago. The project in 2012 was a non-intrusive research study. Thus, the researchers were unable to investigate any objects and their state of preservation under the sand. However, the salvaging in the 1980s established the presence of a wide variety of objects, including ceramics, metal, and fragile objects made of wood and leather (see Appendix II). It could be argued that similar objects are still preserved under the sand and the remains of the ship. Future research and excavations should be able to determine this.

The objects that were found are all on or partially in the seabed. They can be divided in the following material categories:
- Metal: anchors, cannons and undefined concretions
- Stone: heaps of ballast
- Wood: wooden remains can be found in a few places, which appear near the seabed or protrude out of the seabed

Are any construction details of the ship visible at the site?
The researchers in 2012 found four locations, where wood from the wreck protruded through the seabed. At locations H1 and H2, remains of the frames and outer planking were found along with some inner planking (ceiling) at location H2. At location H3, part of the (possible) keel was visible. Next to the keel (T14) are 2 planks form the outer planking (T11 and T12). On the other side are remains of a frame protruding from the ballast pile. Interesting construction details include the garboard strake on the side of the keel and the possible double planking (T13).

T12 and T13 are laying on top of each other and both seem to be connected to the keel. This would prove that the ship had at least a double hull to protect it against the wood-boring activities of shipworms. The third sacrificial layer of outer planking, observed in 2007 by archaeologists, was not visible in 2012. As most of the remaining construction parts are buried in the seabed, it is very difficult to draw any conclusions about the building sequence and other methods of construction without excavation.

What is the state of preservation of the archaeological objects?
Most of the anchors and cannons are complete, but heavily concreted. Those concreted objects and the ballast stones are also covered with marine growth. The wood that was found protruding through the seabed is heavily infested with shipworm (probably *Teredo navalis*) and is not very solid, indicating a heavy state of degradation. Although the top part of the timbers (possible frames) found at location H1 are heavily degraded, probing indicates that the parts buried deeper in the sand are still in excellent condition.

fig. Page 34, Fig. 29: Students record all anchors and cannons for the creation of threedimensional digital models. (Photo: J. Opdebeeck)

To what extent has the Utrecht site been disturbed since the first salvage operations in the 1980s?
The site shows a great deal of evidence of the salvaging operation thirty years ago. A good example is the distribution of the stone ballast, which had clearly been moved to one side of the wreck to enable the salvage of the artefacts underneath.

To determine the exact extent to which the site has been disturbed, on-site conditions before the salvage operation would need to be compared with present conditions. The oldest information available comes from the salvage company in 1981. They produced a site plan and published a number of photos of the site. The site plan shows a large number of cannons, anchors and wooden structures.

Unfortunately, the site plan differs so greatly from the 2012 map that a detailed comparison is not possible. This appears to be the result of poor mapmaking, rather than actual changes to the archaeological remains. On the 1981 map, heavy objects appear to be in a slightly different location. As the salvaging company was out to find treasure, and not to lift an entire structure, they would rather have worked their way around these objects than re-position them to some extent. The process of relocating non-valuable artefacts (from a salvaging point of view) costs tremendous effort under water, where time is already limited due to diving conditions as depth, current and weather .

Photos from the salvaging period in the 1980s confirm the presence of large amounts of wooden structures. In 2012 these have disappeared almost completely. Whether these have been removed by the salvage operators, destroyed by the shipworm or are still present under the sediment is unclear. Although the site is heavily disturbed, it is very well possible that part of the site remains undisturbed under the existing ballast piles and a thin layer of sediment. Probing in 2012 indicated that wood under the sand was still in a good condition.

What are the threats to the site?
The wreck site lies at 24m depth in a large bay, which protects the location from the swell of the ocean. During the 2012 project, the researchers noticed there could be some current, but it is unlikely to move many objects on the site, as all smaller and lighter objects have already been removed, or are still well-protected under the sand.

The main threat to the site is illegal excavation and/or salvaging. Although the wreck was thoroughly disturbed by the salvagers in 1981, the site still contains large objects, such as anchors and cannons. Underneath the sand and ballast piles, there might be hidden (undisturbed) remains, which could be vulnerable to souvenir hunters or larger-scale salvagers.

Although the wreck is protected by Brazilian laws, it is not easy to enforce these laws, as the site is located some ten kilometres from the nearest shore.

What measures can be used to protect the site in situ?
Usually, legal measures are not sufficient to protect an archaeological site, especially shipwrecks. These often attract a great deal of attention from treasure and souvenir hunters. One way to protect a site like this is to raise public awareness. The more people support the idea of wrecks as common heritage that require protection, the better the site will be safeguarded.

Therefore, it would be a good idea to increase public support for protection by raising awareness. For instance, a diving school could “adopt” a wreck, and give regular tours to tourists/sports divers. Such tours would not only increase public support, but could also be instrumental in monitoring the site and notifying competent authorities when illegal activities take place.

The site could also be physically protected, using such materials as artificial seagrass, debris nets, geotextiles and sandbags.[43] However, since these protection measures camouflage wreck remains, they would preclude underwater diving tourism at the site. The costs of such in situ protection measures are still considerable bearing in mind the size, depth and remote location. In addition, monitoring would be required to oversee whether these protection methods are sustainable over longer periods. Iron anchors and cannons could be additionally protected by using anodes.[44]

Aside from the observations above, the researchers would like to recommend additional intrusive research to investigate the ship's construction. The site offers ample opportunity to investigate the construction of a Dutch admiralty ship from the Netherlands' Golden Age: the time of colonisation and large-scale warfare at sea, long journeys in tropical waters and the transition from the random approach to ship building to that of warships built by class. Before this is done, however, the exposed timbers could be reburied, or protected with geotextile.

Is it possible to identify this wreck as the "Utrecht," which sunk in 1648?
No objects were found that could establish the origin of the shipwreck. The salvaging in 1981, however, did yield several objects that can be regarded as being of Dutch origin: ceramics, coins, clay pipes and other artefacts.[45]

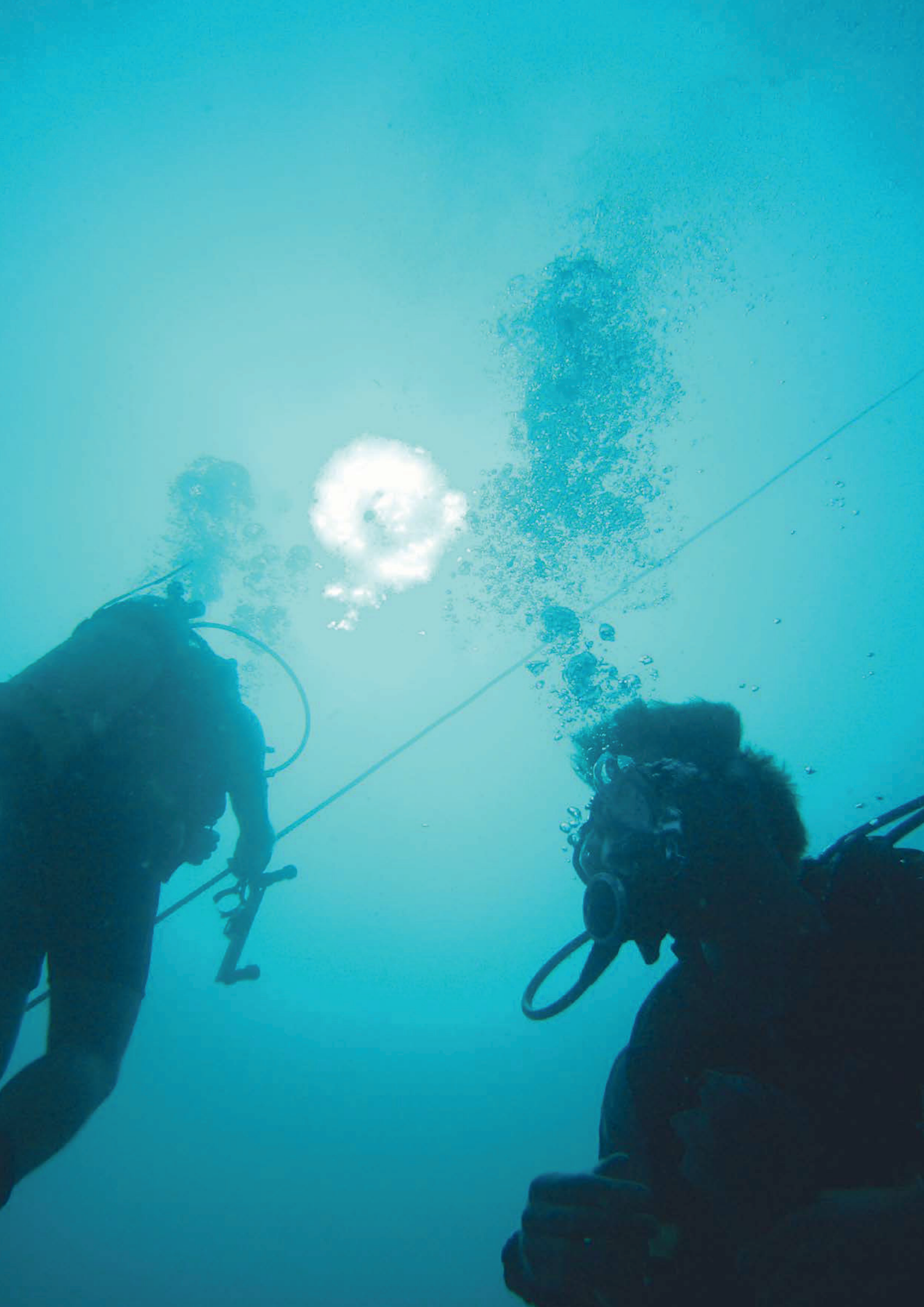
Based on the historical evidence, the wreck site could be the Utrecht. Its position nearby a second wreck, presumably the Rosario, is further evidence. However, without examining the site thoroughly by means of excavation (including wood sampling and dendrochronology), the ship cannot be identified with certainty.

What is the cultural historical value of the site?
An assessment of the cultural historical value was carried out by the researchers based on the results of the 2012 campaign. The site was rated on aspects of perception, physical condition and the intrinsic value of the wreck. The final conclusion was that the Utrecht wreck site has a high cultural historical value (see chapter assessment and recommendations).

The Utrecht as a capacity-building/training site
The Utrecht site was used to train four students in underwater archaeology, and proved to be an excellent location for capacity building. Local visibility is good, the location is relatively protected within the bay, and the site is large enough to allow different groups or pairs to work underwater without disturbing each other. However, at 24 metres depth, the site is considerably deep. These are not easy diving conditions despite the blue and relatively calm waters. In light of that, future trainees should already have considerable training as divers. Enriched air diving will mean longer time on the seabed, which will make it necessary to have an analyser on board. Most importantly, if a larger training programme is going to take place at the site, a larger ship should be provided.

The best solution would be to have a ship as a base-and-dive platform: a ship that could stay at the site for several days, where the divers and students can sleep, dive, clean the gear and process the data. In addition, more effort and investment should be devoted to overseeing the safety of diving operations by including a diving and safety instructor on board. A feasibility study will be done to see if this is possible to arrange. Training could be organised according to the UNESCO Training Manual for the UNESCO Foundation Course on the Protection and Management of Underwater Cultural Heritage.[46]

[43] See Manders *et al.*, 2009
[44] See,for example, MacLeod 1996
[45] See appendix 2
[46] Manders & Underwood, 2012



7 Assessment and recommendations

J. Opdebeeck, T. Coenen & W.F.G.J. Brouwers

7.1 Assessment of the archaeological value of *the Utrecht* shipwreck site

In the course of a sea battle with Portuguese ships in 1648, the Dutch admiralty ship, *the Utrecht*, sank before the coast of Brazil. A joint collaboration between Brazilian, Dutch and international researchers revisited the site to assess the archaeological potential of the remains of this wreck. To evaluate its archaeological significance, the Dutch quality standard protocol for the assessment of archaeological underwater sites was used (*KNA waterbodems 3.1 protocol 4103 VS06 waarderen IVO waterbodems*). According to these standards, a site's archaeological significance is established on the basis of its *aspects of perception*, *physical condition* and *scientific content*. These different values will be discussed below.

7.1.1 Aspects of perception

1.1 Aesthetic value
Several objects on the site can be clearly defined, such as large sea anchors and cannons. Although the site is rather far from shore, it is locally well known as a dive site. The depth (max. 24 metres), good visibility under water and the historical tale of the shipwreck make it a popular diving destination. The site can be easily reached from Salvador de Bahia, or Itaparica Island.
Aesthetic value = Average

1.2 Remembrance
The Utrecht has verifiable links to the Netherlands, Portugal and Brazil, as this admiralty ship sank at the end of the Dutch colonial era in Brazil. It is thus a relic of the latter period of battles between Portugal and the Netherlands to gain control over the sugar and slave trades in northeast Brazil. Today, Brazil is a booming economic power. Nonetheless, the country is aware of its (colonial) past. The coast along Salvador, Bahia boasts numerous remnants of the 17th and 18th centuries, mainly constructions such as fortresses and churches. The wreck site is a testimony, a physical remembrance of this same history and maritime landscape.
Remembrance value = High

7.1.2 Physical condition

1.3 Completeness/preservation
Although the archaeological site underwent commercial salvaging, it still contains significant remains. The salvagers moved a great many ballast stones and large objects in their search for valuable goods.

The shipwreck lies along the seafloor at a depth of 21 to 24m, in an area of 40m by 50m. This area still contains piles of ballast stones, cannons and anchors in their original position. The salt water and organisms, such as the shipworm, have destroyed the uncovered wooden remains at the site. However, a large portion of the ship's structure remains preserved under a thin layer of sand / coral, and in some places under unmoved ballast piles. These wooden remains still form a coherent ship unit.
Preservation status = Average

1.4 Conservation
The wooden remains that were examined by the researchers in 2012, were all affected by shipworm (possibly *Teredo navalis*). In one particular part of the wreck, where frames of the ship protruded the surface, the researchers probed into the seabed to establish the quality of the deeper laying structural remains. The prospection proved that the wooden remains that lie deeper in the seabed are in a remarkably good state of preservation. The remains of the cannons and anchors are all heavily corroded.
Conservation status = Average

7.1.3 Intrinsic value

3.1 Rarity
Very few archaeological wreck sites of the West Indian Company (WIC) and Dutch admiralty ships are known and preserved. In the Netherlands, there are only a handful of such sites. Some wrecks are located in tropical waters. Sadly, many of those sites are in a bad state of preservation due to the constant degradation and the lack of protection and supervision.
Rarity = High

fig. Page 38, Fig. 30: After all dives, a safety stop of three minutes was performed at three meters depth.

3.2 *Informational value*

Comparatively speaking, little is known about the construction of large naval vessels in the 17th century. As there are no surviving constructional drawings/plans (only descriptions), archaeological data is the only remaining source of information on the construction of these sea-going vessels. In 2007, the first prospecting research study of the site already proved that the shell of *the Utrecht* was constructed of double and possibly triple planking. This "doubling" was common practice for ships that sailed to tropical regions. The double planking protected the ship's shell against destructive shipworm attacks. Triple planking is still a very rare find in archaeological records.

Further research into the construction of *the Utrecht* may make it possible to establish when this third planking was attached. Was it a later addition, or was this feature planned when the keel of the ship was laid. This "small" detail could give researchers insight into the strategic/military purpose of the vessel and the subsequent political decisions of the Dutch Provincial Council regarding colonial activity in Brazil.

Information value = High

3.3 *Ensemble value (connection with local maritime history)*

Given the positive identification of this admiralty ship and the historical literature on this sea battle in 1648, the archaeological and historical sources can be connected. The remains of *the Utrecht* and the Portuguese ship, *Nossa Senhora do Rosário*, which lays at a distance of 200m, offer unique evidence of a sea battle in the 17th century. Moreover, the 17th-century layout of the city of Salvador de Bahia, including its forts, still exists. Together, the wreck site and the city form an impressive maritime landscape.

Ensemble value = High

3.4 *Representative value*

Although there are few examples of 17th-century Dutch men-of-war, *the Utrecht*, with its 30 cannons, can be assumed to be a classic example of a Dutch frigate or yacht. The ship was part of a Dutch fleet consisting of twelve sister ships under the command of Admiral Witte Corneliszoon de With.

Representative value = Average

7.2 Conclusion of the assessment

The 2012 research study established that a substantial part of the structural remains are in a reasonably good state of preservation. These remains can reveal more about aspects of shipbuilding and colonial politics in the 17th century. This particular combination of historical literature and archaeological data form a unique testimony to a 17th-century sea battle. The archaeological assessment of *the Utrecht* site is consequently high.

TOTAL SCORE = HIGH

Table 2: Consolidated assessment of archaeological value of *the Utrecht* shipwreck site

VALUE	CRITERIA	SCORES
§1. Aspects of perception	§1.1. Aesthetic value	2
	§1.2. Remembrance	3
	Assessment perception	**5 = High**
§2. Physical condition	§2.1. Completeness	2
	§2.2. Conservation	2
	Assessment condition	**4 = Average**
§3. Intrinsic value	§ 3.1. Rarity	2
	§3.2. Informational value	3
	§3.3. Ensemble value	3
	§3.4. Representative value	2
	Assessment intrinsic	**10 = High**
	TOTAL SCORE	**19 = HIGH**

7.3 Recommendations and final considerations

After seven days of a non-intrusive survey, aimed at documenting *the Utrecht* shipwreck site and assessing its potential for future research, we concluded that the site, though highly disturbed, can still yield important information regarding early modern Dutch shipbuilding and seafaring technology.

An estimation of the ballast weight, type, and provenance may offer important insight into the tonnage and stability, and may also help to identify at least some of the ship's ports of call and routes. Furthermore, as noted above, a number of large artefacts and fittings have remained on the site. If the six anchors shown in the site plans represent the ship's complete set, their study is perhaps a unique opportunity to compare the archaeological data with documented evidence pertaining to the outfitting of these ships, notably the relationships between anchor weights and tonnage. Sixteen cast iron guns have remained on the Utrecht site, more than half of the 30 referred to in the documents, constituting a fair sample of the ship's original armaments. A number of bronze guns have been removed from the site, and at least two of them are still available for study, notably at the Rio de Janeiro Naval and Oceanographic Museum.

A substantial portion of the ship's hull remains at the site, preserved under a thin layer of sediment and ballast stones, including frames, a ceiling and a (possible) triple-planked section of the hull's outer planking, which offers a rare window into early to mid-17th-century Dutch shipbuilding practices. Future studies on timber provenance and scantlings, fastenings, scarves, tool marks, sheathing, and hopefully the curvature measured on the preserved section of the hull, could undoubtedly yield valuable inputs in regard to the vessel's size, shape, proportions, stability and sailing capabilities. Such information would also facilitate virtual model reconstructions of the ship.

The documented artefact distribution and its comparison to early sketches have started to unveil the extension and chronology of past interventions at the site, ultimately contributing to our understanding of the site formation processes, and thus, establishing the basis for future interpretations. Moreover, the knowledge acquired with this research effort will facilitate the planning of forthcoming studies, the implementation of capacity-building courses and the development of a management plan for the site.

If the site will not undergo any further study within the near future, we would recommend - at the very least - in situ protection of the ships' exposed wooden elements.

Finally, aside from its value for technical studies, the site offers ideal conditions for planning an underwater trail or in situ exhibition along the UNESCO Diving Trail Programme route.[47] It also offers opportunities for creating awareness among recreational divers and opinion formers in regard to the importance of rigorous archaeological research and the protection of our common underwater cultural heritage. Through international cooperation, education and expertise exchange, the development of this project could become a benchmark for shipwreck conservation in Brazil, as well as for capacity building and human resources in underwater archaeology.

The wreck of the Utrecht offers many different values, as its history of salvaging and historical-archaeological research has shown. Objects have been raised from the wreck by commercial salvagers for their direct economic value, and archaeologists have discovered important features of 17th-century Dutch shipbuilding for overseas naval ships. Archaeology aside, shipwrecks are also places that can be enjoyed. Sport divers love to dive around wreck s. It gives them a purpose: there are things to see, to discover and maybe possibly also to learn. We could opt to preserve sites in situ and take measures to exclude people from visiting the wreck, or we could choose to encourage these visits as part of an awareness-raising strategy. Given its position in the "Baya de Todos los Santos" near Salvador de Bahia, the clear local visibility, and the lack of current and visible structures on the seabed, *the Utrecht* would be an excellent site in the future for a dive trail. It is,

[47] http://www.unesco.org/new/en/culture/themes/underwater-cultural-heritage/ Consulted on January 21, 2016

however, our opinion that this should include an informative and awareness-raising component. This can be either be arranged on site or off site. For example, divers could be transported to the site by a dive tour operator who gives instructions. Informative placards could be placed under water, or an instructive booklet can be made for divers. This strategy would actively serve to bring divers to the site for a clear purpose: to learn about history while experiencing the exciting under water world. The inclusion of dive operators in these site tours would provide "eyes and ears" for the sites. Their (economic) involvement would probably motivate these operators to guard the sites and enforce laws there. All over the world, different dive trails have been established over the last couple of years. For more details, see the list provided by UNESCO.[48]

The dive trail around the Utrecht can be informative about the story of the ship itself, (Dutch) shipbuilding practices, or the role of the Dutch in Brazil's history. It may even be part of a larger trail that extends on land, with the historic buildings in Salvador, and even the Dutch fortresses elsewhere in Brazil. However, before this can be done, more research may provide more knowledge regarding the site, which would benefit the underwater tourists. Naturally, these are all only ideas, which the Brazilian authorities may want to take into consideration in the future.

[48] http://www.unesco.org/new/en/culture/themes/underwater-cultural-heritage/. Consulted on January 21, 2016

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Illustrations

Appendix I: Large artefact catalogue

R. Torres & K.Yamafune

This appendix contains a table with all the anchors and canons that were found on the Utrecht site. The right column displays photos of the artefacts, on the left are models from each object. These models were created with the computer program Maya 3D, and are interpretations of the artefacts, based on the measurements of the original artefacts. As they were heavily encrusted with concreted corrosion products, corals and other marine life, given measurements may not represent original artifact dimension, but instead, the features as they were found in-situ. Measurements are given in centimeter and the scale bar in the pictures is of 100 centimeters.

