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A Swedish man-of-war in Dutch waters

An archaeological field evaluation of the wreck of the Sophia Albertina

A.B.M. Overmeer

Archaeological Heritage Management Reports 201
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Preface

Across the world the seabed contains a treasure trove of information about our past. The remains of old civilisations and shipwrecks lie hidden beneath the sea. One legendary example is the sunken palace off the coast of Alexandria. Another is the Pharos lighthouse, one of the Seven Wonders of the Ancient World, which was engulfed by a tsunami after an earthquake in the fourth century. According to UNESCO estimates there are more than three million shipwrecks on the floor of the world's seas and oceans, many of them undiscovered. Underwater heritage on the seabed is often well preserved, although it may also at times be severely eroded. While most underwater sites have long been difficult or impossible to access, new diving technology has now opened up the seabed to us.

Only recently has awareness of the enormous potential of this underwater heritage begun to grow, both at home and abroad. Although frequently well-preserved, it nevertheless requires proper management. This desire to deal more effectively with underwater heritage is reflected internationally in agreements such as the 2001 UNESCO Convention for the Protection of Underwater Cultural Heritage. It is the presence of archaeological finds in particular, the mysteries associated with searching for underwater treasure, that exerts a powerful attraction for many. The well-preserved finds, their recognisability, and above all the underwater conditions, are all part of this attraction. For many, the underwater world remains an unknown world, the final frontier. So when something surfaces from this mysterious world, as happens from time to time, it is sensational news.

Maritime history, of such vital importance to the Netherlands, unfolded for the most part in an international setting. Cargo-laden ships sailed from one country to another, and wars were fought at sea. Each year, Dutch shipwrecks continue to be found off the coast of Europe and beyond. In 2007 and 2009 two complete Dutch ships were discovered on the floor of the Baltic Sea. And Finnish waters contain the Vrouwe Maria, a Dutch ship bound for Russia carrying an art collection purchased in the Netherlands by the Russian Empress Catherine the Great. We therefore depend on other nations to manage this heritage, just as they rely on us to protect their heritage in Dutch territorial waters.

Dutch waters are home to ships from Sweden, England, Germany, Denmark and France. These wrecks are just as much part of Dutch heritage as they are of their country of origin. Increasingly, this shared heritage is managed and accessed in consultation with the countries concerned.

This report is about the Sophia Albertina, a Swedish ship which foundered in Dutch waters in 1781. The Cultural Heritage Agency employs a team of divers who regularly carry out underwater archaeological surveys. In 2004 this team explored the wreck of the Sophia Albertina.

Alice Overmeer, a researcher and member of the 2004 diving team, demonstrates in this report that the wreck is indeed that of the Swedish ship, the Sophia Albertina, making it one of the few in Dutch waters to have been officially identified. This is hugely important and may serve as a springboard for further archival and historical research in both the Netherlands and Sweden.

Benno van Tilburg
Head of Ship Archaeology
Cultural Heritage Agency

Abstract

On 29 August 1781, the *Leeuwarder Courant* newspaper reported that *'On the 20th, at 11 o'clock at night, the Swedish man-of-war Sophia Albertina ran aground on the Haaks'*. The 'Haaks' is the Noorderhaaks, a sandbar southwest of the island of Texel. In 2002, recreational divers found a bell bearing the legend 'G:MEIJER FEC:IHOLM: 1738' in a shipwreck near the Noorderhaaks. After an exchange of correspondence with the Swedish National Maritime Museum, it was announced that the shipwreck could well be that of the Princess Sophia Albertina, the Swedish man-of-war which had foundered in 1781.

From 3 June to 3 August 2004, the archaeological diving team of the then State Service for Archaeological Investigations (now the Cultural Heritage Agency) conducted an archaeological field evaluation of the wreck containing the Swedish bell, which has been given the working name Noorderhaaks 10. The team spent a total of seventeen days diving at the site, working in accordance with a predefined methodology that they had used successfully to conduct many previous field evaluations.