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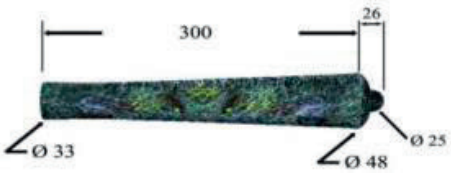

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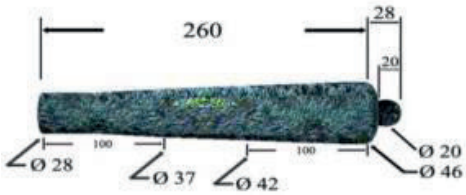

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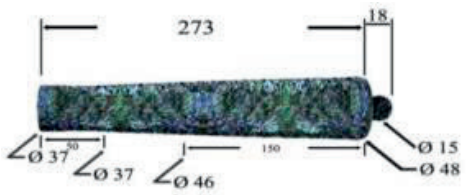

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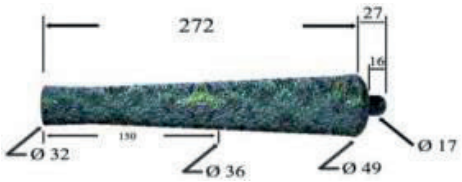
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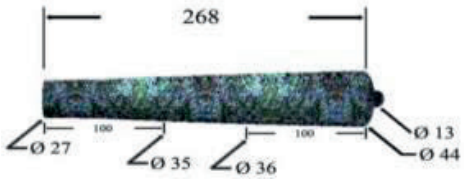
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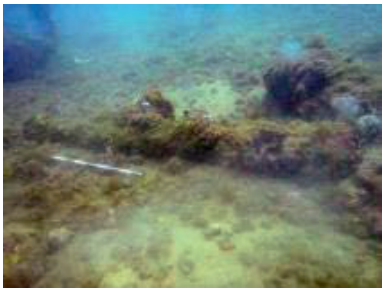

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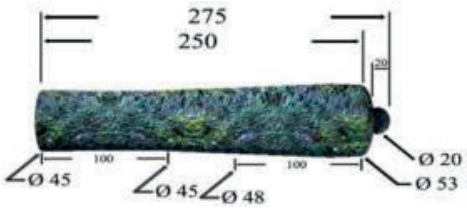
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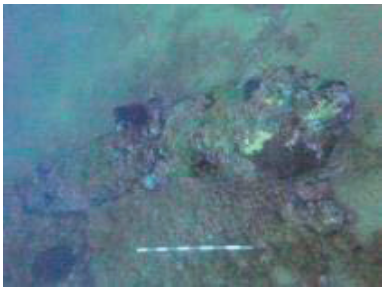

C8


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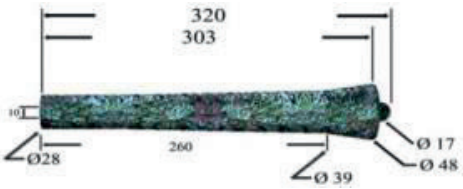
C9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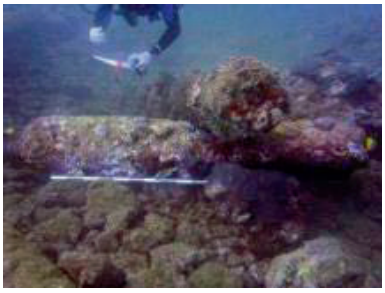

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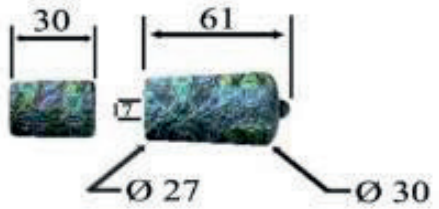
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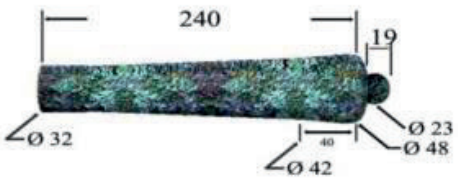

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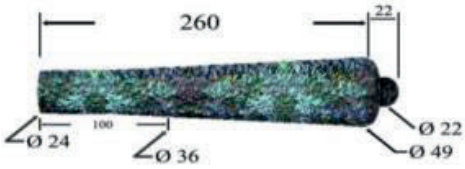

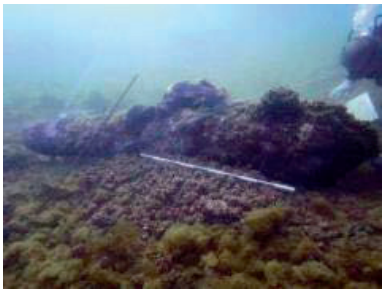

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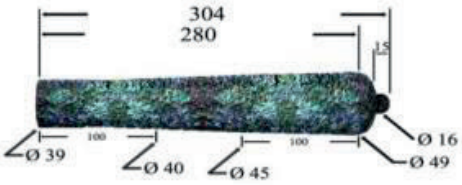

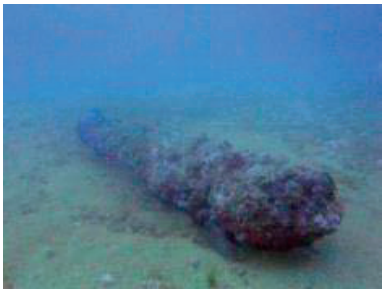

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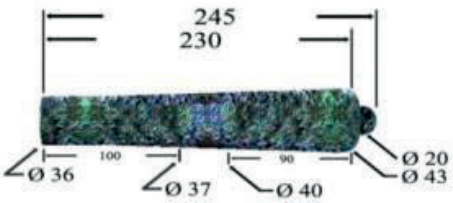

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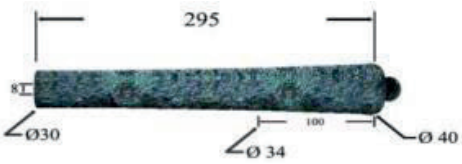

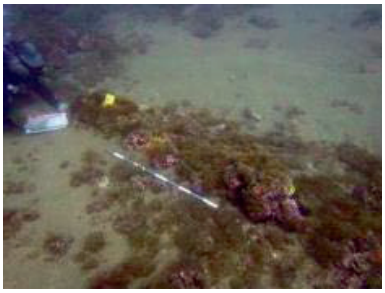

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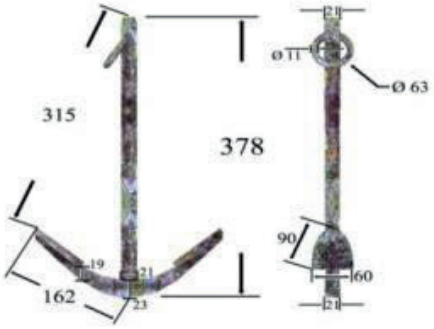

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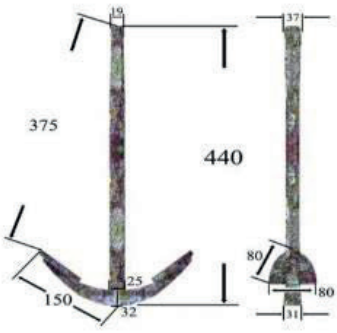

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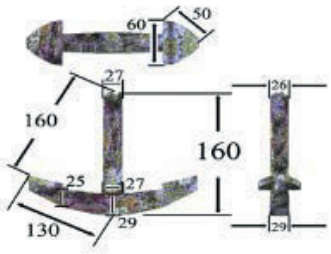
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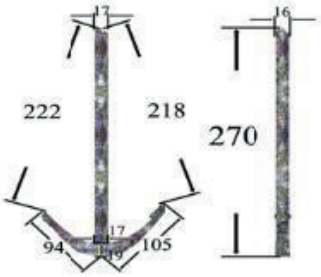
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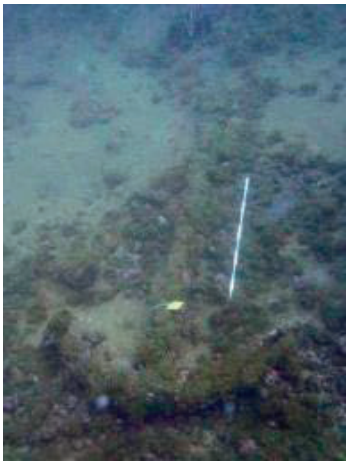

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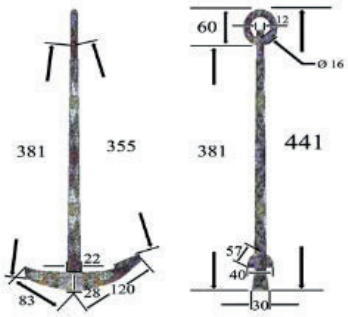
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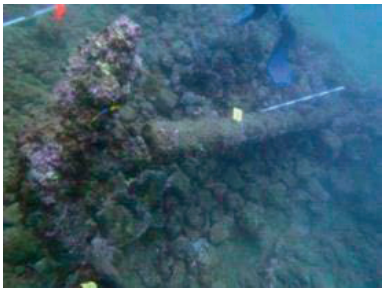

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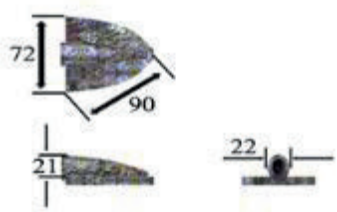

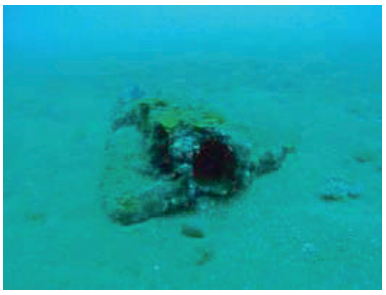

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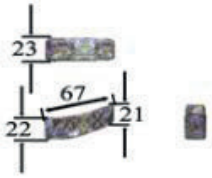
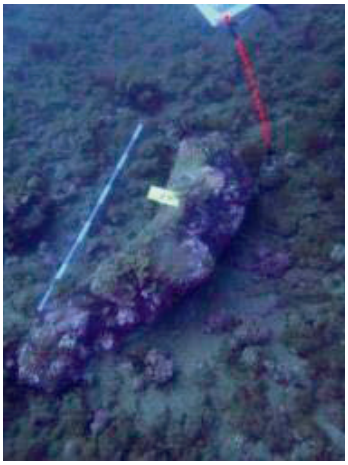




Appendix II: Small artefact catelogue

R. Torres, F. Castro & T. Coenen

This attachment consists of a catalogue of finds that have been lifted from the Utrecht site many years ago. The largest part of these objects were salvaged during the early eighties. They are now deposited in the Navy Museum of Rio de Janeiro. In the early phase of the Utrecht project, these objects were located and an initial documentation was made, which was published in 2012.

The authors have decided to add the complete catalogue with all the photos of the objects to this publication, in order to be as complete as possible and to provide future researchers with as much material as possible. For this publication the list has been rearranged and the objects have been classified, based on the photos, into: ship's hull, equipment, inventory, personal possessions and cargo. The largest group of objects consists of ceramics. In the database that has been provided for this publication, no specific distinction or determination was given for these sherds. We leave a more detailed identification to future researchers.

fig. Page 54, Fig. 31: Historic centre of Salvador de Bahia

Ship's hull with standing and running rigging

N°	INV #	TYPE	MATERIAL	STATE OF CONSERVATION
20	300	NAIL PIN / BOLT (?)	BRONZE	STABLE.
72	16024	NAIL	COPPER (?)	NOT CONSERVED.
73	16025	NAIL	IRON (?)	NOT CONSERVED.
74	16026	NAIL	COPPER (?)	NOT CONSERVED.
75	16027	NAIL	COPPER (?)	NOT CONSERVED.
76	16028	NAIL	COPPER (?)	NOT CONSERVED.
77	16029	NAIL	COPPER (?)	NOT CONSERVED.
115	16030-39	NAILS	COPPER	VARIOUS CONDITIONS.
116	16053 / 370	FASTNER (?)	BRONZE/COPPER	STABLE. CONSERVED.
181	16653 / 665	SHEATHING FRAGMENT + NAILS	COPPER	UNSTABLE. NOT CONSERVED. UTRETCH ??

20 NAIL PIN

72 NAIL

73 NAIL

74 NAIL

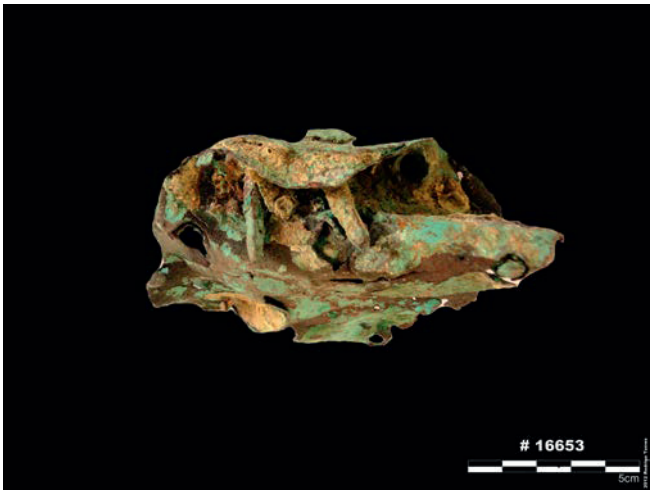
75 NAIL

76 NAIL

77 NAIL

115 NAILS

116 FASTNER



181 SHEATHING FRAGMENT

Equipment, including Ship's equipment, Working equipment and weaponry

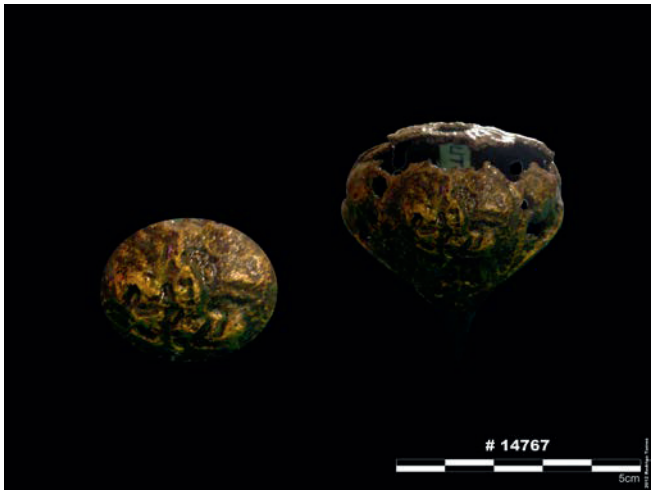
N°	INV #	TYPE	MATERIAL	STATE OF CONSERVATION
8	281 / UT-BA	PISTOL HANDLE DECORATION	BRASS	STABLE.
19	298 / UT-BA	HAND GRANADE (?)	CERAMIC	BADLY DETERIORATED SURFACE. GREEN PATINA PRESERVED. VERY SHINNY FINISH CONSERVATION. MATERIAL INSIDE.
31	315	KNIFE HANDLE	BRONZE	STABLE.
54	422	PAIR OF COMPASSES	BRONZE + STEEL RESTORATION	CORRODED BRONZE. WORKING. STABLE. ARM TIPS HAVE BEEN RESTORED.
59	14767	PISTOL HANDLE DECORATION	BRONZE OR BRASS	CONSERVATION NOTE ATTACHED.
60	14769	FLINT STONE (3)	LITHIC	MANY MORE NOT RECCORDED. BEAUTIFUL SET.
61	14786	DOOR HANDLE	METAL	STABLE. NOT CONSERVED.
69	15152	SHOT	IRON	CORROSION. NOT CONSERVED.
78	16058	PISTOL FRAGMENT (?)	WOOD AND METAL	UNSTABLE. NOT CONSERVED.
89	16621	TIP SWORD SHEATH	BRONZE	UNSTABLE. NOT CONSERVED.
90	16622	SWORD SHEATH FRAGMENT	BRONZE (?)	UNSTABLE. NOT CONSERVED.
91	16623	SWORD SHEATH FRAGMENT	BRONZE (?)	UNSTABLE. NOT CONSERVED.
92	16624	SWORD SHEATH FRAGMENT	BRONZE	UNSTABLE. NOT CONSERVED.
108	15144 - 52	STONE SHOTS	LITHIC	UNSTABLE. NOT CONSERVED.
111	15471 - 74 / 329	MUSKET AND PISTOL SHOTS	LEAD	UNSTABLE. NOT CONSERVED. There is a box full.
187	NO #	BLOCK	WOOD	2 SHIEVES. UNSTABLE. POOR CONDITION. UTRETCH ??

8 PISTOL HANDLE DECORATION

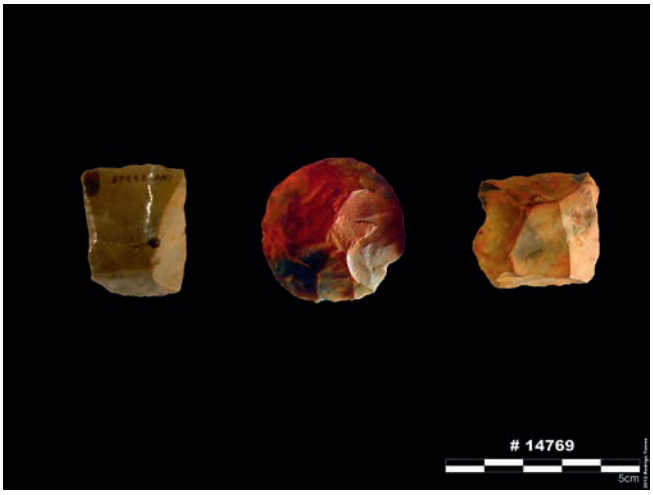
19 HAND GRANADE (?)

31 KNIFE HANDLE

54 COMPASS



59 PISTOL HANDLE DECORATION

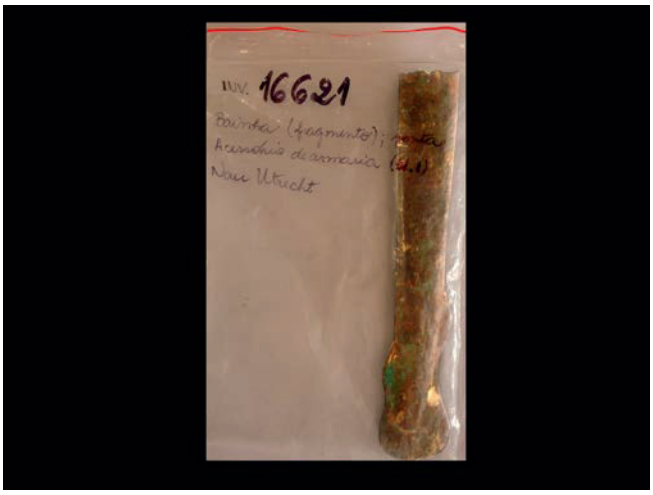


60 FLINT STONE (3)

61 HANDLE

69 SHOT

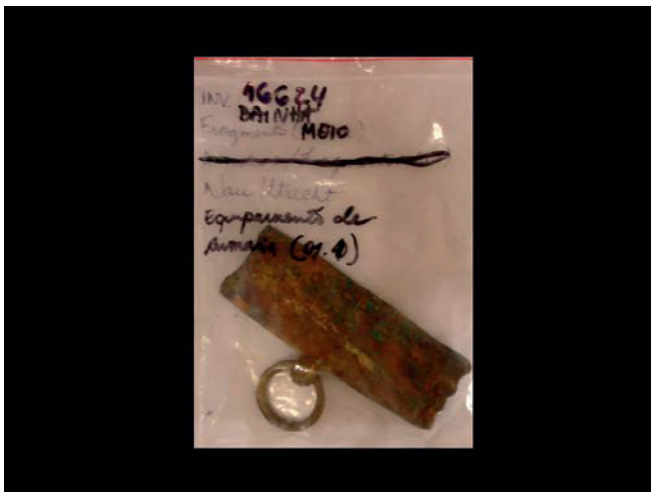
78 UNIDENTIFIED.



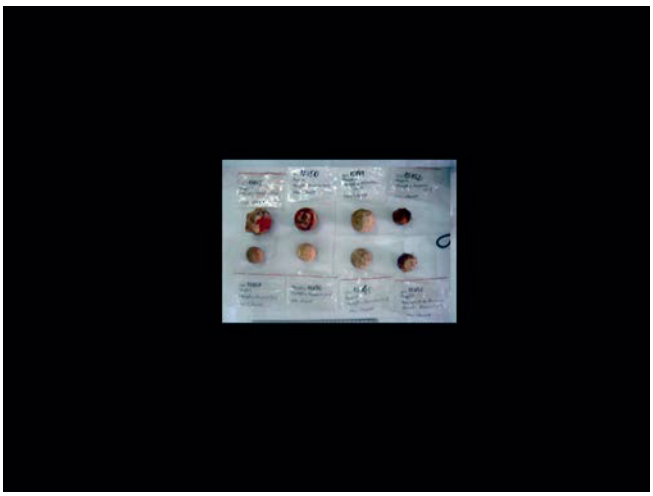
89 TIP SWORD SHEATH

90 SHEATH FRAGMENT

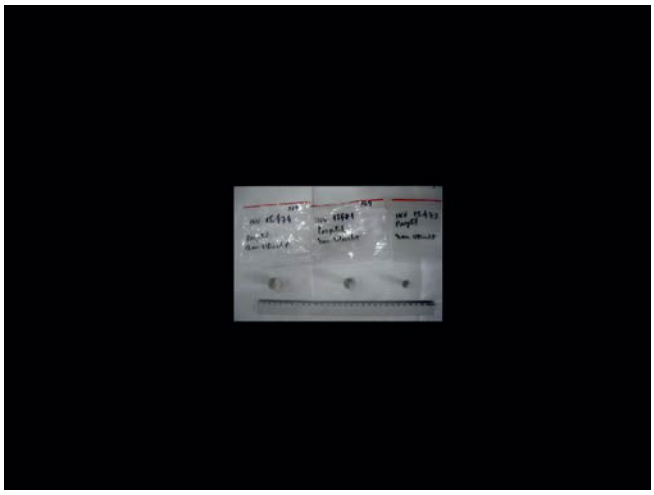
91 SHEATH FRAGMENT



92 SHEATH FRAGMENT



108 STONE SHOTS



111 MUSKET AND PISTOL SHOTS

187 BLOCK

Inventory, including Navigation, Tools, Domestic effects, Hearth and galley, Eating and Drinking and Victuals and provisions

N°	INV #	TYPE	MATERIAL	STATE OF CONSERVATION
1	159 / UT-BA	PAN HANDLE	BRASS	STABLE.
2	188	LARGE PLATE	TIN	ACTIVE CORROSION.
3	197 / UT-BA	BOTTLE	SALT GLAZED	COMPLETE. BENT. REMAIN GLUE IN BOTTOM
4	262 (a) / UT-BA	WRITING SLATE	SLATE	LEFT VERNIZ. BROKEN.
5	262 (b) / UT-BA	PENCIL	SLATE	STABLE.
6	275	PORTUGUESE COIN	SILVER	FISSURES AND SOME DARK SPOTS.
7	277	CANDLE HOLDER	BRASS	BADLY REPAIRED IN THE BOTTOM. STABLE.
8	281 / UT-BA	PISTOL HANDLE DECORATION	BRASS	STABLE.
9	283	JAR	TIN	STABLE
10	285 / UT-BA	BOTTLE	SALT GLAZED	BADLY REPAIRED NECK. BADLY COATED.
17	294 / UT-BA 82	MORTAR	IRON (?)	POORLY CONSERVED. SOME ACTIVE CORROSION.
18	296	ONION BOTTLE	GLASS	STABLE.
23	305 (c) / UT-BA 80/86	BOTTLE	SALT GLAZED	COMPLETE. SOME ACTIVE CORROSION.
24	307 / UT-BA 81	BOTTLE	GLASS	COMPLETE. SOME DEVITRIFICATION.
25	308 / UT-BA 86	BOTTLE	SALT GLAZED	BROKEN WING. SOME CONCRETION.
26	309	SCISSORS	CONCRETION Fe	ACTIVE CORROSION.
27	310 / UT-BA 32 (?)	SPOON	TIN (?)	NOT CONSERVED.
29	313 / UT-BA	SKILLET	COPPER	COMPLETE. SOME ACTIVE CORROSION.
30	314 / UT-BA	LID	CERAMIC	POOR EDGES.
32	320 / UT-BA 84	JAR	SALT GLAZED	COMPLETE.
33	321 / UT	JAR	DELFT (?)	REPAIRED BOTTOM. SOME POROUS. GOOD TO POOR.
34	323 / BA 01-491 UT	PLUMMET	LEAD	NA
35	324	PAIR OF COMPASSES	BRONZE OR BRASS	GOOD CONDITION. BROKEN TIPS. WORKING.
36	325	PAIR OF COMPASSES	BRONZE OR BRASS	NOT FOLDING. CONSERVED. STABLE.
37	332	LAMP	COPPER OR BRASS	UNSTABLE. ZINHAVRE.
38	333 / UT-BA 81	LAMP	BRASS	STABLE. HEAVY.
41	340	MORTAR	COPPER	ACTIVE CORROSION. PAINTED.
42	345	SIRINGE	TIN OR BRASS	STABLE. CONSERVED.
43	346	SIRINGE	TIN	STABLE
44	350	LAMP ?	BRASS	STABLE
45	351	SPATULA	BRASS	STABLE.
46	352 / UT-BA10	JAR	TIN	NOT CONSERVED. ACTIVE CORROSION. LOOSE LID.
47	353	INK POT (?)	TIN	COMPLETE. ACTIVE CORROSION AT BOTTOM.
48	362	UNKNOWN	BRASS	NA
49	380 (?)	BOWL (FOR SHAVING ?)	TIN	SOME ACTIVE CORROSION. PLATED IN GOLDEN?
50	385	PLATE	CERAMIC	POOR REPAIR. NOT UTRECHT.
51	395	VASE	SALT GLAZED	STABLE. SOME BAD REPAIRS.
52	401	JAR	SALT GLAZED	BROKEN. STABLE.
56	727 / UT-BA 86	BOTTLE	SALT GLAZED	REPAIRED NECK. SOME MINOR DETERIORATION.
57	731 / UT-BA 60	SPOON	TIN (?)	STABLE.

N°	INV #	TYPE	MATERIAL	STATE OF CONSERVATION
58	732 / UT-BA ?	JAR	SALT GLAZED	SOME POROSITY.
62	14832	THIMBLE	BRASS	CONSERVED. CONSERVATION CARD ATTATCHED.
63	14836	SCALE (?)	BRONZE OR BRASS	UNSTABLE. INCOMPLETE.
64	14837	POTTERY SHERD	CERAMIC	STABLE. NOT CONSERVED.
65	14839	POTTERY SHERD	CERAMIC	STABLE. NOT CONSERVED.
66	14840	POTTERY SHERD (5)	CERAMIC	STABLE. NOT CONSERVED.
67	14842	JAR	SALT GLAZED	POROUS. NOT CONSERVED.
68	15048	BOTTLE	SALT GLAZED	SOME SALT CONCRETIONS (WHITE). COMPLETE.
79	16074	POTTERY SHERD (2)	POTTERY	STABLE. NOT CONSERVED.
80	16118	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
81	16120	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
82	16122	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
83	16125	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
84	16126	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
85	16175	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
86	16264	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
87	16271	HANDLE (2)	POTTERY	STABLE. NOT CONSERVED.
88	16619	HANDLE (?)	COPPER	FAIR. SOME ACTIVE ZINAVRE.
94	16629 / 368	JAR HANDLE	SALT GLAZED (?)	STABLE.
95	17714	GRADUATED RIM / COMPASS (?)	BRONZE	CONSERVED.
97	14751 - 60/ 310	COIN WEIGHTS	LEAD OR TIN	UNSTABLE. NOT CONSERVED.
99	14814 - 21	GLASS BOTTLE LID	TIN	UNSTABLE. NOT CONSERVED. THERE ARE NEAR A DOZEN OF THESE IN THE COLLECTION.
100	14825 - 29	DRAWER HANDLE (?)	BRONZE	CONSERVED.
101	14833 / 246	SPOON HANDLE	BRONZE (?)	CONSERVATION NOTE ATTACHED.
103	14835 / 362	JAR NECK RIM	CERAMIC	UNSTABLE. NOT CONSERVED.
104	14838 / 590	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
105	14841 / 130	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
106	15034 - 36	PAN SCLALE WEIGHTS (?)	LEAD	UNSTABLE. NOT CONSERVED. CLASSIFIED AS FISHING WEIGHTS.
109	15331 (?)	SEED BUD	SEED	UNSTABLE. FRAGILE.
110	15395 / 568	STOPPER	POTTERY	STABLE. NOT CONSERVED.
112	15890-96	WASHERS	COPPER (?)	UNSTABLE. NOT CONSERVED.
113	15897 / 27	POTTERY SHERD	CERAMIC	STABLE. NOT CONSERVED.
114	15899 / 412	JAR NECK FRAGMENT	CERAMIC	INTERESTING PIECE. STABLE. NOT CONSERVED. NOT SURE IS UTRETCH.
117	16111 / 543	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
118	16114 / 548	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
119	16115 / 548	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
120	16116 / 548	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
121	16117 / 548	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
122	16119 / D88	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
123	16121 / 548	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
124	16123 / 548	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
125	16124 / 548	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.

N°	INV #	TYPE	MATERIAL	STATE OF CONSERVATION
126	16167 / (?)	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
127	16169 / 590	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
128	16171 / 590	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
129	16172 / 548	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
130	16173 / 548	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
131	16174 / 548	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
132	16176 / (?)	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
133	16177 / 548	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
134	16178 / 548	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
135	16179 / 548	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
136	16180 / 548	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
137	16181 / 548	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
138	16182 / 548	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
139	16183 / 548	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
140	16184 / 548	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
141	16185 / 629	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
142	16186 / 629	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
143	16187 / 629	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
144	16188 / 629	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
145	16189 / 590	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
146	16191 / 629	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
147	16192 / 629	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
148	16193 / 629	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
149	16194 / 629	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
150	16206 / (?)	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
151	16207 / 629	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
152	16240 / 590 (1)	POTTERY SHERD (RECENT?)	POTTERY	STABLE. NOT CONSERVED.
153	16241 / 590 (1)	POTTERY SHERD (RECENT?)	POTTERY	STABLE. NOT CONSERVED.
154	16242 / 590 (1)	POTTERY SHERD (RECENT?)	POTTERY	STABLE. NOT CONSERVED.
155	16243 / 590 (1)	POTTERY SHERD (RECENT?)	POTTERY	STABLE. NOT CONSERVED.
156	16244 / 369	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
157	16246 / 590 (2)	POTTERY SHERD (RECENT?)	POTTERY	STABLE. NOT CONSERVED.
158	16247 / (?)	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
159	16248 / 369	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
160	16249 / 369	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
161	16250 / 369	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
162	16251 / 369	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
163	16252 / 590 (1)	POTTERY SHERD (RECENT?)	POTTERY	STABLE. NOT CONSERVED.
164	16253 (590 (1)	POTTERY SHERD (RECENT?)	POTTERY	STABLE. NOT CONSERVED.
165	16254 / 590 (2)	POTTERY SHERD (RECENT?)	POTTERY	STABLE. CONSERVED.
166	16258 / 590(2)	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
167	16260 / 369	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
168	16261 / 369	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.

N°	INV #	TYPE	MATERIAL	STATE OF CONSERVATION
169	16262 / 629	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
170	16263 / 629	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
171	16265 / 629	POTTERY RIM	POTTERY	STABLE. NOT CONSERVED.
172	16266 / 368	JAR HANDLE	POTTERY	STABLE. NOT CONSERVED.
173	16267 / 368	JAR HANDLE	POTTERY	STABLE. NOT CONSERVED.
174	16268 / 368	HANDLE	POTTERY	STABLE. NOT CONSERVED.
175	16269 / 368	JAR HANDLE	POTTERY	STABLE. NOT CONSERVED.
176	16270 / 629	HANDLE FRAGMENT	POTTERY	STABLE. NOT CONSERVED.
177	16272 /629	HANDLE	POTTERY	STABLE. NOT CONSERVED.
178	16273 / 629	POTTERY SHERD	POTTERY	STABLE. NOT CONSERVED.
179	16627 / UT-BA	CANDLE HOLDER	BRONZE	GOOD. SOME GREEN PATINA.
180	16652 / 714	MALLET	WOOD	POORLY CONSERVED. UNSTABLE.
182	16654 / 35	CUP OR BOTTLE (5)	TIN	UNSTABLE. CONSERVATION NOTE ATTACHED.
185	8076 / UT-BA 86/305b	BOTTLE	SALT GLAZED	COMPLETE
186	8077 / UT-BA 305(A)	BOTTLE	SALT GLAZED	BADLY REPAIRED.
193	PLATE	PLATE	TIN	STABLE. VERY BADLY CONSERVED.

1 PAN HANDLE

2 LARGE PLATE

3 BOTTLE

4 WRITING SLATE

5 PENCIL

6 PORTUGUESE COIN

7 CANDLE HOLDER

8 PISTOL HANDLE DECORATION

9 JAR

10 BOTTLE

17 MORTAR

18 ONION BOTTLE

23 BOTTLE

24 BOTTLE

25 BOTTLE

26 SCISSORS

27 SPOON

28 DUTCH COIN

29 SKILLET

30 LID

32 JAR

33 JAR

34 FISHING WEIGHT

35 COMPASS

36 COMPASS

37 LAMP

38 LAMP

41 MORTAR

42 SIRINGE

43 SIRINGE

44 LAMP (?)

45 SPATULA

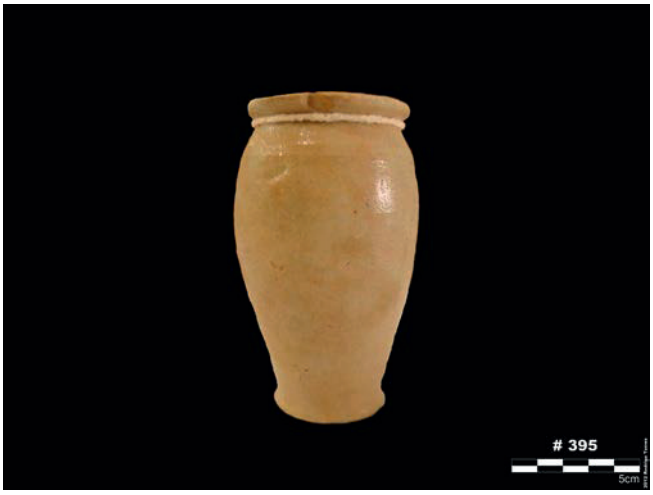
46 JAR

47 INK POT (?)

48 PALM FRAGMENT

49 TUREEN

50 PLATE



51 VASE

52 JAR

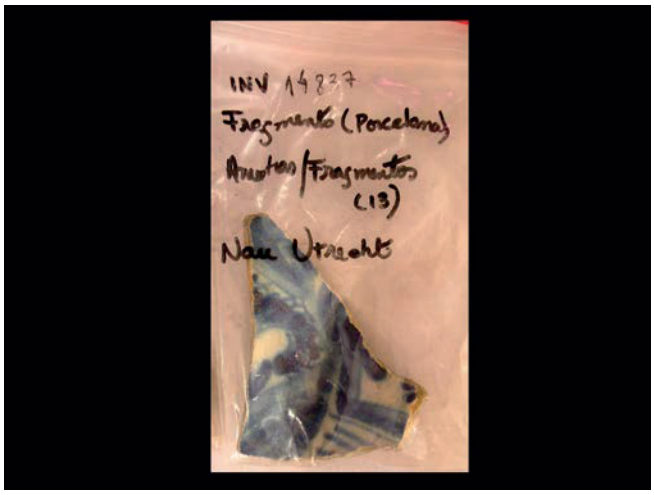
56 BOTTLE

57 SPOON

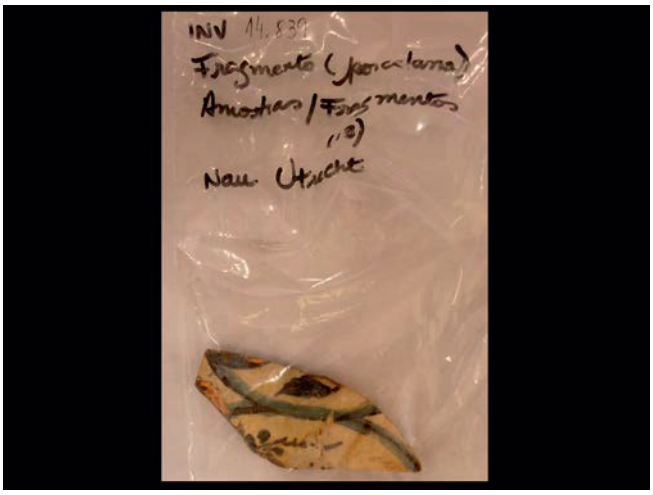
58 JAR

62 THIMBLE

63 SCALE (?)



64 POTTERY SHERD

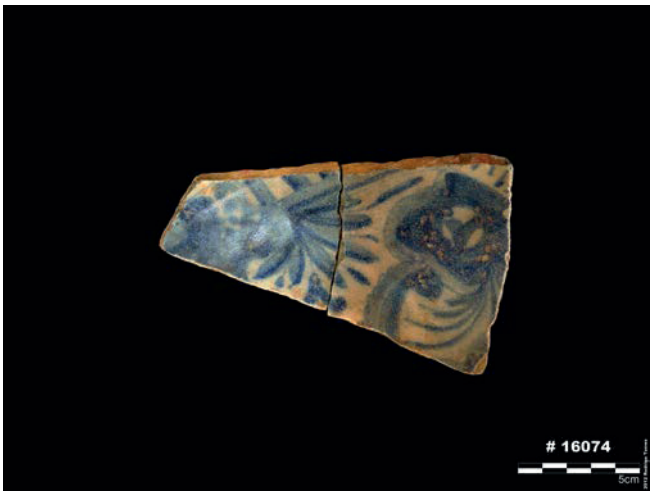


65 POTTERY SHERD

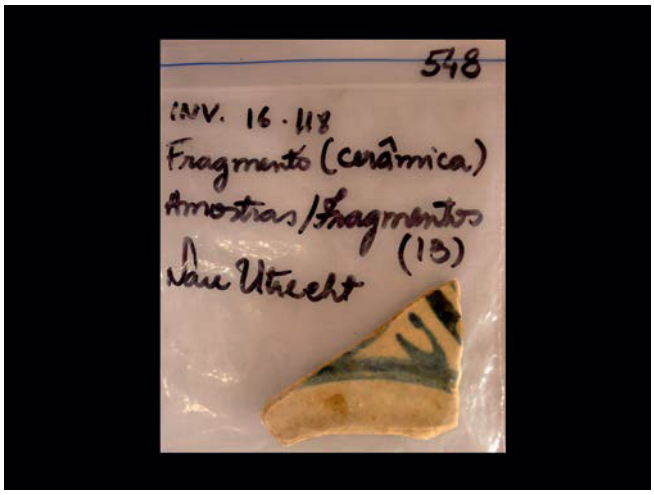
66 POTTERY SHERD (5)

67 JAR

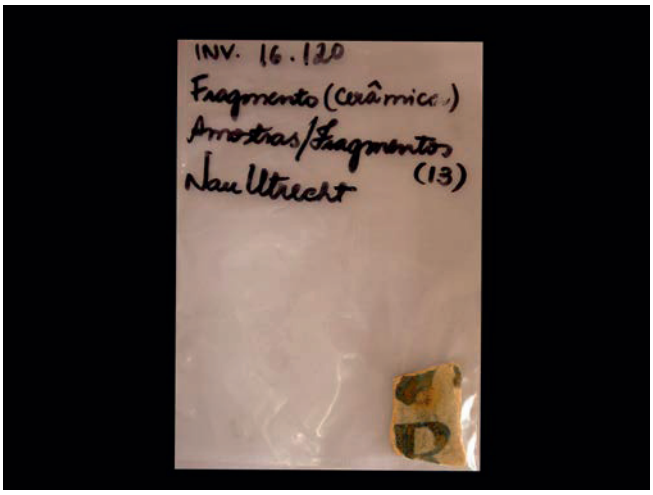
68 BOTTLE



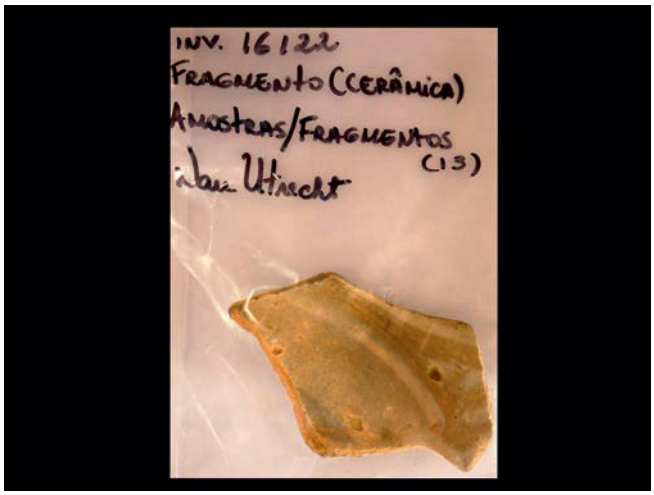
79 POTTERY SHERD (2)



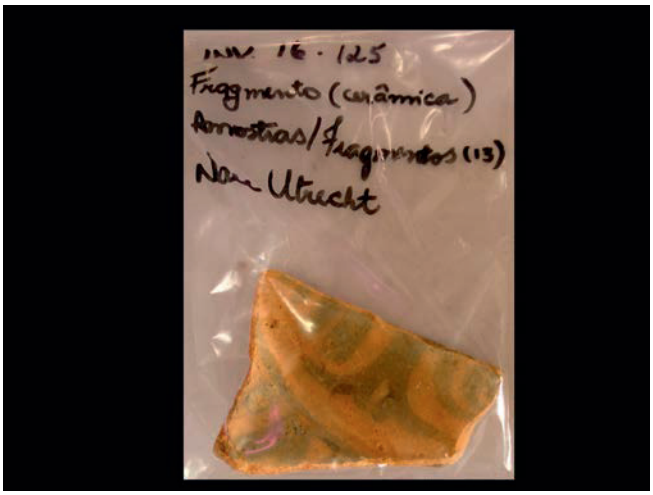
80 POTTERY SHERD



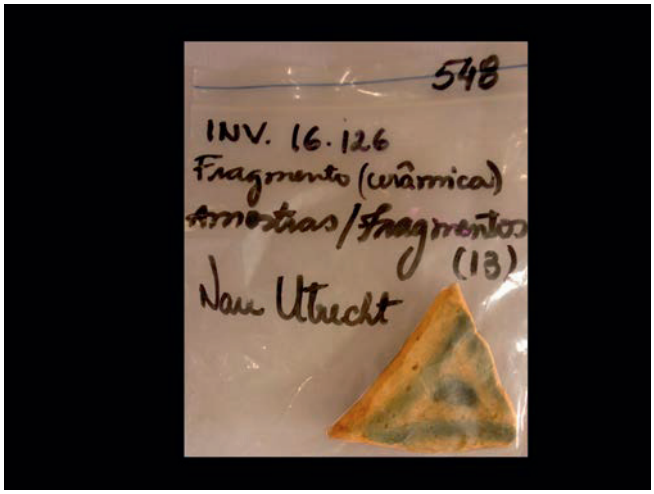
81 POTTERY SHERD



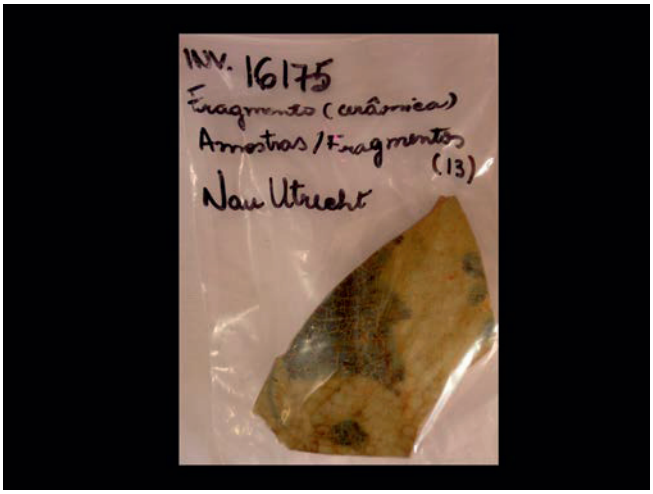
82 POTTERY SHERD



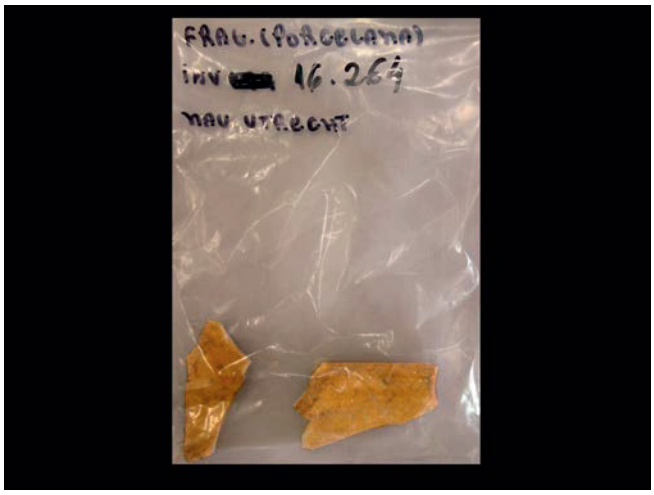
83 POTTERY SHERD



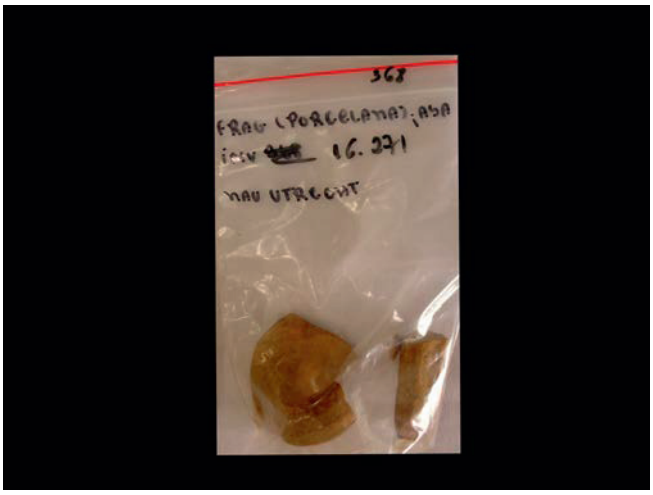
84 POTTERY SHERD



85 POTTERY SHERD



86 POTTERY SHERD (2)



87 HANDLE (2)

88 HANDLE

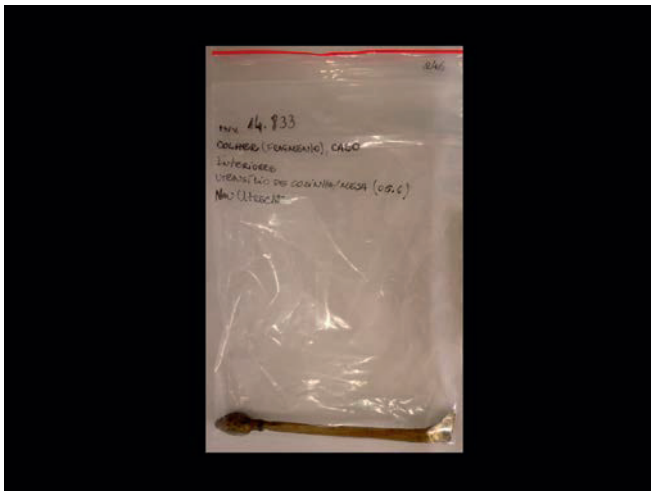
94 JAR HANDLE

95 GRADUATED RIM

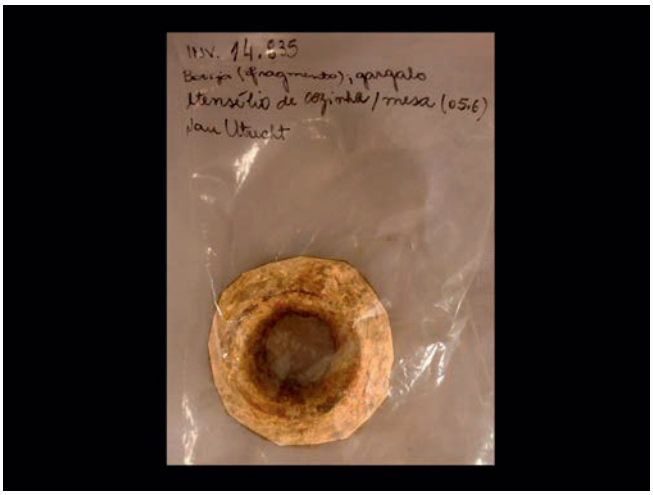
97 TOKENS (?)