The diving team found a large mound thickly encrusted with sea anemones and covering an area of 55 by 30 m. Following days of cleaning, this proved to be the ship's timbers, ballast and cannons. The core of the site was a large group of iron bars, which together formed a platform, beneath which lay a 12 by 8.5 metre fragment of the ship's bottom. At a slight distance, two more fragments of ship's timbers were found in association, with dimensions of 8 by 6 m and 6.5 by 4.5 m respectively. The structure suggests that the original ship was a heavily built vessel at least 20 m long and 8.5 m wide. The ship's hull was carvel-planked with oak planks measuring 24 to 38 cm wide and 8 to 9 cm thick. The substantial floor timbers are made of oak and are 26 to 38 cm wide and thick. The hull planking is attached to the timbers by means of treenails that are 3 to 4 cm in diameter. The keelson, which is 50 cm wide, is very sturdy. For the rest, the ship had a closed oak ceiling 8 to 10 cm thick.

One striking feature is the large quantity of ballast iron at the site. Cast iron bars lie neatly stacked on both sides of the keelson. Outside the central 'platform', the iron bars are mainly found to the west and south, some isolated and out of context, some in concretions containing dozens of bars. The bars range in length from 65 to 120 cm, while their width and thickness vary from 8 to 14 cm. Other ballast material includes a pile of very large boulders in the northeast and east of the site.

A total of sixteen cannons were found and recreational divers have salvaged a further seven. There is a concentration of cannons along the eastern perimeter of the wreck mound. These are 6-, 12- and 24-pounders, some of them of Swedish manufacture. Some cannons have thickenings at the trunnions, a feature that was probably not introduced until the second quarter of the eighteenth century or later. On the west and south side of the platform of iron bars there are several concentrations of stacked iron cannon-balls and bar shot, with diameters ranging from 12 to 17 cm.

There is almost no other find material. Virtually none of the organic material has been preserved, while the finer inorganic material has probably been washed away by the current. One interesting find is a wooden munitions chest, which still contained hundreds of pistolet balls.

A dendrochronological study of a framing timber from the south of the site has shown that the timber was felled after 1750 ± 6 years. Unfortunately, because the sample contained no sapwood, the felling date cannot be pinpointed accurately to a particular year. Given the small number of year rings it is quite possible that the ship was built in the second half of the eighteenth century.

Almost all the salvaged find material has proved to be of a later date and was probably washed into the wreck. In other words, it cannot help us establish the date on which the ship went down.

However, the non-salvaged find material, such as the cannons and ballast iron, does provide some clues. The above-mentioned thickenings at the cannon trunnions, the trunnion shoulders, point to a date in at least the second quarter of the eighteenth century, but probably later. Iron bars were not used as ship's ballast until after the mid-eighteenth century.

The physical condition of the shipwreck is moderate to poor. Few ship's timbers protrude from the seabed, and then only in places where they are covered with heavy objects from the cargo, ballast or inventory. Almost no find material has been discovered; nor were any objects of organic material found. The iron platform now protrudes two to three metres above the seabed and all the material has sunk into the surrounding trenches. It is obvious that this site was was exposed a long time ago and continues to deteriorate. This is also confirmed by the observations of local divers.

The archaeological field evaluation carried out by the diving team has yielded sufficient information to establish that this shipwreck near the Noorderhaaks is indeed the Swedish man-of-war, the Princess Sophia Albertina. The dendrochronological dating of a frame from the wreck is close to the construction date for the Princess Sophia Albertina, between 1760 and 1764. The ship's timbers that have been analysed originate from central and northern Scandinavia. Furthermore, the wreck's heavy structure suggests that it was a man-of-war, a function which required extra strength. The cannons at the site, 23 in total, also support this conclusion.

The ship's Swedish origins are suggested by the presence of iron bars, which were used as ballast in Sweden from 1748 onwards because they allowed a more secure and efficient use of space. It has also been confirmed that several cannons are of Swedish manufacture. And finally, there is no doubt that the ship's bell was made in Sweden. The observations of the diver who found the bell and the findings of the archaeological diving team are fully consistent, establishing with certainty that the bell comes from the Noorderhaaks 10/Sophia Albertina shipwreck.

In short, the archaeological field evaluation has confirmed that the shipwreck with the working name of Noorderhaaks 10/Sophia Albertina can indeed be identified as the Swedish man-of-war, the Princess Sophia Albertina. Until now, such an identification has been a rare occurrence in Dutch underwater archaeology.

This positive identification lends additional value to this moderately to poorly preserved shipwreck. For this reason, the wreck has been classified as warranting preservation on the basis of criteria such as rarity, information value, representativity and remembrance value.

Contents

1 Introduction

1.1 Background

From 3 June to 3 August 2004 the archaeological diving team of the Netherlands Institute for Ship and Underwater Archaeology (NISA), part of the then State Service for Archaeological Investigations (ROB, now the Ship Archaeology department of the Cultural Heritage Agency) conducted an archaeological field evaluation at a site that was assigned the working name of Noorderhaaks 10/ Sophia Albertina.

In 2002 the ROB's Maritime Heritage department had received a report of a shipwreck on the Noorderhaaks sandbar. The ROB had known about this wreck for several years, but this time the 'discoverers' made the enthusiastic claim that it was the wreck of a Swedish man-of-war. They had found a bronze bell of Swedish manufacture which was dated 1738, suggesting that the ship was the Princess Sophia Albertina, a Swedish man-of-war that had indeed foundered near Den Helder on 20 August 1781.

ROB assigned the wreck the working name Noorderhaaks 18, and later Noorderhaaks 10, after the location of the wreck, a sandbar west of Texel (illustration 1). Noorderhaaks 10 is the official name of the site, but the name Sophia Albertina remained in common use (Appendix 1: Archis Observation Report 48090).

Prompted by the discovery of the bell, Jef van den Akker of the ROB's Maritime Policy department contacted the Swedish authorities. It was agreed that a closer inspection of the site would shortly be conducted. After consultation with the Netherlands Institute for Ship and Underwater Archaeology, a division of the ROB, a decision was taken to include the wreck in the 2004 programme for the ROB/NISA archaeological diving team.[1]

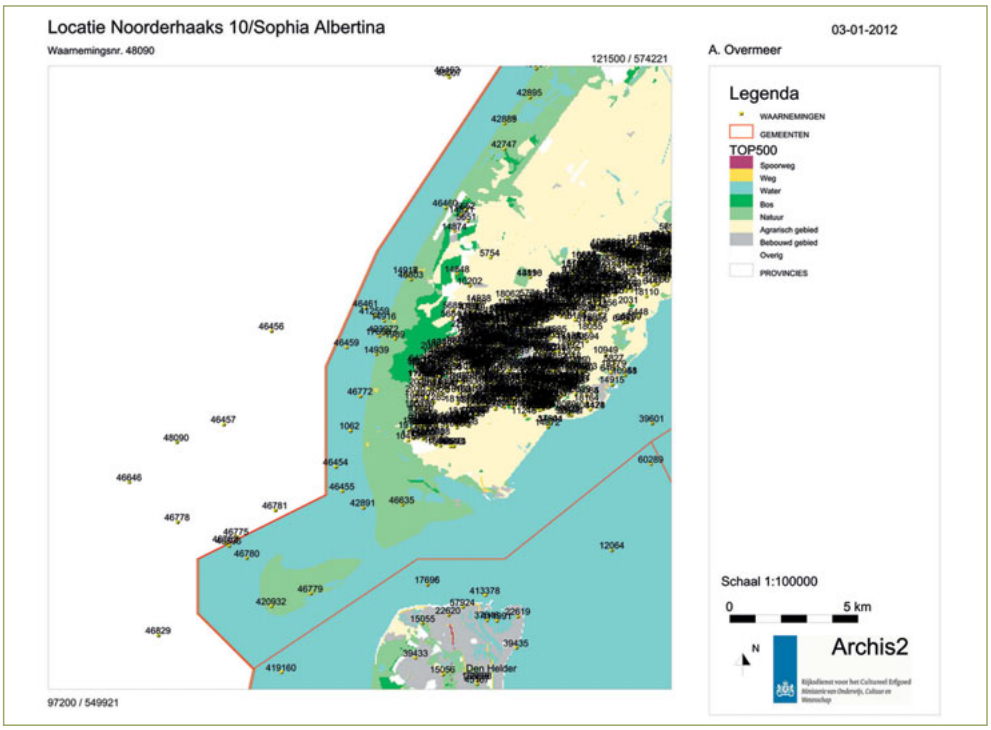


Illustration 1: Archis map showing the location of the Noorderhaaks 10/Sophia Albertina shipwreck (source: Archis).