99 LID

100 DRAWER HANDLE (?)

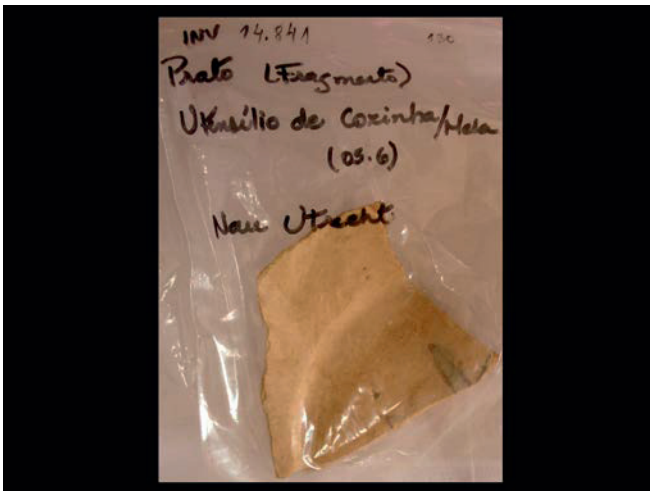


101 SPOON HANDLE

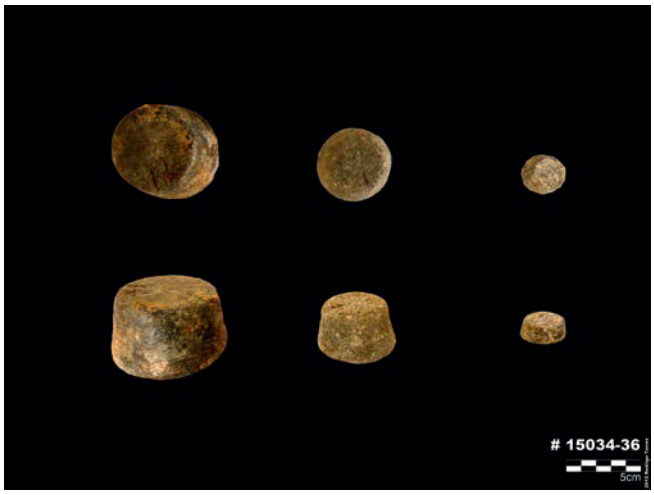


103 JAR NECK RIM

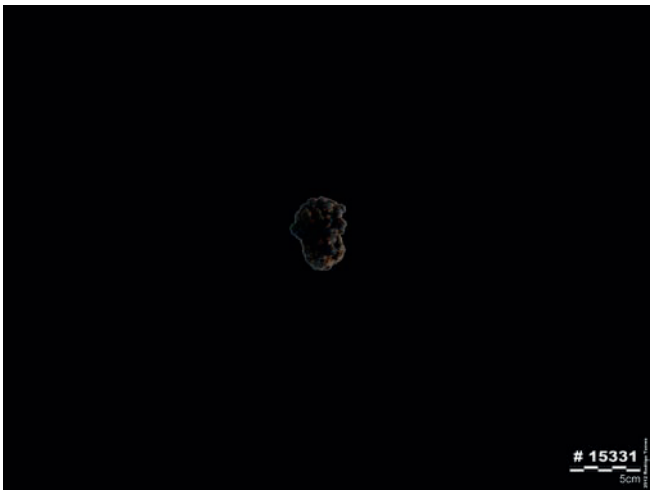
104 POTTERY SHERD (2)



105 POTTERY SHERD



106 PAN SCLALE WEIGHTS (?)



109 SEED BUD

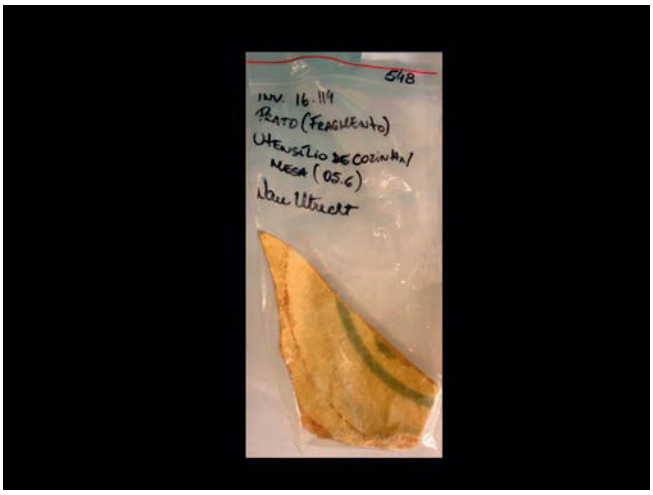
110 TREADED LID

112 WASHERS

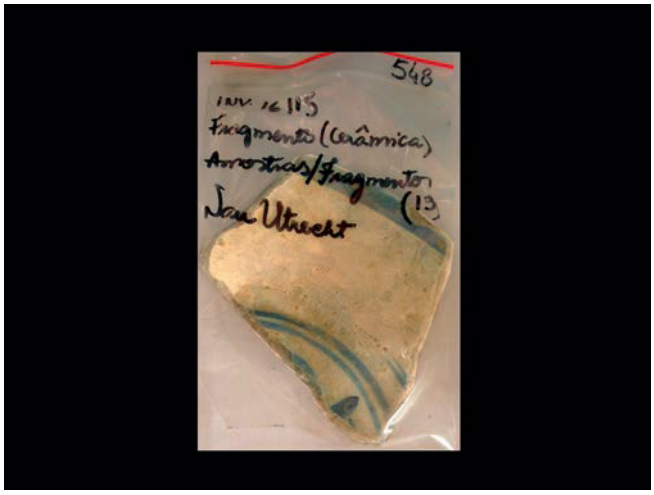
113 POTTERY SHERD

114 JAR NECK FRAGMENT

117 POTTERY SHERD (4)

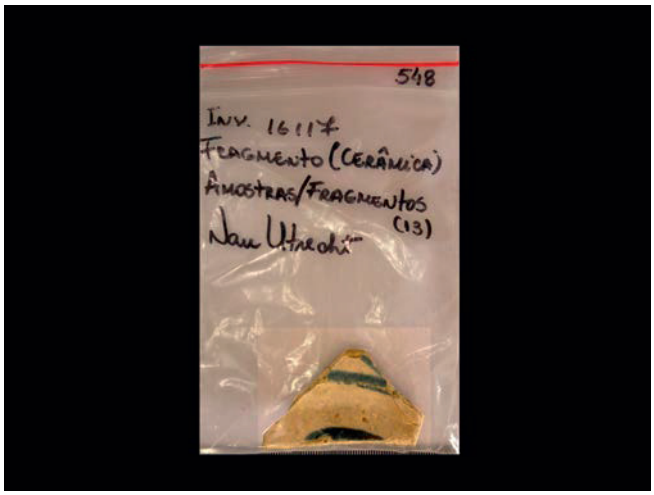


118 POTTERY SHERD

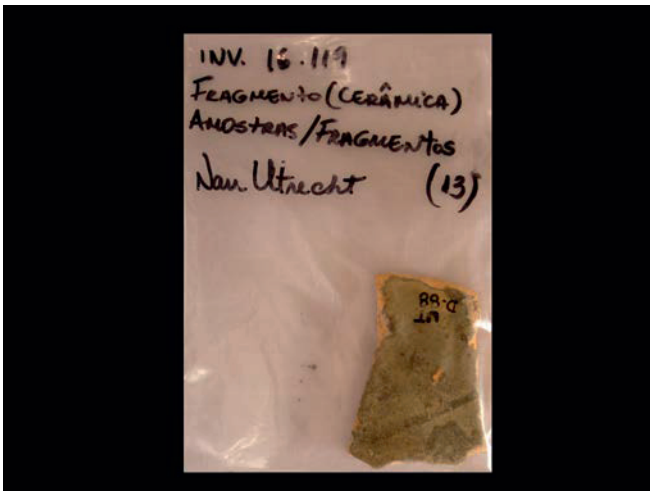


119 POTTERT SHERD

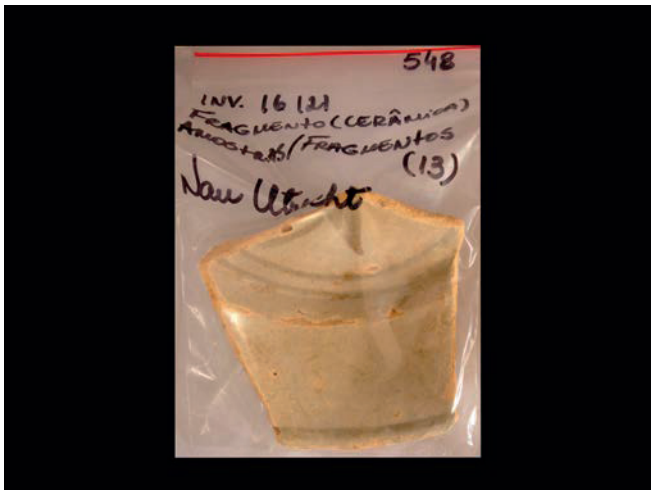
120 POTTERY SHERD



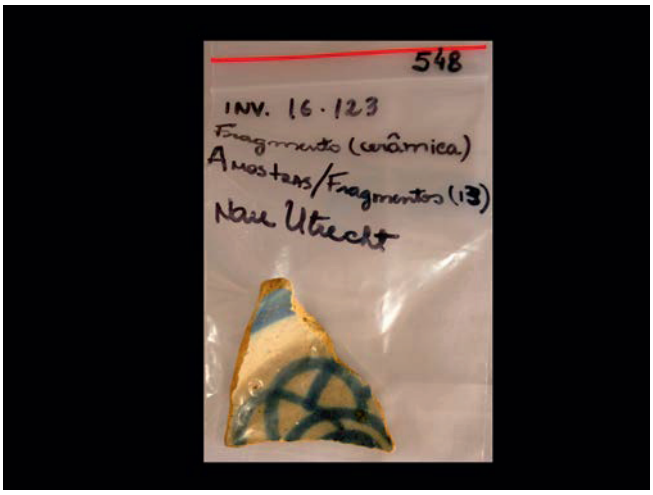
121 POTTERY SHERD



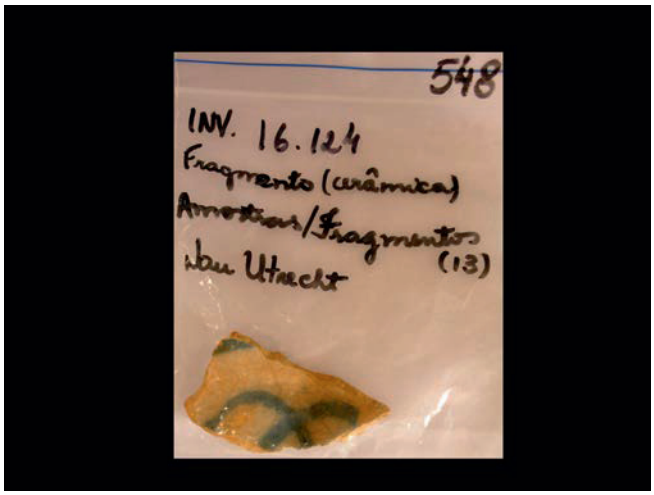
122 POTTERY SHERD



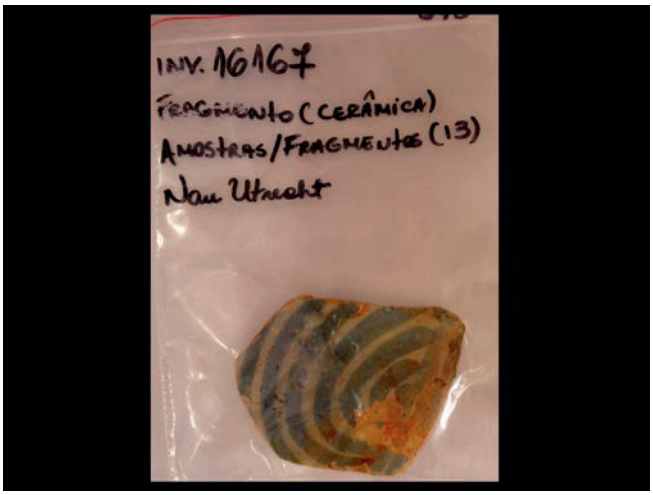
123 POTTERY SHERD



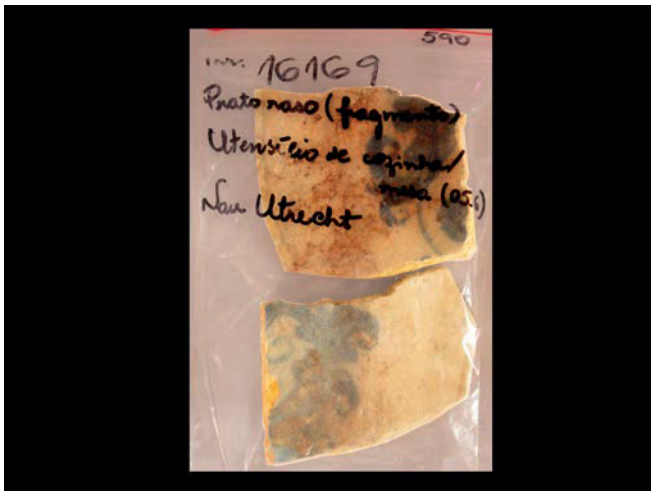
124 POTTERY SHERD



125 POTTERY SHERD

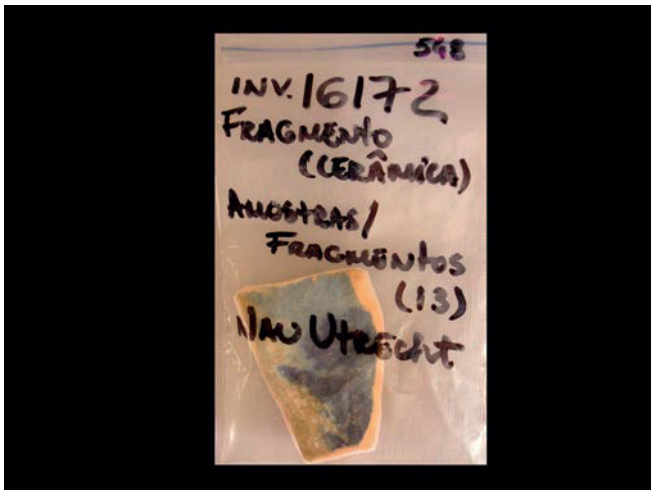


126 POTTERY SHERD

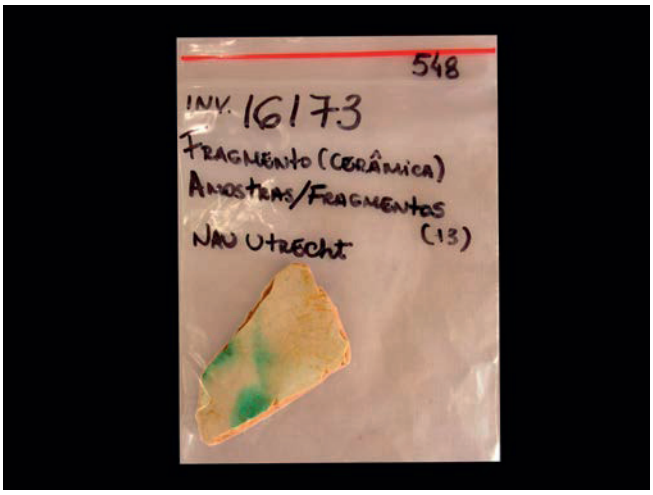


127 POTTERY SHERD (2)

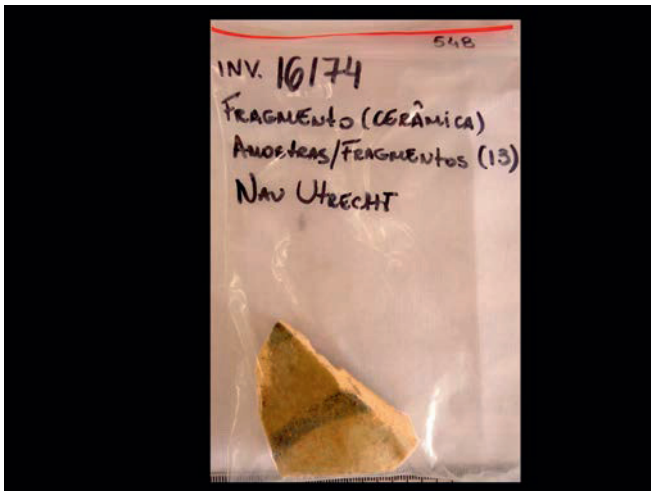
128 POTTERY SHERD (3)



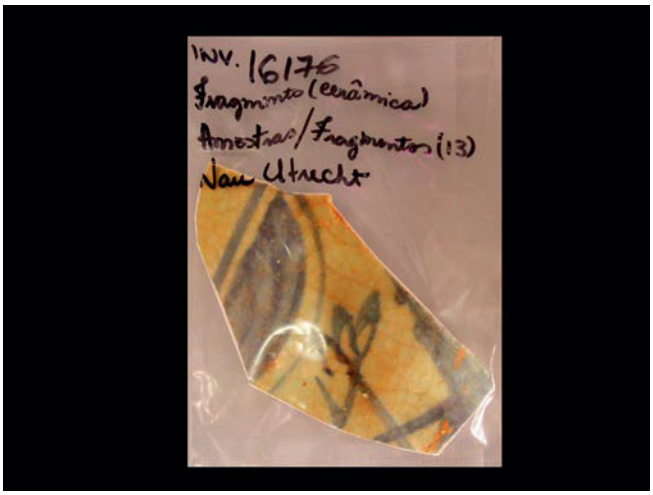
129 POTTERY SHERD



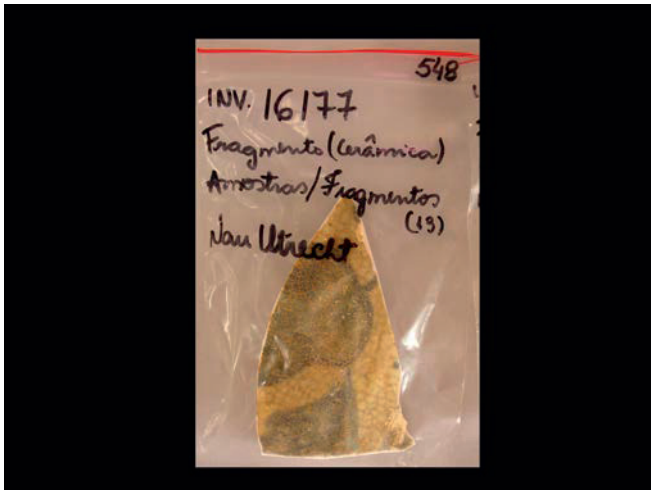
130 POTTERY SHERD



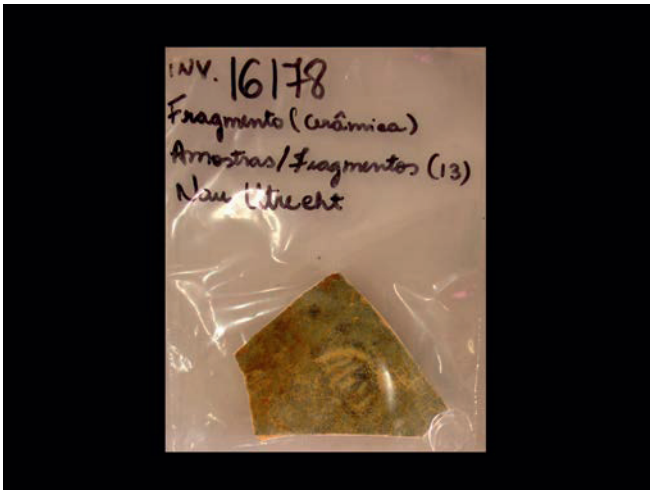
131 POTTERY SHERD



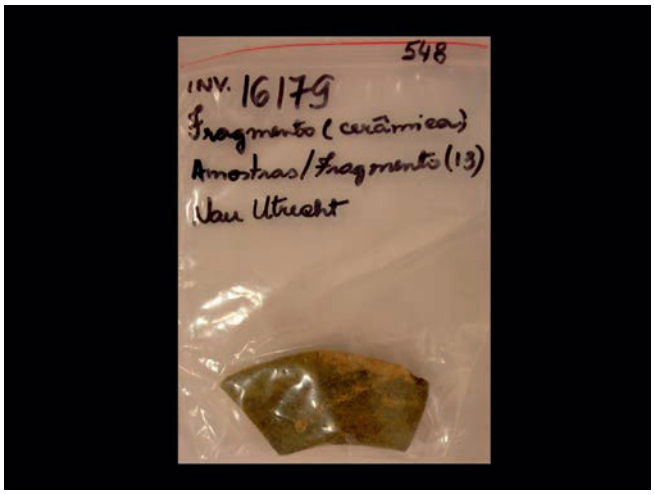
132 POTTERY SHERD



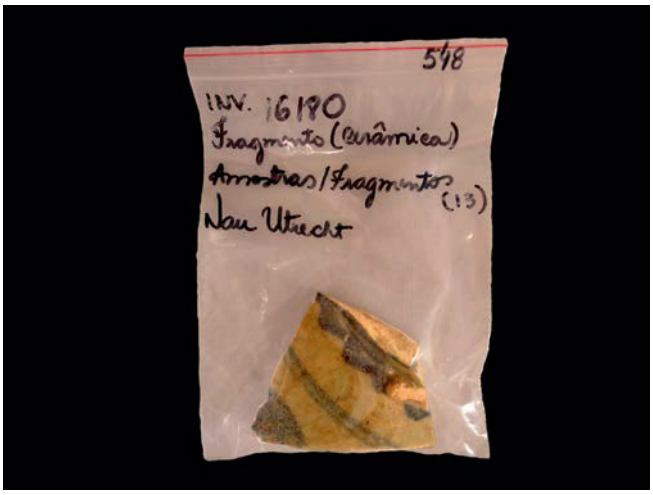
133 POTTERY SHERD



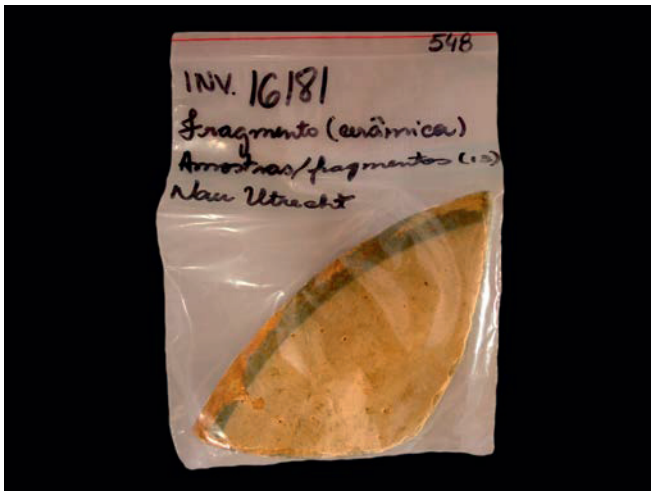
134 POTTERY SHERD



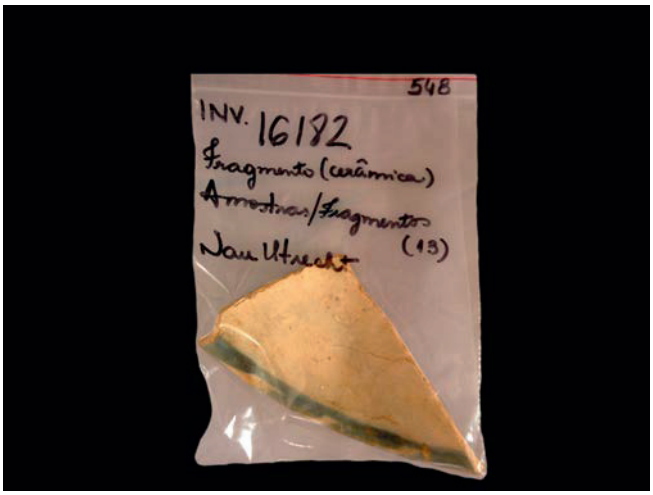
135 POTTERY SHERD



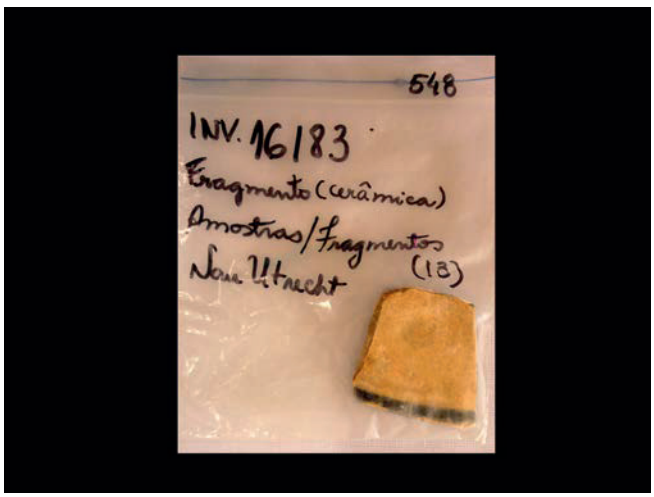
136 POTTERY SHERD



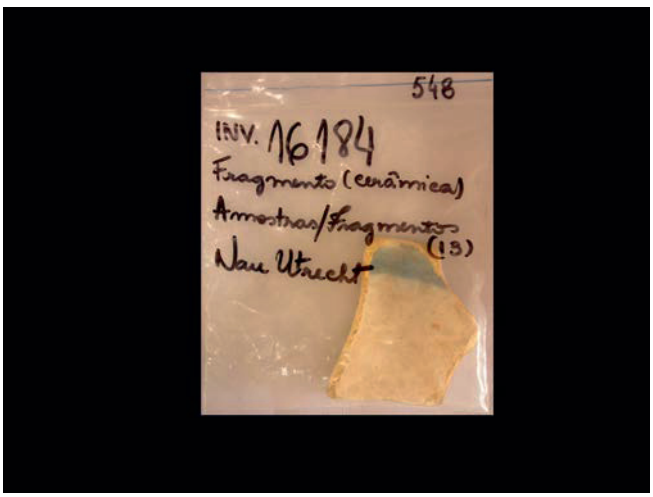
137 POTTERY SHERD



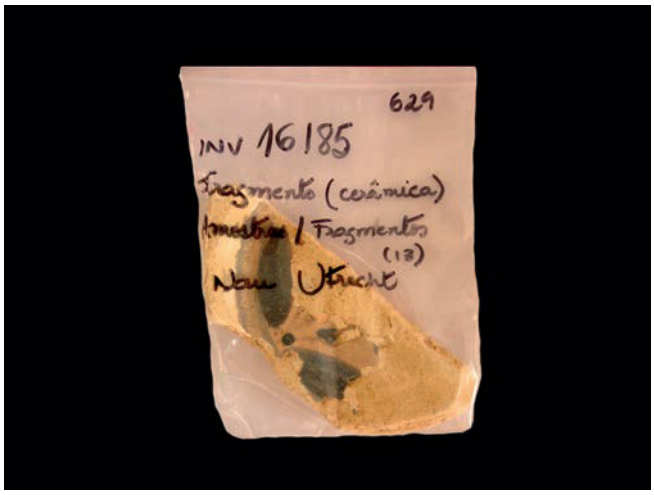
138 POTTERY SHERD



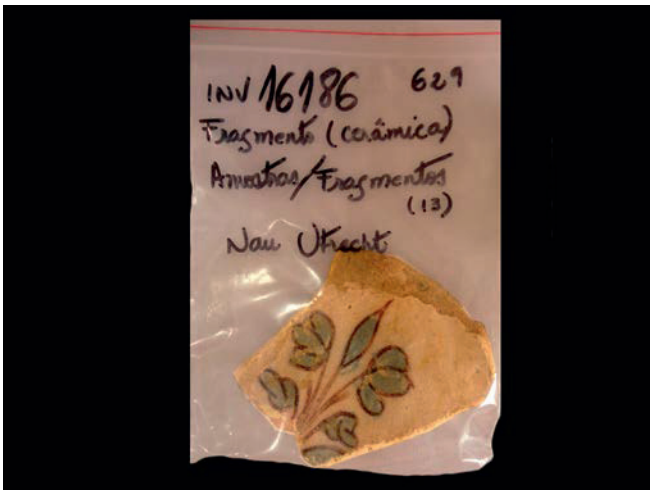
139 POTTERY SHERD



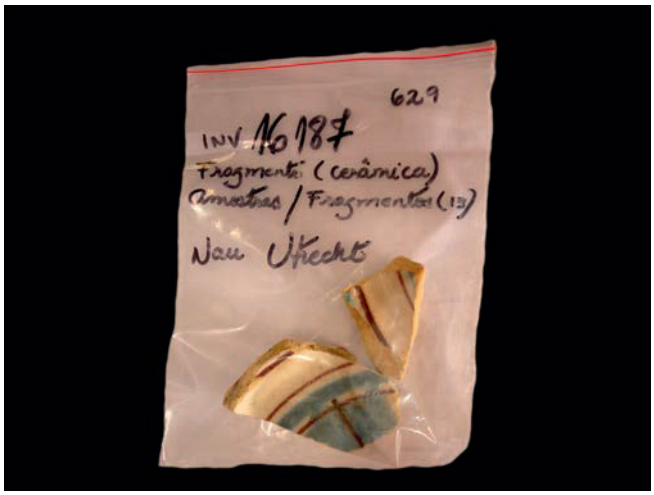
140 POTTERY SHERD



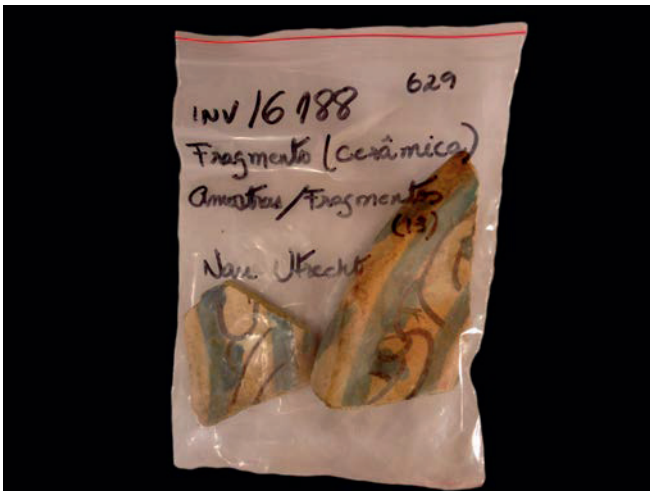
141 POTTERY SHERD



142 POTTERY SHERD

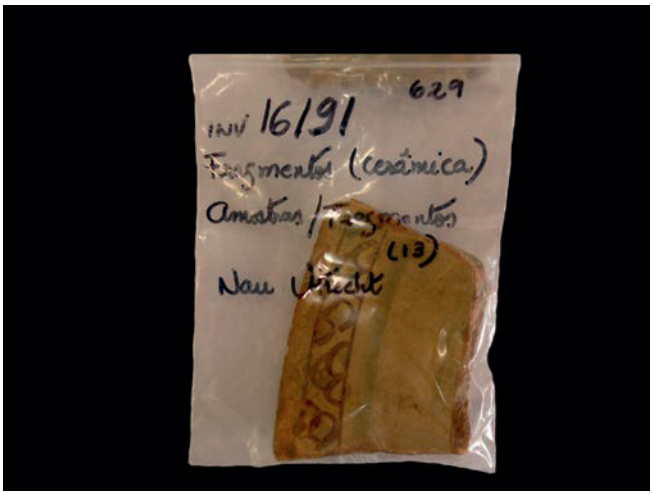


143 POTTERY SHERD (2)

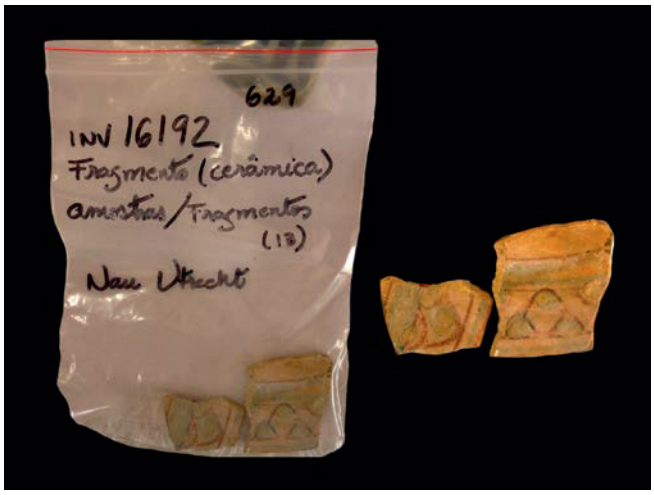


144 POTTERY SHERD (2)

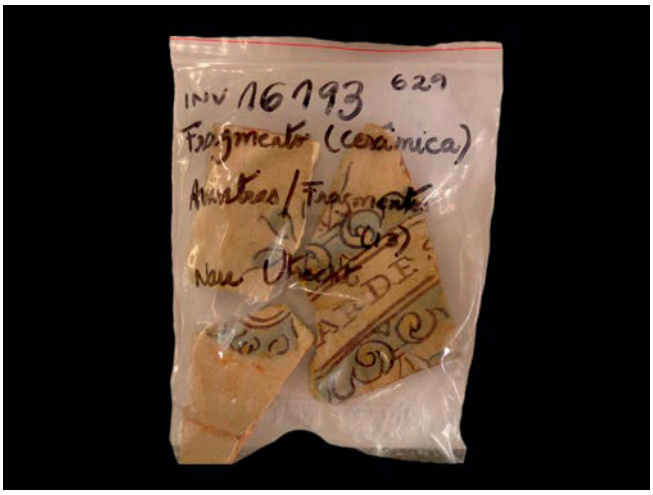
145 POTTERY SHERD (5)



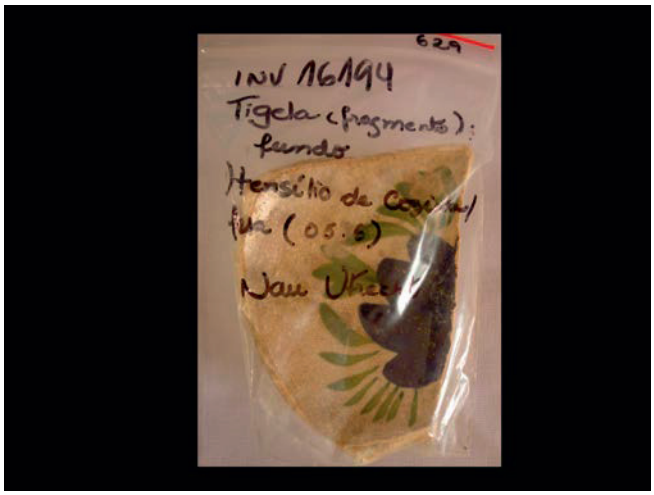
146 POTTERY SHERD



147 POTTERY SHERD (2)



148 POTTERY SHERD (3)



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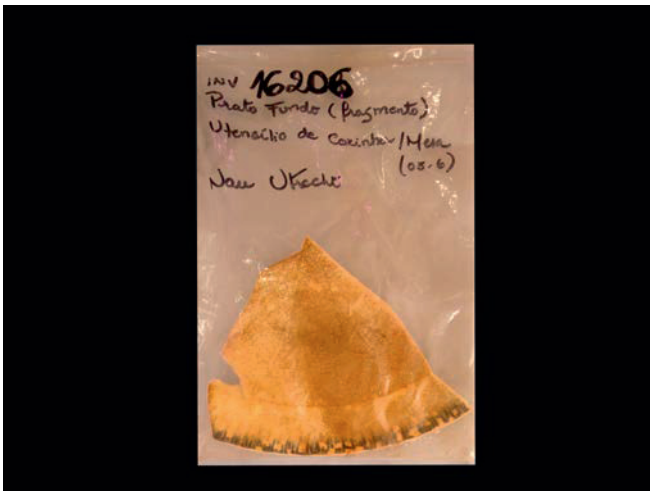

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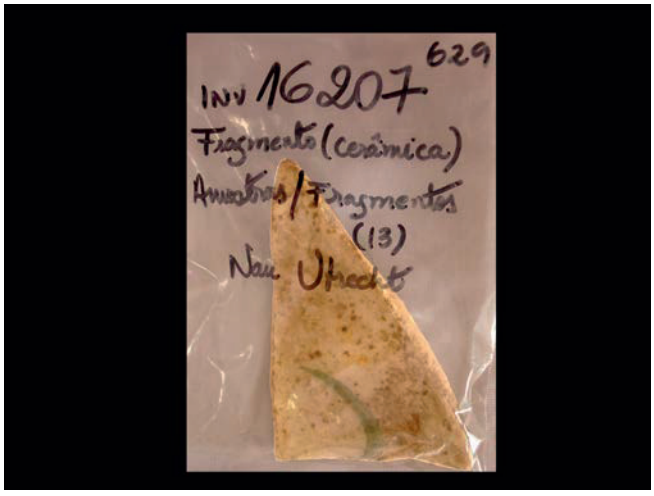

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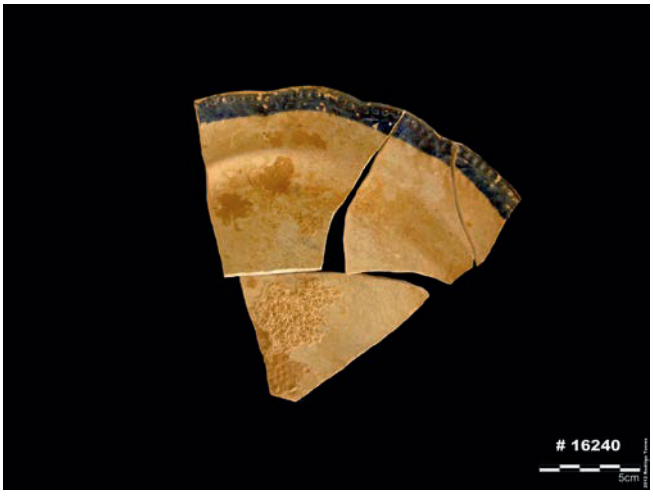

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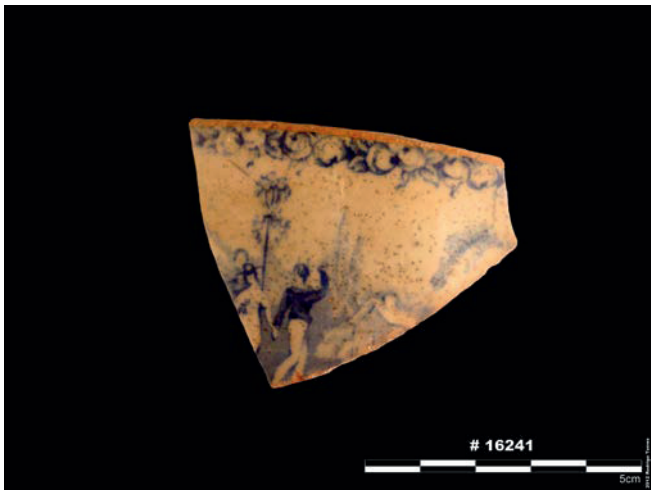
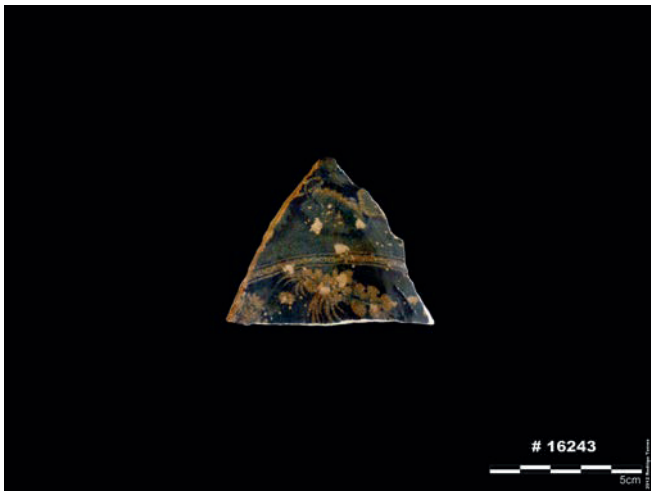


153 POTTERY SHERD

154 POTTERY SHERD (3)



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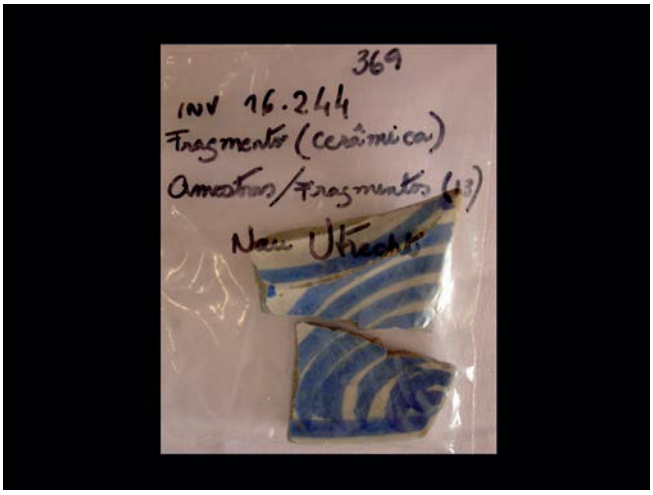

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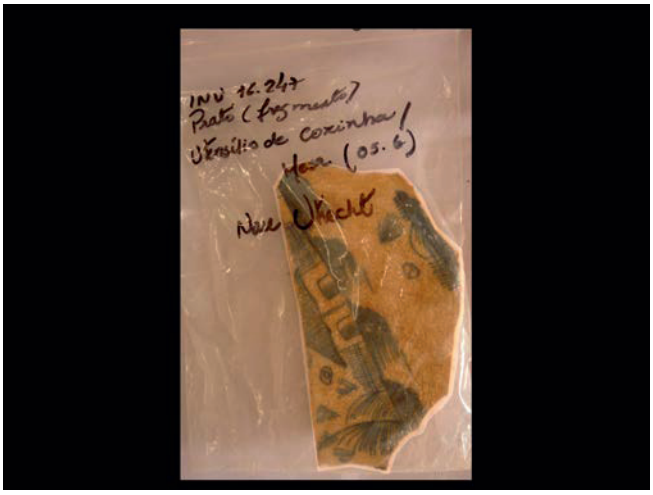
157 POTTERY SHERD



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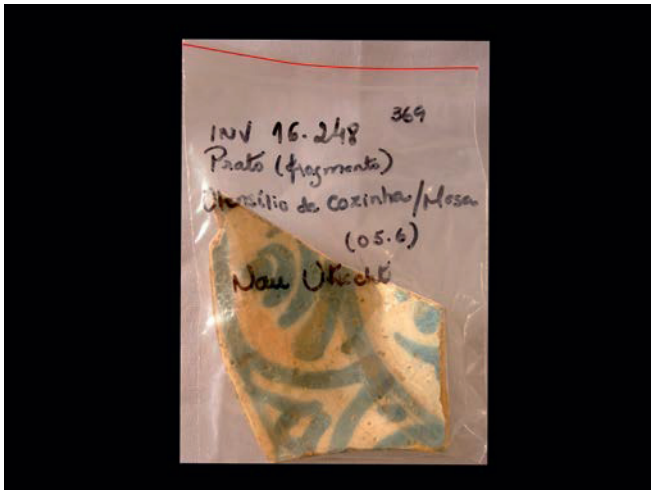

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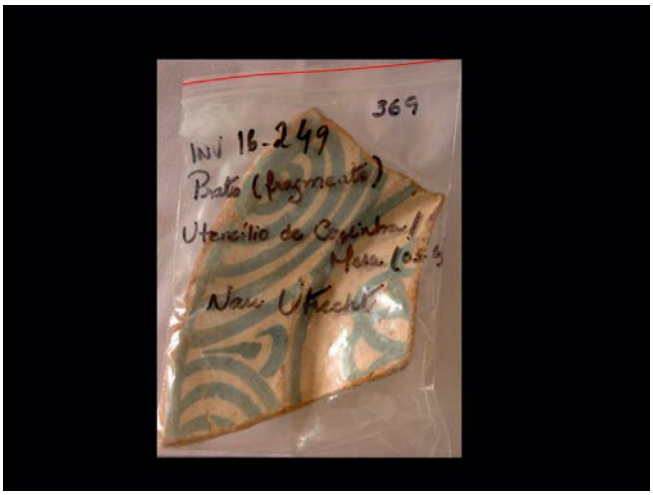

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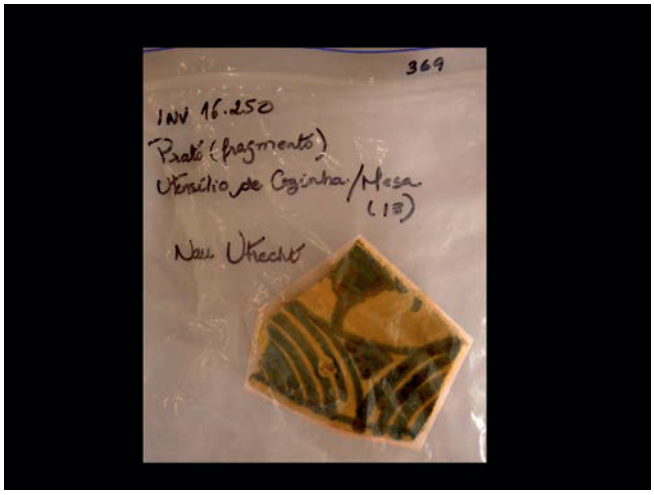

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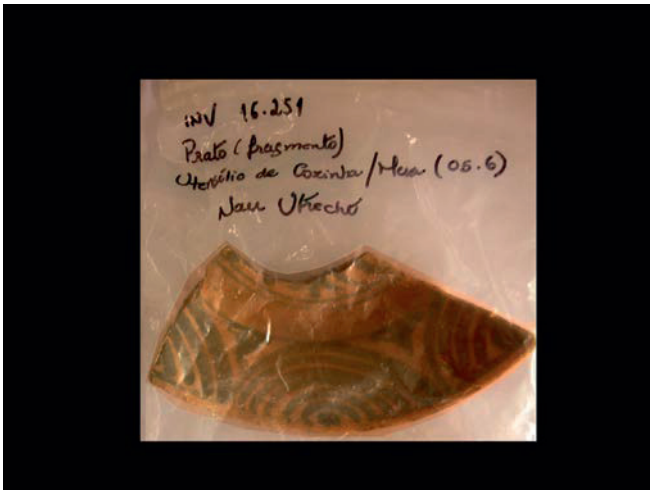

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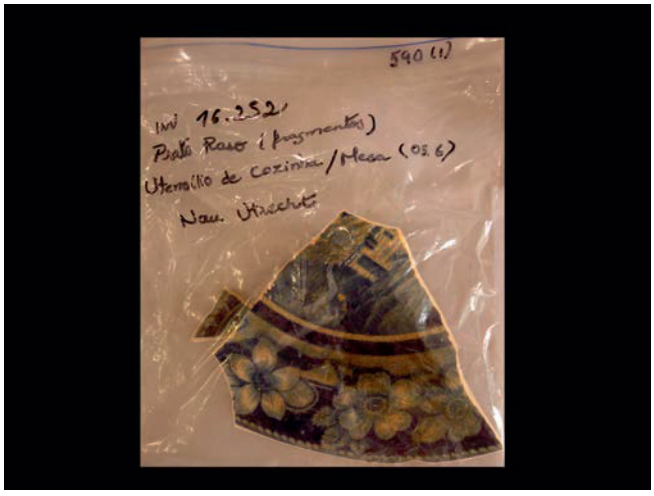

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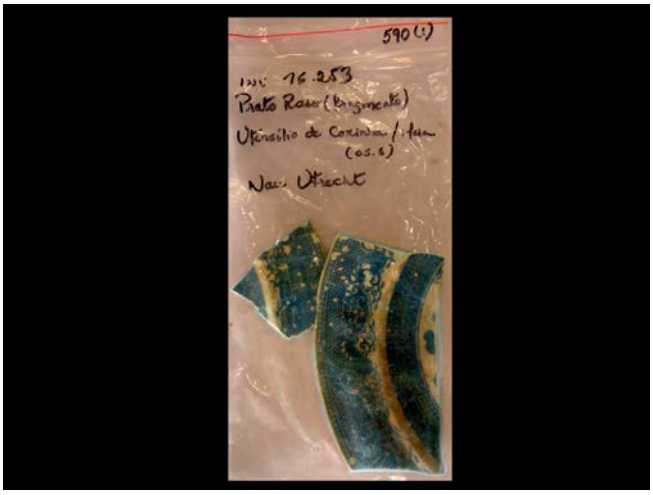
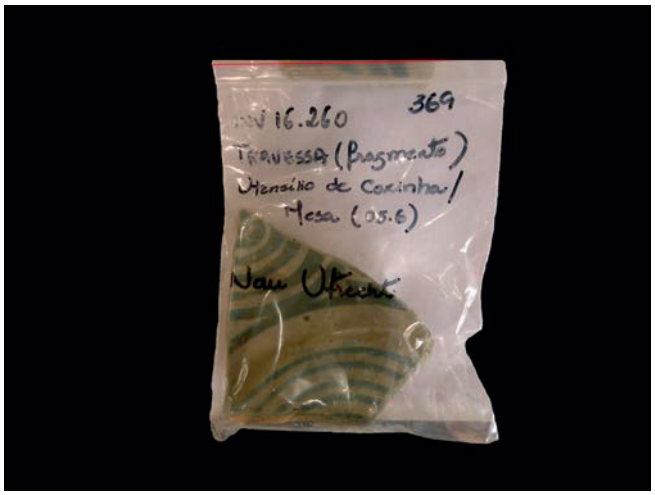


164 POTTERY SHERD (2)

165 POTTERY SHERD

166 POTTERY SHERD (2)



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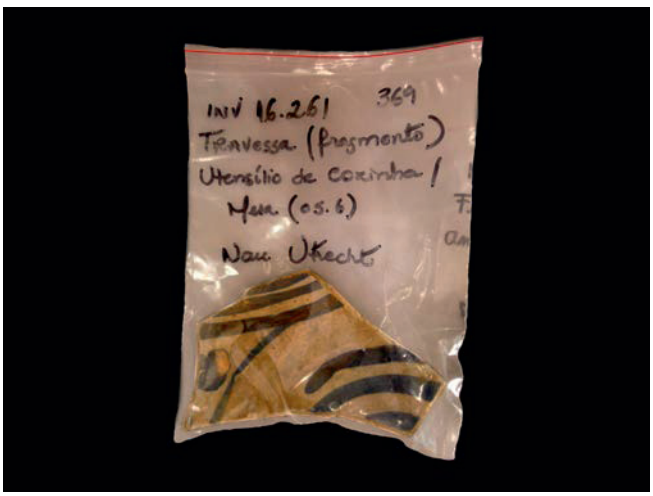

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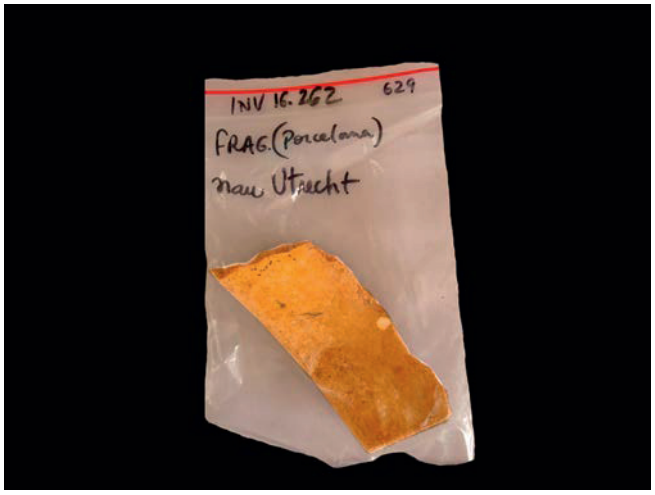

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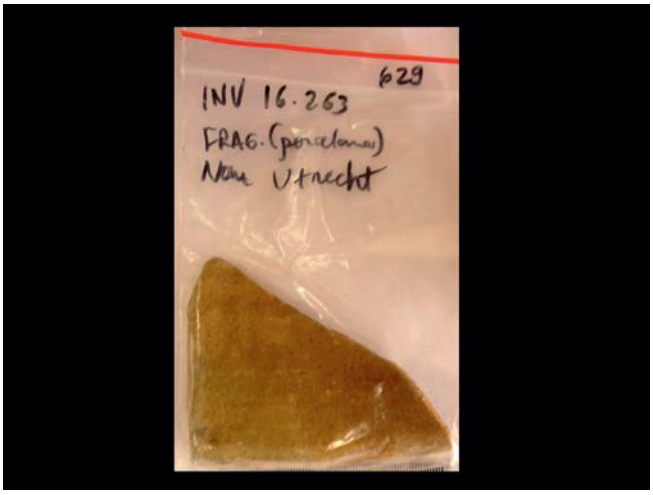

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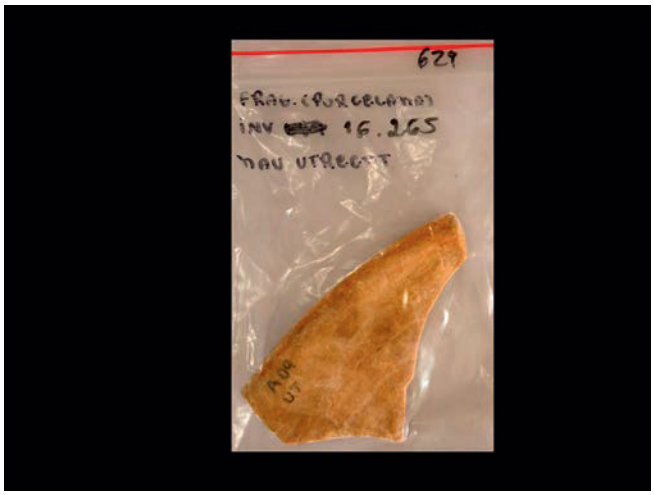


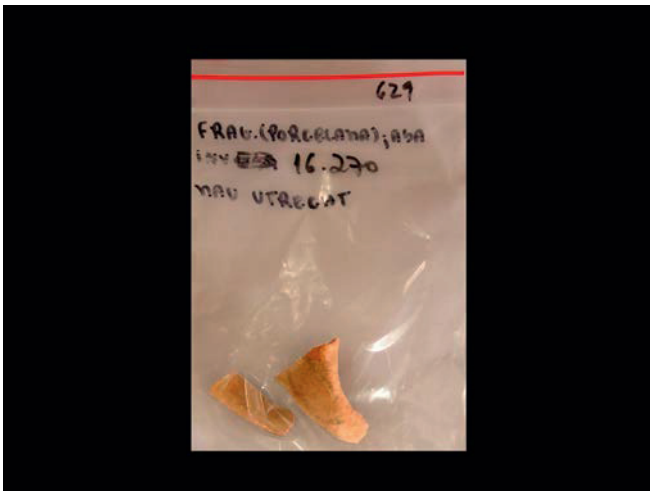
171 POTTERY RIM

172 JAR HANDLE

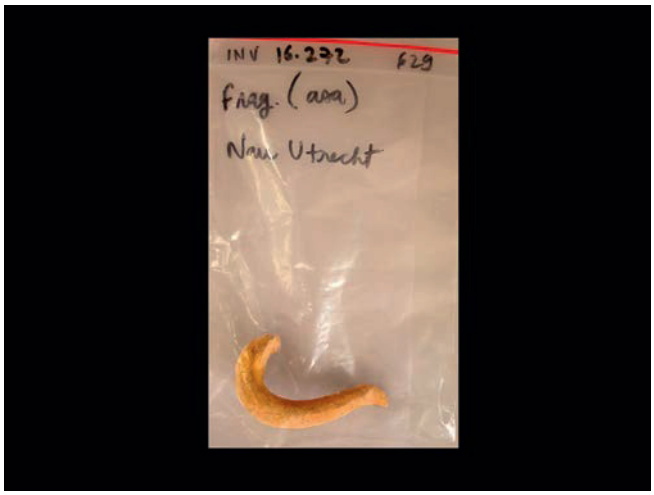
173 JAR HANDLE

174 HANDLE

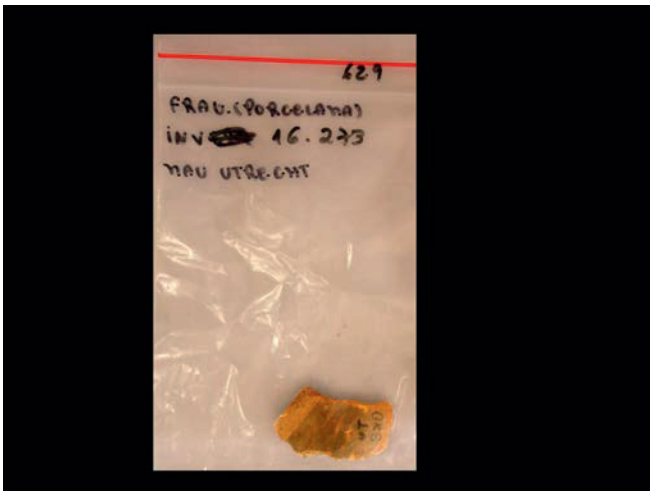
175 JAR HANDLE



176 HANDLE FRAGMENT

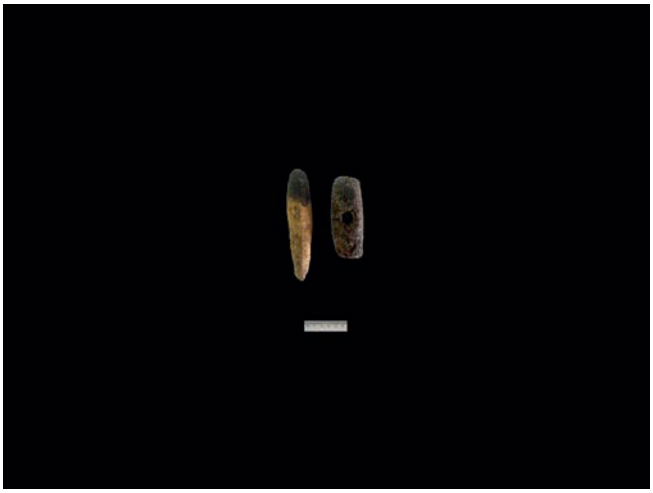


177 HANDLE



178 POTTERY SHERD

179 CANDLE HOLDER



180 MALLET

182 CUP OR BOTTLE (5)

185 BOTTLE

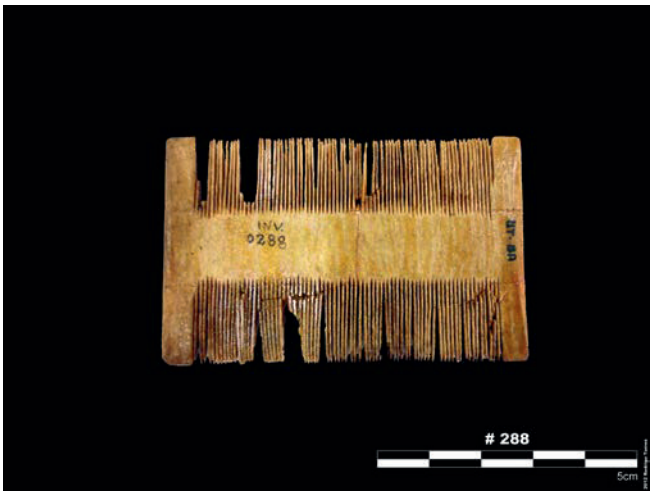
186 BOTTLE

193 PLATE

Personal possessions

N°	INV #	TYPE	MATERIAL	STATE OF CONSERVATION
6	275	PORTUGUESE COIN	SILVER	FISSURES AND SOME DARK SPOTS.
12	288 / UT-BA	COMB	BONE	POORLY CONSERVED
13	289	PIPE	CLAY	APPARENTLY NOT BURNT.
14	290	PIPE	CLAY	APPARENTLY NOT BURNT.
15	291	PIPE	CLAY	BADLY GLUED. SHINNY. BURNT.
16	292	PIPE	CLAY	BURNT.
28	312	DUTCH COIN	SILVER	SOME DARK SPOTS.
40	335	WHISTLE	BONE	STABLE.
53	406	PORTUGUESE COIN	SILVER	FAIR. SOME CORROSION.
55	723	PORTUGUESE COIN	SILVER	NACK BIT. DIFFICULT TO READ.
70	15898	BUCKLE	BRONZE OR BRASS	STABLE. CONSERVED.
96	0737_738_741	BOARD GAME PIECES	BONE	SOME CRACKING. LOOSING BITS.
98	14750 / 425	BEAD (?)	WOOD	CONSERVED.
107	15046 and 15047	COINS (2)	??	MOLD. UNDISTINGUISHBLE.
184	326(f)_742_743	BOARD GAME PIECES	BONE	SOME CRACKING. LOOSING BITS. THERE ARE MORE PIECES.
188	NO #	PORTUGUESE COIN	SILVER	SURFACE DETAILS BARELY SEEN.
189	NO #	DUTCH COIN	SILVER	SOME DARK SPOTS.
190	NO #	DUTCH COIN	SILVER	SOME DARK SPOTS.
191	NO #	COINS (4)	COPPER	SOME ACTIVE CORROSION. DARKER SPOTS. PROBABLY NOT UTRECHT.
192	NO #	MEDAL	BRASS (?)	HOLES. UNSTABLE.
194	CHESS PIECES	BOARD GAME PIECES	BONE	

6 PORTUGUESE COIN



12 COMB

13 PIPE

14 PIPE

15 PIPE

16 PIPE

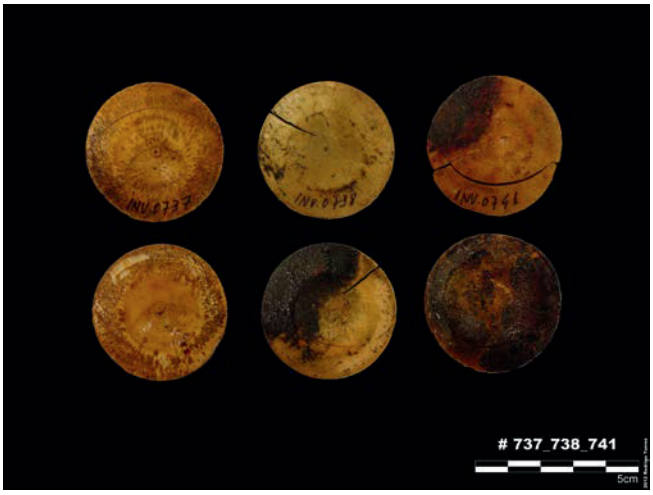
28 DUTCH COIN

40 WHISTLE

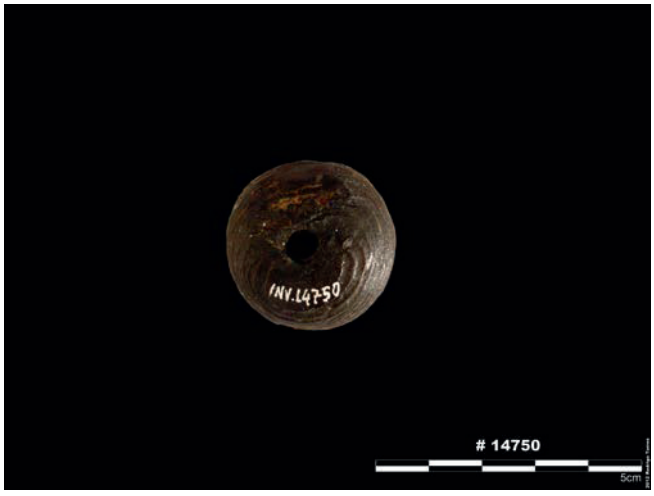
53 PORTUGUESE COIN

55 PORTUGUESE COIN

70 BUCKLE



96 CHESS PIECES



98 BOTTOM

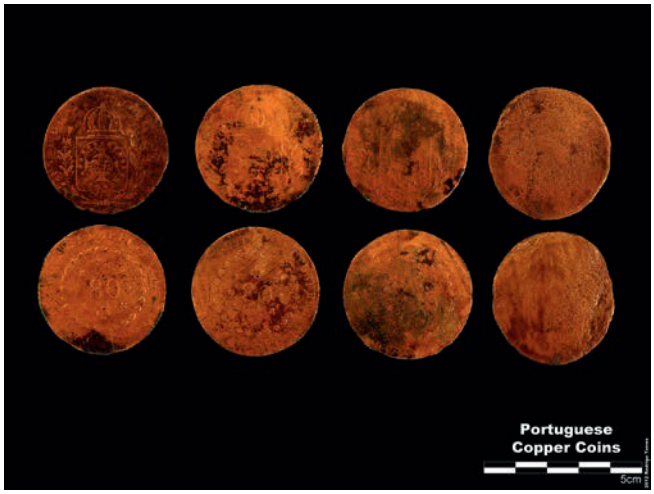
107 COINS (2)

184 CHESS PIECES

188 PORTUGUESE COIN

189 DUTCH COIN

190 DUTCH COIN



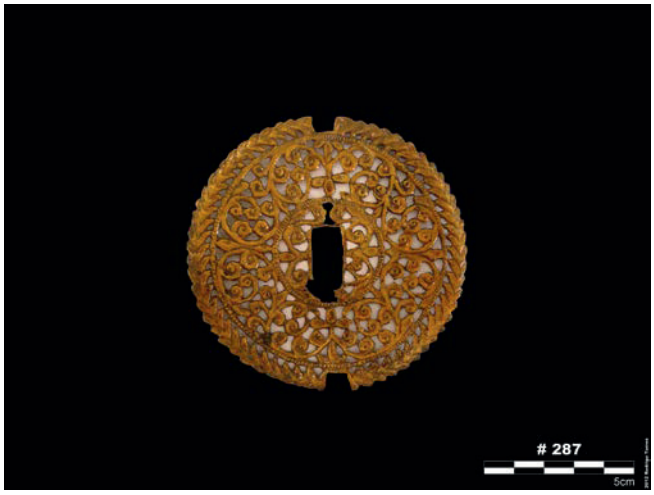
191 COINS (4)

192 MEDAL

194 CHESS PIECES

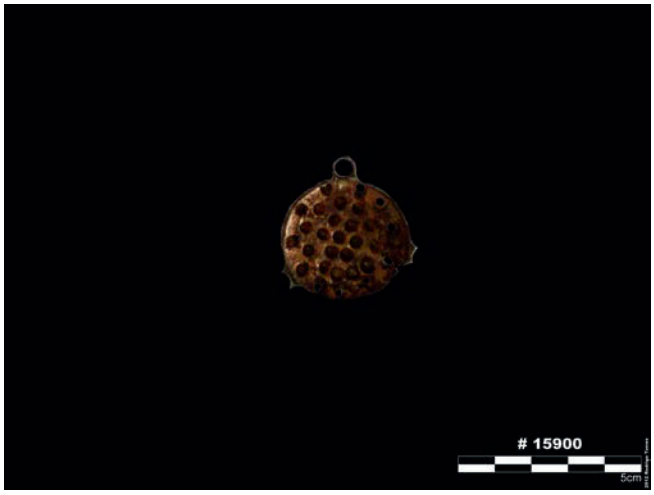
Miscellaneous

N°	INV #	TYPE	MATERIAL	STATE OF CONSERVATION
11	287	DECORATED KEY HOLE / SWORD HANDLE (?)	BRONZE OR BRASS	GOOD CONDITION, STABLE.
39	334 / UT-BA	UNIDENTIFIED	BONE (?)	UNSTABLE. CONSERVED.
71	15900	UNKNOWN	BRASS	UNSTABLE. CONSERVED. CONSERVATION CARD ATTATCHED.
93	16625	UNKNOWN	BRONZE (?)	NOT CONSERVED.
102	14834 / 564	UNIDENTIFIED	COPPER (?)	UNSTABLE. NOT CONSERVED.
183	17731 (?)	UNIDENTIFIED	LEAD (?)	UNSTABLE. NOT CONSERVED.

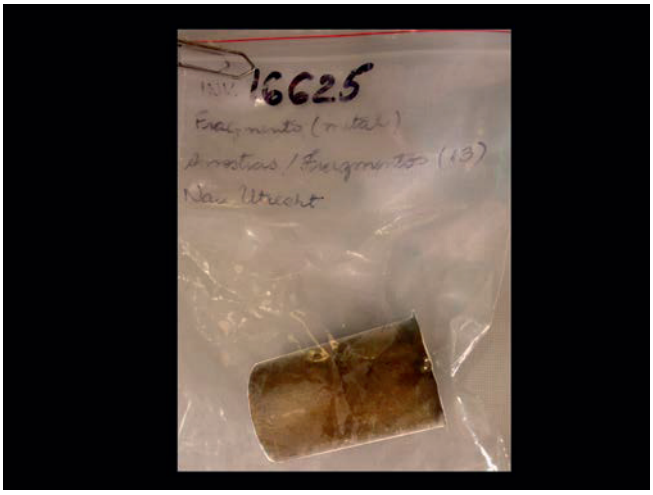


11 DECORATED KEY HOLE (?)

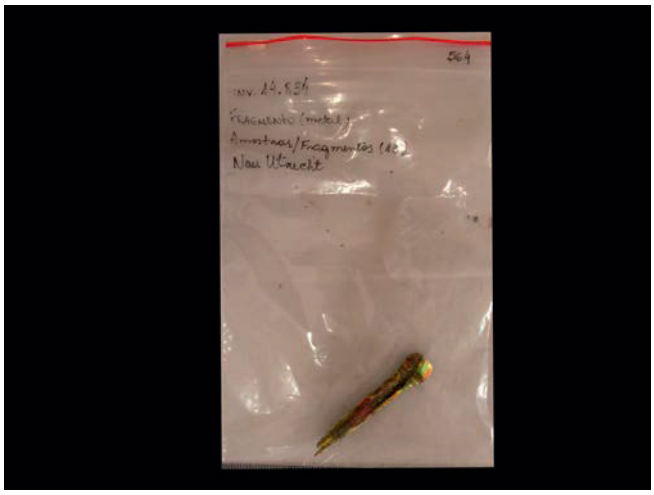
39 UNIDENTIFIED



71 UNKNOWN



93 ?



102 UNIDENTIFIED

183 UNIDENTIFIED

fig. Page 97, Fig. 32: Beach Salvador, in the background the historic Forte Santa Maria, built by the Portugese in 1614


INCENDIA MOLARUM
PRÆFECTURÆ OMNIUM SANCTORU
C
C
D
B

Appendix III: Research guide to maritime wrecks

M. Van Kooten, R.C. Hol & M.de Groot

Within the Utrecht project a resource for carrying out archival research into shipwrecks of the VOC, the WIC and Admiralty in the collection of the National Archives of the Netherlands, the 'National Archief' was developed.

Preface

In the context of the Common Cultural Heritage Programme of the Ministry of Education, Culture and Science and the Ministry of Foreign Affairs (also called Shared Heritage Programme), maritime archaeology is one of the priority areas. The Dutch government keeps a close watch on its property rights as the legal successor to the trading companies of the Verenigde Oost Indische Compagnie (VOC) and the West Indische Compagnie (WIC), respectively the Dutch East India and West India (East Indies and West Indies) companies. This ownership claim stretches out to all corners of the world. Effectively it does not mean that the Netherlands claim everything back. It tries to ensure responsible management of the wrecks that are being considered as archaeological sites. For this often capacity building is needed and therefore it is being selected as one of the priorities within the Policy Programme. Underwater archaeology trainings have been given to many (future) archaeologists from countries with Dutch maritime heritage in their waters, like Indonesia, Sri Lanka, India, Japan, Australia, Surinam, US, South Africa and also Brazil.

As you were able to read in this report, together with its Brazilian partners, the RCE has done a training on the location of 'De Utrecht' of Vice Admiral Witte de With's Staten Fleet, which was lost in a naval battle near Salvador de Bahia in 1648.

An important aspects in research conducted on an historical well known site is often archival research. The archives of the VOC, the WIC and the government agencies which carried the responsibilities for the Republic's fleet are for the largest part in the Nationaal Archief in The Hague, although large parts, particularly about the VOC period, are also to be found in archives in Indonesia, Sri Lanka and South Africa. But if the WIC and the Republic are to be included, the 'Nationaal Archief' is in fact the only location for research sources. Nevertheless, a search in more than 6,000 inventories and entries for a specific subject will always remain a time-consuming process. This is why, while taking the case of 'De Utrecht' as a starting point, the Nationaal Archief delved into the depths of its own treasure trove to trace the steps researchers will have to take in order to find any information on ships of these trading companies or state enterprises, so that archaeologists may develop a notion of what they might meet in the depths of the oceans.

This guide to archival wreck research should become the resource for research into crewing and provisioning ships, in readiness for a sea voyage with information on the cargo, the crew and so forth, as information about this was kept in the VOC and WIC archives and for instance in the Republic's Naval Colleges run by the Admiralty.

We believe that with this guide you will be able to perform a better search in the archives. It will not ensure you to find everything you wish for. Neither will this guide to wrecks guarantee that you will have everything you need to carry out maritime archaeological research. Progress in research activities will help to refine and deepen this guide to wrecks. We therefore kindly request our users to send new information to info@nationaalarchief.nl and/or info@cultureelerfgoed.nl stating 'guide to wrecks update'.

Archival research into shipwrecks

From the beginning of the 16th century the Dutch expanded their trading empire to territories in Asia, Africa and Brazil. The driving force was initially the lucrative trade in spice. Portugal had a monopoly on this trade but was increasingly harassed by piracy and privateers and was no longer capable of supplying the growing demand for spice in Europe. Prices of pepper and spice went sky high and the Republic seized its opportunity. Expeditions to East India attracted substantial investments. For example more than 1700 merchant vessels were built in the VOC shipyards on Amsterdam, which made about 8000 voyages to the East. These were long and hazardous sea voyages; many of these ships never reached their final destination. Damage from storms and enemy attacks caused ships to be wrecked with all hands lost. A number of these shipwrecks are still lying in

fig. Page 98, Fig 33: View of the battle between the Dutch and the Portuguese for the city of San Salvador in the Bay of All Saints in 1624

various states of disintegration at the bottom of the oceans as silent witnesses to the Dutch merchant history. This guide to wrecks offers the researcher and other interested parties some pointers as to which archives may be examined and how to look for information about shipwrecks. This handbook is limited to the wrecks of ships that belonged to the Dutch East India Company (VOC), the Dutch West India Company (WIC) or the Admiralty (17th and 18th centuries) and for which the sources can be found in the Nationaal Archief. When researching shipwrecks in the Nationaal Archief, one should decide in advance as to what type of vessel is involved. Did it sail under the flag of the VOC, the WIC or was it a naval vessel? Each 'type' of shipwreck requires a different approach in its research.

The following shipwrecks are dealt with in this guide:

- **Wrecks of ships commissioned by the VOC:** The VOC built 1600 vessels during its existence. In addition it bought a number of ships and hired these out. The VOC had a total of 4700 vessels at its disposal, 1700 in the seventeenth century and approximately 3000 in the eighteenth century. An estimated 247 ships were lost.
- **Wrecks of ships commissioned by the WIC:** The merchantmen of the WIC sailed to West Africa and the North and South Americas. Information on the WIC shipwrecks can be found in all of the WIC archive collections. There is no unambiguous method for retrieving information from these archives.
- **Wrecks of ships commissioned by the Admiralty:** This concerns the lost ships of the Dutch Navy. The Navy was divided between five Naval Colleges in the period of the Republic. There were three in Holland (Rotterdam, Amsterdam and Hoorn/Enkhuizen), one in Zeeland and one in Friesland. They were jointly responsible for the building, maintenance and fitting out of the fleet and impressment of the crew. When researching these wrecks, one should be aware that the archived records were written in (Old) Dutch in the 17th and 18th centuries and that some manuscripts are barely legible. Some knowledge of paleography is desirable. The archives below are listed in order of their significance to research, meaning that the probability of finding information in a given archival collection will be highest in the collections listed at the top. The more generalised series should be taken into account, but these have often not been examined any further, although they may contain documents concerning shipwrecks. In that case the research should be at the level of the documents. Any available and/or contemporary means of access, such as indexes, is a handy device for delving deeper into the archive. The MACHU website (Managing Cultural Heritage Underwater) is a database that provides information such as the location where the wreck was found, the type and history of the ship. http://www.machuproject.eu

The websites listed in this guide to wrecks are only a selection from all the websites concerned with shipwrecks.

Research into VOC shipwrecks

Information about the VOC ships:
Before starting archival research, it is recommended to view the website 'Dutch Asiatic Shipping (DAS)': http://www.inghist.nl/Onderzoek/Projecten/DAS. This website is the digital version of what were known as 'Uitloopboek' (departure logbook), in which the essential details of every voyage made by the VOC between 1595 and 1795 is recorded.

- name of the ship
- captain or master
- tonnage of the ship
- year and shipyard where the ship was built
- VOC chamber whose cargo the ship was carried
- date of departure, waypoint and arrival
- crew (divided into various categories)
- value of the return cargo
- details about the voyage, such as mutiny or shipwreck
- name of the commodore of the return fleet

This database forms the starting point from which one will be able to search for the VOC shipwrecks.

Data about the crew of the VOC ships
A second relevant website for researching VOC ships is: http://vocopvarenden.nationaalArchief.nl/ This website contains the administrative journals of a large number of VOC ships. It is based on the ship's accounts of service pay, in which the crew and details of pay of all paid crew of each VOC ship was registered. The option 'shipwreck' in the database can be searched on the ships lost at sea as the reason for the end of service.

Other websites:
Other on-line databases concerning the VOC and of interest to researchers of shipwrecks are the following:
- http://www.vocsite.nl/

This concerns a databank with information about approximately 2000 VOC ships. It includes descriptions of ships lost at sea and the voyages made by these ships.
- http://www.maritiemdigitaal.nl

A number of maritime museums in the Netherlands have set up a database in which all the objects and literature from the collections are included. This database contains images of scale models and drawings of ships among other things.

Archives:
- **Archives of the United East India Company (access 1.04.02)**
  http://www.gahetna.nl/collectie/Archief/ead/index/eadid/1.04.02/aantal/20

- Resolutions: Mostly from the Amsterdam Chamber, the Zeeland Chamber and the Heren XVII (Seventeen Governors). Contains data about a variety of topics, such as the construction of ships and fitting out
- Outgoing letters: Letters form the Heren XVII, the Amsterdam Chamber and the Zeeland Chamber in connection with matters concerning Asia
- Documents received from Asia and the Cape of Good Hope These documents give an impression of the trade and life in the settlements and consist of contracts and similar documents.
  - Copy of the resolutions made by the Governor-General and Councils: administrations in Asia, predominantly with regard to trading activities, appointments and regulatory processes
  - Copy of the outgoing documents of the Governor-General and Councils
  - Transferred Letters and Papers: Originated in East India, the Cape or China and addressed to the Heren XVII and the Amsterdam Chamber
- The Hague Besoigne (joint council of the various Chambers held in The Hague): Data regarding the sinking of a given ship of which the name, the location and the year are known.
- Committee archives
- Individually retained documents of the Amsterdam Chamber and the Zeeland Chamber
  - Kept in Europe
  - Kept outside Europe
- Departmental archives: Information about the business management of the various Chambers
  - General ledgers and journals: information about the administration of ships such as payments for shipbuilding materials, provisioning of ships, cash and merchandise.
  - Payment Office: administration regarding the hands at sea and staff in the trading posts
    - General land and muster rolls
    - Ships' payrolls
    - Roles of the rated civil and military servants

Archives of the States-General (access: 1.01.02)
http://www.gahetna.nl/collectie/Archief/ead/index/eadid/1.01.02/aantal/20
These archives contain information about the control of the VOC. Dating the construction or the floundering of a ship can be carried by searching the bundles such as those of the Admiralty's or the agents' or in the (printed) resolutions.

Archives originating in former VOC establishments such as:
- The Higher Authorities in Batavia (access: 1.04.17): contains documents transferred from Batavia, including resolutions and missives.
- Bookkeeper-General Batavia (access: 1.04.18.02): contains general and trading records and journals providing information about the cargo of homebound ships. Archives from settlements and archives of

VOC settlements:
- Archives of the Dutch Settlement in Canton, 1742 – 1826 (access: 1.04.20): contains the archives of the Board of Trade (resolutions, correspondence, daybooks and accounts), the notarial documents of the Secretary of the Brede Raad (Merchant Court Martial), private correspondence between the ship owner's agents and the agents of the overseas merchant companies.
- Archives of the Dutch settlement in Hirado, (1609-1641) and Deshima (1641-1860), Japan (access: 1.04.21): concerns the archives of the head of delegation and the council (resolutions, correspondence, day registers, judicial documents), of the book keeper (notarial documents and general ledgers).

- **International archives**
  Archives relating to the VOC are also retained in various countries where the VOC had its trading posts. These can be accessed digitally via: www.tanap.org

The archives that can be accessed via this portal come from:
- the Nationaal Archief
  the National Archives of Sri Lanka (Colombo, Sri Lanka: http://www.cultural.gov.lk/)
- the Western Cape Archives and Records Service (Cape Town, South Africa: http://www.capegateway.gov.za/eng/your_gov/154577)
- Arkib Negara Malaysia (Kuala Lumpur, Malaysia: http://www.arkib.gov.my/)
- the Tamil Nadu Archives (Chennai- Tamil Nadu, India: http://www.tn.gov.in/citizen/archives.htm)
- the Arsip Nasional Republik Indonesia (Jakarta, Indonesia: http://www.anri.go.id/web/index.php)
- the British Library, Oriental and India Office Collections (London, England: http://www.bl.uk/collections/)

- **New Additions to the Collection of the former First Division of the General State Archives (access: 1.11.01.01)**
  This collection consists of documents of various kinds, including documents that originated in the VOC. This includes individual documents amongst diaries, journals and letters from the VOC Chambers and the Ministers and ship's lists. These documents may contain information about (the loss of) ships.

- **Private archives:**
  Various private archives kept by the Nationaal Archief such as the archives of Ministers, may provide additional research material.
  For example when digital access to the Nationaal Archief is being searched with keywords such as 'wreck' and 'sunk', the following archives will be found:
  - Radermacher Collection (access: 1.10.69)
  - Nederburgh (access: 1.10.59)

  Search terms related to a more specific search request may result in different private archives being referred to.

  Further reference will be made to the general series from the VOC archives, such as the resolutions. In addition to these there are contemporary ways of accessing various archives that may contain references to shipwrecked VOC merchantmen.

Research into shipwrecks of the West India Company

- **Archives of the Old West India Company (access: 1.05.01.01)**
  http://www.gahetna.nl/collectie/Archief/ead/index/eadid/1.05.01.01/aantal/20

The majority of the original archives were lost when they were sold as waste paper in 1821. The most significant part of the remaining archives is from the Zeeland Chamber.
The archives include documents about the Coast of Guinea (Ghana), Brazil, New Netherland (part of the North East Coast of the United States), the minutes of the Hague Besoigne, documents about the Amsterdam Chamber (minutes of meetings in particular) and a few documents of the Delft Chamber, the Chamber op de Maze (the River Meuse) and the Noorderkwartier Chamber (Northern Quarter). A substantial part of the archive consists of documents that came from the Zeeland Chamber, including the significant series of letters and papers from the period from 1630 to 1654 originating in Brazil. The series includes the bills of lading of several ships.

- **Archives of the Dutch West India Company (access: 1.05.01.02)**
  http://www.gahetna.nl/collectie/Archief/ead/index/eadid/1.05.01.02/aantal/20

Like the archives of the Old WIC, this archive too has been largely lost. The remaining archives of the Second or New WIC contains documents from the period between 1674 and 1791. It consists of documents of the Heren X (Meeting of Ten), such as charters and letters and documents sent to and from the Colonies, including the Suriname, the Coast of Guinea (Ghana), Curaçao, Essequebo and Demarary (Guyana). The registers of resolutions by the Amsterdam Chamber from 1674 to 1791 form a voluminous series. The archives also contain lading manifests and administrative-financial WIC documents such as: general accounts, payrolls and muster books as well as payment records from the Colonies.

- **Miscellaneous West India documents (access: 1.05.06)**
  http://www.gahetna.nl/collectie/Archief/ead/index/eadid/1.05.01.01/aantal/20

The Miscellaneous West India Documents make up a very diverse collection over the period of the 17th to the 19th centuries. The documents come from other archives. Many documents relate to the territories that fell within the 'octroi' (charter area) of the WIC.

- **Archives of the Suriname Society (access: 1.05.03)**
  http://www.gahetna.nl/collectie/Archief/ead/index/zoekterm/societeit%20berbice/aantal/20/eadid/1.05.03

The Suriname Society was founded by the WIC, the City of Amsterdam and the Sommelsdijck family in 1683 and was the legal owner of the Dutch Colony of Suriname.
The archive contains more financial administration documents, resolutions and payrolls among other things.

- **Archives of the Berbice Society (access: 1.05.05)**
  http://www.gahetna.nl/collectie/Archief/ead/index/zoekterm/societeit%20berbice/aantal/20/eadid/1.05.05

These archives comprise records of the organisational, financial, administrative and military affairs such as the slaves revolt of 1763 and the military entanglement with England. This archive also contains a few bills of lading. A large part of these archives are not on Dutch territory.
England demanded the first archives that belonged to the Zeeland Chamber of the WIC in 1817.
The Kingdom of the Netherlands conceded to this demand, with the exception of some old documents concerning Essequebo and Demerary. The English subsequently claimed another 71 volumes concerning Berbice. All these documents have been brought together into a single collection and can be found in the Public Record Office in Kew, London, catalogued as C.A. 116-68/136. Berbice.

- **States-General (access: 1.01.02)**
  http://www.gahetna.nl/collectie/Archief/ead/index/eadid/1.05.01.01/aantal/20

For further research you should consult the archives of the States-General and in particular the WIC bundles in the WIC archive cabinets; also the archives of the States of Holland (all in the Nationaal Archief), Zeeland (Zeeland Archives) and Groningen (Groningen Archives); as well as the archives of the local authorities in cities that had a branch chamber of the WIC (Amsterdam, Middelburg (Veere and Vlissingen), Groningen, Delft and Rotterdam).

Information on New Netherland (Manhattan) is very hard to find in this archive, but primarily in the resolutions. For information about New Netherland you should consult the archival collections in New York State (for example the Public Library in Albany), much of which has been published and translated into English. Much information can also be found in a few archives of the Amsterdam City Archives, in particular in the notarial archives, the archives of the Amsterdam regional meetings and the archives of the city council.

- **Archive of the Individual Acquisitions of the former First Division of the General State Archives (access: 1.11.01.01)**
  http://www.gahetna.nl/collectie/Archief/ead/index/eadid/1.11.01.01/aantal/20

This collection consists of a wide variety of records, including records originating from the WIC.

Among other things, this concerns individual documents, journals, resolutions and letters from Ministers. These documents must be examined physically in order to determine whether they contain information on ships lost at sea.

Research into Admiralty shipwrecks

- **Archives of the States-General (access: 1.01.02)**
  http://www.gahetna.nl/collectie/Archief/ead/index/eadid/1.01.02/aantal/20

Among other things, the archive includes more information about how the Admiralty was supervised. The bundles of (printed) resolutions can be searched to find out the dates of construction and sinking of the ship. The archives contain records, journals, memoirs and reports on the management of the admiralties and the Nation's Navy (affairs of the admiralty). The records and journals hail from the deputies of the States-General and the navy officers, who wrote the reports on their voyages in these documents.

- **Archives of the Naval Colleges (access: 1.01.46)**

This archive comes from the various naval colleges in Holland, Zeeland and Friesland, whose task it was to maintain the fleet and recruit new hands.
Parts of the archives have been lost through fire and 'though attempts were made to fill the gaps by adding archives from navy officials, commodores and officers, the archives remain incomplete.
The archive comprises:

- resolution records from the different admiralties
- commission records with staff appointments
- records of correspondence from several government institutions such as the States-
- General, Council of State and the States of Holland.
- correspondence with native and foreign persons, other courts martial and of the postcaptains
- documents relating to justice regarding goods and persons (criminal and civil rolls)
- accounts regarding the receipts and expenditures, including for example the sale of
- captured prizes.
- ship's logbooks (in particular those from the 18th century period)

- **States of Holland and West Friesland (access: 3.01.04.01)**

The archive comprises:

- written and printed resolutions regarding financial matters
- documents about negotiations with foreign powers, about the status of stadholders (regents or viceroys), submitted requests and charters conferred by the States of Holland.
- documents concerning the Admiralty: the provisioning of ordnance and armour as well as piloting merchant ships, the VOC and the WIC
- documents related to the collection, changes and reformation of taxes
- documents concerning military matters

- **Archive of the New Additions to the former First Division of the General State Archives (access: 1.11.01.01)**
  http://www.gahetna.nl/collectie/Archief/ead/index/eadid/1.11.01.01/aantal/20

This collection comprises a wide variety of documents, including documents originating from the WIC. These documents must be examined physically in order to determine whether they contain information on ships lost at sea.

- **Private archives:**

Various private archives kept by the Nationaal Archief such as the archives of Ministers, may provide additional research material. These are the archives from the Grand Pensionary, the supreme administrative officer and the clerks of the naval colleges. For example when digital access to the Nationaal Archief is being searched with keywords such as 'wreck' and 'sunk', the following archives will be found:

- Grand Pensionary Fagel (access: 3.01.18)
- Naval Colleges XIV Hoeufft (access: 1.01.47.10)
- Naval Colleges XVIII Van Kinckel (access: 1.01.47.11)

Search terms relating to a more specific search request will probably result in different private archives.

Selection of cartographic material

- The Leupe Collection (access: 4.VEL, 4.VELH) consists of a large number of sea charts, which have now been partly digitised and can be found in the image library of the Nationaal Archief. The same applies to 600 charts which show the locations of the VOC shipwrecks and which were compiled by the Centre for International Heritage based on the Atlas Maior. Most of these chartscan also be found in the Image Library of the Nationaal Archief.
- The Atlas of Mutual Heritage (AMH) is a digital catalogue that contains pictures and information about the Dutch colonies of the VOC and WIC: www.atlasofmutualheritage.nl/

Selection of relevant literature

- Boer, M.G. de, Van Oude Voyagiën (On ancient voyages), Amsterdam, 1923, 1979
- Boxer, C.R., The Dutch in Brazil 1624-1654, Oxford 1957
- Bruijn, J.R., et al. ed., Dutch-Asiatic Shipping in the 17th and 18th centuries, Rijks Geschiedkundige Publicatiën (National Historic Publications), Nos. 165-167, The Hague 1979 and 1987
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- Dam, P. van (ed. F.W. Stapel and C.W.Th. van Boetzelaer), Beschrijvinge van de Oostindische Compagnie (Description of the Dutch East India Company), The Hague 1977
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- Doortmont, M.R. and Smit, J., Sources for the Mutual History of Ghana and the Netherlands, The Hague 2008
- Gaastra, F., De geschiedenis van de VOC (The History of the VOC), Amsterdam 1999
- Goslinga, C. Ch., The Dutch in the Caribbean and on the Wild Coast 1580-1680, Volume 1, Assen 1971
- Green, J.N. and Gangadharam, E.V., The survey of the V.O.C. Fluit Risdam 1727 Malaysia, Report Department Maritime Archaeology Western Australian Museum: no. 25, 1985
- Heijer, H.J. den, Geschiedenis van de WIC (History of the WIC), Zutphen 1994
- Laet, J. de, Iarlyck Verhael van de Verrichtinghen der Geoctroyeerde West-Indische Compagnie in derthien Boecken (Annals of the Activities of the Chartered West India Company in thirteen books), four volumes, published by S.P. L'Honoré Naber, The Works of the Linschoten Society 34, 35, 37 and 40, The Hague 1931-1937
- Lequin, F., Klapper op de plaatsnamen die voorkomen in de rollen van gequalificeerden van de Verenigde Oostindische Compagnie 1701-1787, serie kamer Amsterdam..., benevens een gedetailleerde inhoudsopgave der banden en een plaatsnamenregister (Index of the place names which appear in the muster rolls of able seamen of the United East India Company 1701-1787, Amsterdam Chamber series..., in addition to a detailed table of contents of the bound volumes and a place name register), Leiden 1976
- Menkman, W.R., De West-Indische Compagnie (The West India Company), Amsterdam 1947
- Mollema, J.C., De Eerste Schipvaart der Hollanders naar Oost-Indië (The First Dutch Maritime Voyage to the East India, The Hague 1936
- Mollema, J.C., De Nederlandsche vlag op de wereldzeeën. Ontdekkingsreizen onzer voorouders (The Dutch ensign on the world's seas. Voyages of discovery by our forebears), Amsterdam
- Parthesius, R., Dutch Ships in Tropical Waters. The development of the Dutch East India Company (VOC) shipping network in Asia 1595-1660, Amsterdam 2007.
- Posthumus Meyjes, R., Geschiedkundige Atlas van Nederland. De eerste reizen der

Nederlanders, naar de bijbehorende kaart en aangeduide landen en eilanden. (Historical Atlas of the Netherlands. The first voyages of the Dutch, after the associated chart and the countries and islands shown), The Hague 1924
- Marius P.H. Roessingh, Sources of the history of Asia and Oceania in the Netherlands. Part I: sources up to 1796, Munich 1982
- Wätjen, H., Das holländische Kolonialreich in Brasilien (The Dutch Colonial Empire in Brazil) The Hague/Gotha 1921
- Wiesebron, M.L., Brazilië in de Nederlandse archieven (Brazil in the archives of the Netherlands) (1624-1654), part 1 & 2, Leiden 2005 & 2008
- Winter, P.J. van, De Westindische Compagnie ter kamer Stad en Lande (The West India Company of the Stad en Lande chamber), The Hague 1978

Case study: Archival research into the wreck of 'De Utrecht'

In order to illustrate the research path to finding a shipwreck in the aforementioned (archival) sources, a desk exercise was carried out to research into the wreck of the admiralty's ship, the 'Utrecht'. The archive documents that would be eligible for further research to the background of the ship are listed below.

In 1647, the States-General dispatched an auxiliary fleet under the command of Admiral Witte Cornelisz. De With to assist the Brazilian settlements in their fight against the Portuguese. The Naval Colleges carried out the manning and provisioning of the fleet. A squadron of seven ships left their moorings at Recife and set course for Bahia. The 'Utrecht' was one of the ships sailing in this squadron under their captain, Jacob Pouwelsz. They found two Portuguese men of war on 28 September and attacked these immediately. Together with the Huis van Nassau, vice-admiral Matthijs Gillisz' ship, the 'Utrecht' attacked the 32 guns Nostra Senhora de Rosario. The other ships went for the second Portuguese ship, the San Bartholomeu. With the new orders from the Spanish king in mind, the Portuguese crew of the Rosario ignited the fuse in the gunpowder kegs the moment their ship threatened to fall into the hands of the Dutch, 'upon which the three ships exploded, particularly the Portuguese galleon and Master Pouwel's ship, which shattered into a hundred thousand pieces', so wrote Witte de With in his final despatch to the States-General. The other Dutch ship was kept afloat but was so damaged that it was decided to scuttle her and leave her behind. On 22 October (!), de With reported that Captain Pouwels and 21 of his crew had been found: they had managed to keep themselves afloat on 'a masthead' and apparently had made landfall somewhere: the report gives no information other than that the hands were rescued by De With's yacht. Captain Pouwels is mentioned a few more times in despatches (March, April 1649).
The wreck of the 'Utrecht' was discovered near to Salvador de Bahia in 1983. It lies at a depth of approximately 30 metres, which makes it attractive to divers.

Finding the facts

The MACHU database refers to the frigate 'De Utrecht' and some background information about the ship. It concerns an admiralty yacht/ frigate that was built in 1638. The maritime-archaeological context is given at the same time.

In this case the emphasis of the archival search has been on researching the archives of the States-General (decision making and reporting) and the Naval Colleges in particular because of manning and provisioning the ships. This material may throw up elements that could possibly contain information that might be useful to maritime archaeologists.
It should be noted however that the archives of the Naval Colleges have suffered severely from the 1844 fire in the Marine Establishment in Amsterdam and that a substantial part of the West India Company archive had been sold as waste paper in the 19th century. The Naval Colleges' archives contain letters from various collections, in particular from private collectors, who bought material after the fire of 1844 and which had been thought to be lost.
The archive of the so-called Old West India Company has been completely digitalised and can be viewed via the website of the Nationaal Archief, www.gahetna.nl. No relevant inventory numbers were found in the collection of Miscellaneous West India documents.

Following a quick scan the following inventory numbers can be examined:

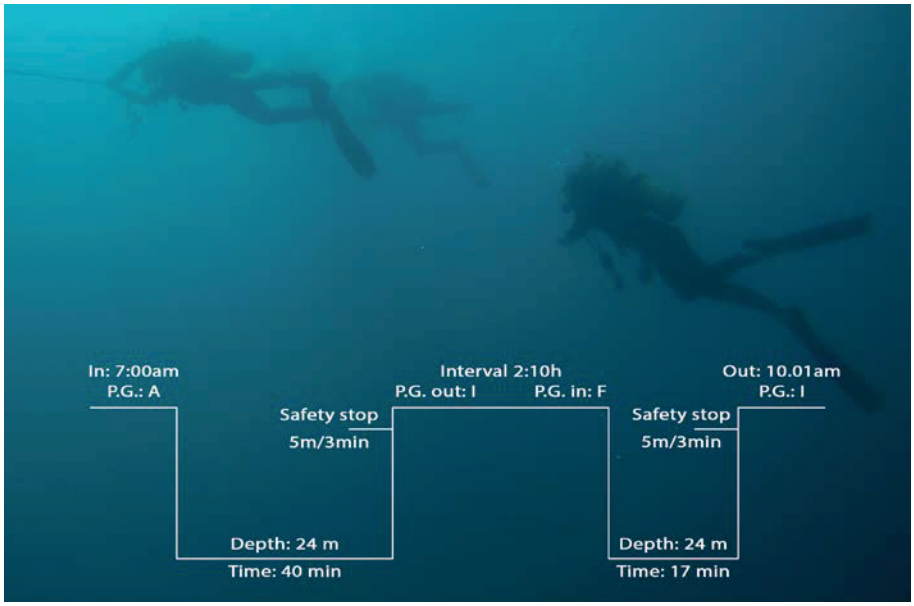
Archives	Access number	Inventory number	Description	Other information
States-General	1.01.02	5543	Letters and documents concerning admiralty and maritime matters received from the clergy, July to December 1648.	
		5717	Statements of incoming convoys and licensees by the Admiralty, 1647-1656.	No information
		9318	'Brief log of our voyage', kept by Witte Cornelisz. De With during his voyage to Brazil and during his activities in this country. 1647 October - 1649 March 29	No information
		9319	Journal kept by Captain Joost van Coulster onboard 'Gelderlandt' during his voyage from Goeree to Brazil and his stay there and the return voyage. 1647 December 26 - 1650 April 9, 1 volume	Report on the action portfolio 9-10 and the explosions onboard De Utrecht.
		9401	'Acts and resolutions by the members of the Court Martial to hear former admiral Witte Cornelisz. De With, post-captain and other senior officer of the fleet in the year 1647 who assisted on the way to Brazil and who have recently returned from there'. 1650 September 13 - 1651 March 15, 1 volume	No information Was not part of the squadron of De With
		12561.113.2	Letters to the States-General from the different Naval Colleges, 1642, 1645. 1647-1648 1 folder	No information
		12564.20	Documents concerning the attempts of the States-General to dispatch an auxiliary fleet to Brazil in 1647 and concerning their further efforts regarding the voyage, 1647-1648. With pre-dating documents from1636-1646, 1 folder	No information
		12564.21	Documents concerning the efforts of the States-General regarding the No information 16 support for the WIC in Brazil, 1647-1648. With predating documents from 1636-1646, 1 folder	No information
		12564.22	Extracts from the resolutions by the States-General regarding the support for the West India Company in Brazil 1647-1648, 1 folder	No information

Archives	Access number	Inventory number	Description	Other information
		12564.30B	Documents concerning the efforts of the States-General regarding the provisioning required in connection with the situation in Brazil, with muster books of ships in West Indian waters, 1649-1650. With pre-dating documents from 1644-1648, 1 folder	No information
		12564.29	Documents concerning the efforts of the States-General with the situation in West India, in particular in Brazil on grounds of the attached letters received from Brazil addressed to the States General, 1650. With pre-dating documents from 1645-1649, 1 folder	No information
		12564.28	Muster rolls of ships and documents dealing with the situation in the West Indies, particularly in Brazil, where the *fluytschip* (flute design based on galleon) 'De Hoop' was sent by the States-General in 1650.1650 1 folder	No information
		12564.34	Letters and other documents sent from Brazil to the States-General. 1649-1651 1 folder	No information
Archives of the Old West India Company.	1.05.01.01	49-67	Letters and documents transferred from Brazil. 1630-1654,18 bundles	No information
Naval Colleges	1.01.46	776	Main ledger of the payment orders issued by the Receiver General with regard to the expedition to 17 Brazil under the leadership of vice-admiral Witte Cornelisz. De With. 1647-1661, 1 volume	
		143	Resolutions, 1648	No information
		218	Letters received from the States-General, 1637-1652	
		281	Letters received from the Council of State, 1648-1650	
		293	Letters received from the Admiralty's Naval Colleges, 1644-1649	No information
		323	Letters received from the States of Holland and the Deputies of the States of Holland, 1630-1658	No information
		375	Letters received from the ambassadors and councils as well as from the colleges and persons abroad, 1642-1648	No information
		441	Letters received from commodores and sea officers, 1648	No information
		555	Letters received from various people, 1648	No information Only 1630 and 1658

Archives	Access number	Inventory number	Description	Other information
		770	Main ledger of the payment orders made by the receiver-general, 1639-1648	No information
		774	Main ledger of the payment orders made by the receiver-general to captains and commanders for the wages of seamen. 1647 April 24 - 1687 April 10, 1 volume	No information Letter reporting all's well from Witte De With with the April 1648 journals
		1023	Resolution extracts of the Admiralty of the River Meuse, sent to 'his deputies of the yard and the chandlery', the trading post counter and the quarter master, 1647 March 7 - 1699 March 18 March 7 - 1699 March 18	
		1079	Tables of contents for the resolution extracts of the Admiralty as sent to 'his deputies of the yard and the chandlery', the trading post counter and the quarter master. 1647 March 17 - Information on the manning and provisioning of the expedition only no specific information about the Utrecht 18 1754 December 3	Information on the manning and provisioning of the expedition only no specific information about the Utrecht
		1403	Resolutions, 1648 January 1 - 1648 December 30, 1 bound volume	Information on the manning and provisioning of the expedition only but no specific information about the Utrecht
		1628	Letters received, 1737-1649, 1 folder	Information on the manning and provisioning of the expedition only but no specific information about the Utrecht
		2428	Copies of the Commissions and copies of the Instructions for deputies, clerks, captains, etc. 1643 December 20 - 1649 April 7, 1 folder	
		2467	Resolutions, 1648 May 25 - 1649 September 20, 1 folder	No information
		2592	Letters received from the States-General, 16481, 1 folder	No information
		2706	Letters, statements, reports, requests etc., received from the various colleges, authorities and others, 1648, 1 folder	No information
		3010	Letters , reports and other documents received, 1633-1659	No information

Appendix IV: Diving profiles

J. Opdebeeck



PROJECT:	**Itaparica Naval Battle Site. Salvador, Brazil.**		
DATE:	Mon, 10, 2012.		
Departure:	06:55am		
On Site:	08:38am		
DIVE 1:	**Team 1:**	**Team 2:**	**Team 3:**
UTRECHT	Rodrigo + Jens	Johan + Kota + Thijs	Carlos + Klismann
Time In:	09:10am	09:13am	09:11am
Bottom Time:	37 min.	30 min.	30 min.
Time Out:	09:55am	09:55am	09:55am
Max. Depth:	21m	21m	21m
Safety Stop:	5m/3min	5m/3min	5m/3min
Water Temp:	24 °C		
Visilibility:	c. 10m		
ACTIVITIES:			
Site reconnaissance. Identify and compare features seen in early sketches. Pictures and videos taken.			
Surface Interval: 02:05h			
DIVE 2:	**Team 1:**	**Team 2:**	
UTRECHT	Carlos + Jens	Rodrigo + Johan + Thijs	
Time In:	12:00am	12:00am	
Bottom Time:	15 min.	16 min.	
Time Out:	12:25am	12:30am	
Max. Depth:	21m	21m	
Safety Stop:	5m/3min	5m/3min	
Water Temp:	25 °C		
Visilibility:	c. 10m		
ACTIVITIES:			
Idem. Start general site plan sketch. Pictures and videos were taken. OBS: Choppy sea. Two divers could not dive due to motion sickness.			
Departure:	12:45pm		
Harbor:	15:00pm		

PROJECT:	**Itaparica Naval Combat Site. Salvador, Brazil.**		
DATE:	Tue, 11, 2012.		
Departure:	05:20am		
On Site:	07:05am		
DIVE 1:	**Team 1:**	**Team 2:**	**Team 3:**
UTRECHT	Rodrigo + Jens + Thijs	Johan + Carlos	Kota + Klismann
Time In:	07:17am	07:19am	07:16am
Bottom Time:	30 min.	31 min.	25 min.
Time Out:	07:50am	07:50am	07:45am
Max. Depth:	21m	21m	21m
Safety Stop:	5m/3min	5m/3min	5m/3min
Water Temp:	24 °C		
Visilibility:	c. 10m		
ACTIVITIES:			
Start tagging cannons and anchors. Base---line positioning. Measurements of individual features (A5). Pictures and videos were taken. Continue sketching site plan.			
Surface Interval: 02:05h			
DIVE 2:	**Team 1:**	**Team 2:**	**Team 3:**
UTRECHT	Rodrigo + Jens + Thijs	Johan + Carlos	Kota + Klismann
Time In:	10:10am	10:10am	10:10am
Bottom Time:	25 min.	17 min.	21 min.
Time Out:	10:45am	12:48am	10:50am
Max. Depth:	22m	22m	22m
Safety Stop:	5m/3min	5m/3min	5m/3min
Water Temp:	25 °C		
Visilibility:	c. 12m		
ACTIVITIES:			
More tagging. Base---line fixing. Measurement of canons C8, C9 and C10. Pictures and videos were taken. Identified naturaly exposed timbers (near A3 and A5). Finished general site sketch.			
Departure:	11:05pm		
Harbor:	12:50pm		

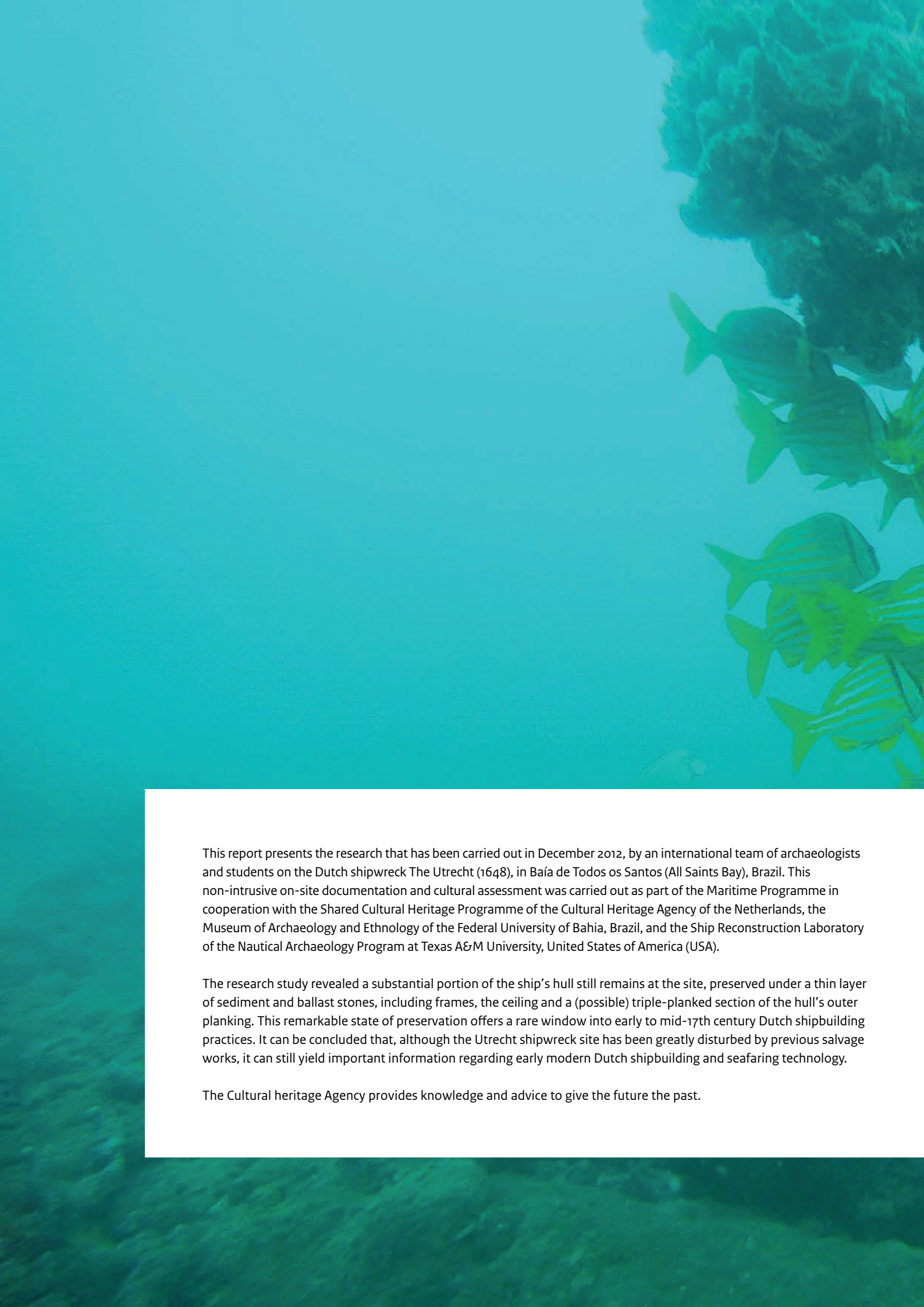
PROJECT:	**Itaparica Naval Combat Site. Salvador, Brazil.**		
DATE:	Wed, 12, 2012.		
Departure:	05:15am		
On Site:	06:50am		
DIVE 1:	**Team 1:**	**Team 2:**	**Team 3:**
UTRECHT	Rodrigo + Jens + Thijs	Johan + Klismann	Kota + Carlos
Time In:	07:20am	07:20am	07:20am
Bottom Time:	40 min.	41 min.	32 min.
Safety Stop:	5m/3min	5m/3min	5m/3min
Time Out:	08:03am	08:04am	07:55am
Max. Depth:	21m	21m	21m
Water Temp:	24 °C		
Visilibility:	c. 7m		
ACTIVITIES:			
Wood probing. More wood found at 26m along, 3m west of the B.L. Measured A1. Photos of wood around A5. Fixing datum points network.			
Surface Interval: 02:05h			
DIVE 2:	**Team 1:**	**Team 2:**	**Team 3:**
UTRECHT	Rodrigo + Jens + Thijs	Johan + Klismann	Kota + Carlos
Time In:	10:15am	10:15am	10:15am
Bottom Time:	25 min.	23 min.	21 min.
Safety Stop:	5m/3min	5m/3min	5m/3min
Time Out:	10:43am	10:41am	10:39am
Max. Depth:	22m	22m	22m
Water Temp:	24 °C		
Visilibility:	c. 7m		
ACTIVITIES:			
Measured A2 and A3. Extended B.L. southwards (41,815m total length). More wood probing. Finished tagging cannons. Tagged artifacts all noted on site skectch. Finished datum points network.			
Departure:	11:00pm		
Harbor:	12:55pm		

PROJECT:	**Itaparica Naval Combat Site. Salvador, Brazil.**		
DATE:	Thu, 13, 2012.		
Departure:	05:05am		
On Site:	06:40am		
DIVE 1:	**Team 1:**	**Team 2:**	**Team 3:**
UTRECHT	Rodrigo + Thijs	Johan + Klismann	Kota + Carlos
Time In:	07:05am	07:05am	07:05am
Bottom Time:	29 min.	27 min.	26 min.
Safety Stop:	5m/3min	5m/3min	5m/3min
Time Out:	07:37am	07:32am	07:31am
Max. Depth:	21m	21m	21m
Water Temp:	24 ºC		
Visilibility:	c. 10m		
ACTIVITIES:			
A6 and A7 (anchor fragments), C16 and C13 measured in detail. Started datum-to-feature measurements (D.S.M.). Depth readings (Depth reference set to Datum A). Sea-state calming down.			
Surface Interval: 02:05h			
DIVE 2:	**Team 1:**	**Team 2:**	**Team 3:**
UTRECHT	Rodrigo + Thijs	Johan + Klismann	Kota + Carlos
Time In:	9:50am	9:50am	9:50am
Bottom Time:	26 min.	26 min.	25 min.
Safety Stop:	5m/3min	5m/3min	5m/3min
Time Out:	10:19am	10:19am	10:18am
Max. Depth:	21m	21m	21m
Water Temp:	25 ºC		
Visilibility:	c. 10m		
ACTIVITIES:			
Continue D.S.M. and depth measurements. C12, C11, C6, C3, C4 and C5 measured in detail.			
Departure:	10:40m		
Harbor:	12:35pm		

PROJECT:	**Itaparica Naval Combat Site. Salvador, Brazil.**		
DATE:	Fri, 14, 2012.		
Departure:	05:15am		
On Site:	06:55am		
DIVE 1:	**Team 1:**	**Team 2:**	**Team 3:**
UTRECHT	Rodrigo + Thijs	Johan + Klismann	Kota + Carlos
Time In:	07:10am	07:10am	07:10am
Bottom Time:	34 min.	36 min.	20 min.
Safety Stop:	5m/3min	5m/3min	5m/3min
Time Out:	07:47am	07:49am	07:35am
Max. Depth:	21m	21m	21m
Water Temp:	25 °C		
Visilibility:	c. 10m		
ACTIVITIES:			
Continue D.S.M. and depth measurements. Measured in detail A4 and C7.			
Surface Interval: 02:05h			
DIVE 2:	**Team 1:**	**Team 2:**	**Team 3:**
UTRECHT	Rodrigo + Thijs	Johan + Klismann	Kota + Carlos
Time In:	10:00am	10:00am	10:00am
Bottom Time:	30 min.	35 min.	22 min.
Safety Stop:	5m/3min	5m/3min	5m/3min
Time Out:	10:33am	10:38am	10:25am
Max. Depth:	21m	21m	21m
Water Temp:	23 °C		
Visilibility:	c. 10m		
ACTIVITIES:			
Continue D.S.M. and depth measurements. C14, C2, C15 and C1 measured in detail.			
Departure:	10:50m		
Harbor:	12:50pm		

PROJECT:	**Itaparica Naval Combat Site. Salvador, Brazil.**		
DATE:	Sat, 15, 2012.		
Departure:	05:10am		
On Site:	06:55am		
DIVE 1:	**Team 1:**	**Team 2:**	**Team 3:**
UTRECHT	Rodrigo + Thijs	Johan + Klismann	Kota + Carlos
Time In:	07:05am	07:05am	07:05am
Bottom Time:	36 min.	36 min.	22 min.
Safety Stop:	5m/3min	5m/3min	5m/3min
Time Out:	07:44am	07:44am	07:30am
Max. Depth:	21m	21m	21m
Water Temp:	25 ºC		
Visilibility:	c. 10m		
ACTIVITIES:			
Finished detail measurements. Pictures w/ scale of individual artifacts (C13, C16, A6, A7, A4, A5, C10, C9, and C8). More depth measurements. Continue D.S.M. measurements.			
Surface Interval: 02:05h			
DIVE 2:	**Team 1:**	**Team 2:**	**Team 3:**
UTRECHT	Rodrigo + Thijs	Johan + Klismann	Kota + Carlos
Time In:	10:00am	10:00am	10:00am
Bottom Time:	30 min.	25 min.	20 min.
Safety Stop:	5m/3min	5m/3min	5m/3min
Time Out:	10:33am	10:28am	10:23am
Max. Depth:	21m	21m	21m
Water Temp:	24 ºC		
Visilibility:	c. 10m		
ACTIVITIES:			
Continued depth measurements and individual artifacts pictures w/scale (C12, C11, C6, C3, C4, C5, A2, A3, C1, C15, C2 and A1). Continue D.S.M. measurements.			
Departure:	10:50m		
Harbor:	12:55pm		

PROJECT:	**Itaparica Naval Combat Site. Salvador, Brazil.**		
DATE:	Sun, 16, 2012.		
Departure:	04:00am		
On Site:	05:50am		
DIVE 1:	**Team 1:**	**Team 2:**	**Team 3:**
UTRECHT	Rodrigo + Thijs	Johan + Klismann	Kota + Carlos
Time In:	06:00am	06:00am	06:00am
Bottom Time:	25 min.	25 min.	20 min.
Safety Stop:	5m/3min	5m/3min	5m/3min
Time Out:	06:28am	06:28am	06:23am
Max. Depth:	21m	21m	21m
Water Temp:	24 °C		
Visilibility:	c. 10m		
ACTIVITIES:			
Ballast measurements. Finished D.S.M. and depth measurements. Finished pictures w/scale (C14 and C7). Measured ring of A5. Wood structures measured and photographed.			
Surface Interval: 01:55h			
DIVE 2:	**Team 1:**	**Team 2:**	**Team 3:**
UTRECHT	Rodrigo + Thijs	Johan + Klismann	Kota + Carlos
Time In:	8:25am	8:25am	8:25am
Bottom Time:	25 min.	20 min.	20 min.
Safety Stop:	5m/3min	5m/3min	5m/3min
Time Out:	8:53am	8:48am	8:48am
Max. Depth:	21m	21m	21m
Water Temp:	24 °C		
Visilibility:	c. 10m		
ACTIVITIES:			
Clean up. Taking off tags, B.L., datums, etc. Photo coverage.			
Surface Interval: 02:00h			
DIVE 3:	**Team 1:**	**Team 2:**	
N S Rosário	Rodrigo + Kota + Johan	Thijs + Klismann + Carlos	
Time In:	11:00am	11:00am	
Bottom Time:	15 min.	15 min.	
Safety Stop:	5m/3min	5m/3min	
Time Out:	11:18am	11:18am	
Max. Depth:	21m	21m	
Water Temp:	25 °C		
Visilibility:	c. 12m		
ACTIVITIES:			
Overview sketch. Photos and videos.			
Departure:	11:35m		
Harbor:	13:15pm		



This report presents the research that has been carried out in December 2012, by an international team of archaeologists and students on the Dutch shipwreck The Utrecht (1648), in Baía de Todos os Santos (All Saints Bay), Brazil. This non-intrusive on-site documentation and cultural assessment was carried out as part of the Maritime Programme in cooperation with the Shared Cultural Heritage Programme of the Cultural Heritage Agency of the Netherlands, the Museum of Archaeology and Ethnology of the Federal University of Bahia, Brazil, and the Ship Reconstruction Laboratory of the Nautical Archaeology Program at Texas A&M University, United States of America (USA).

The research study revealed a substantial portion of the ship's hull still remains at the site, preserved under a thin layer of sediment and ballast stones, including frames, the ceiling and a (possible) triple-planked section of the hull's outer planking. This remarkable state of preservation offers a rare window into early to mid-17th century Dutch shipbuilding practices. It can be concluded that, although the Utrecht shipwreck site has been greatly disturbed by previous salvage works, it can still yield important information regarding early modern Dutch shipbuilding and seafaring technology.

The Cultural heritage Agency provides knowledge and advice to give the future the past.