[1] *The Netherlands Institute for Ship and Underwater Archaeology (NISA) was set up in 1995 as a result of a merger between the Underwater Archaeology department (AAO) and the Ship Archaeology department of the State Service for Archaeological Investigations (ROB). NISA has been based in Lelystad since 1998. In 2009 the ROB was renamed the Cultural Heritage Agency (RCE) and NISA became the Ship Archaeology department.*

1.2 Research objective and research questions

The archaeological field evaluation of the Noorderhaaks 10/Sophia Albertina shipwreck was carried out between 3 June and 3 August 2004, involving a total of 17 days' diving (Appendix 2: Archis research registration report 6500). One of the archaeological diving team's specific objectives was to assess the wreck. The general objectives of an archaeological field evaluation include:[2]

- establishing the nature and content of the site
- documenting the extent of what has survived and is still visible of the ship itself, its equipment and cargo
- working out when the ship was built and when it foundered (through dendro sampling and by dating find material)
- establishing the physical condition of the site and the degree of degradation.

A further aim of the survey was to use this information to establish whether the wreck could in fact be that of the Princess Sophia Albertina,[3] the Swedish man-of-war.[4]

1.3 Agencies and individuals involved

Many people played a part in this project. During the fieldwork the diving team was supported by cook and operations officer Ria Gerards, while Peter Stam and Arend Bergsma, skippers at Rederij Waterweg BV, assisted with a wide range of activities on board the Coastal Digger.

Various specialists studied the find material: the tree-ring samples were analysed by Tamara Vernimmen of Stichting RING, the botanical material was examined by Wim Kuijper, botanical specialist at Leiden University, the earthenware and stoneware were studied by Piet Kleij, municipal archaeologist in Zaandam, and the cannons were inspected underwater by artillery specialist Nico Brinck. Lucas van Dijk and Laura Koehler, material specialists at the National Depot for Ship Archaeology in Lelystad, were responsible for the conservation and restoration of all the find material. Other staff from the Ship Archaeology department of the Cultural Heritage Agency were also involved in various aspects of this project.

Several people at RCE helped in the production of this report. Léon Vroom assisted with technical aspects of diving methods and logistics. Arent Vos and Wilma Gijsbers checked the content of the report and made constructive suggestions, while Martijn Manders gave the text a final review. Rob Oosting provided the information for the glossary of terms and Ruben Schipper took the photographs.

The author would like to thank everyone for their efforts and contributions. However, a special word of thanks is due to all the members of the 2004 archaeological diving team – Arent Vos, Evelyne van Gent, Frank Koppen, Hans Schraal, Léon Vroom and Peter Leensen. The hours they spent underwater mapping and investigating the Sophia Albertina formed the basis for this report.

1.4 Structure of report

This report sets out the results of the archaeological field evaluation of the Noorderhaaks 10/Sophia Albertina site. The researchers already knew that a Swedish bell, which may have come from the Princess Sophia Albertina, had been found at the site. Nevertheless, the survey took a neutral approach. The first objective was to gather as much information as possible from the wreck. Only then would the researchers compare their observations with those of local divers and with the historical information about the Princess Sophia Albertina.

The structure of this report reflects that approach. Chapter Two describes the research history of the site, in particular the discoveries and finds made

[2] *For the procedures of the archaeological diving team, see also: Vos 2005b.*
[3] *To avoid confusion, this report refers to the shipwreck as Noorderhaaks 10/Sophia Albertina, and to the Swedish ship of the line as the Princess Sophia Albertina.*
[4] *Vos 2008, 10.*

by local divers. Chapter Three discusses the research method used by the archaeological diving team. Chapter Four examines the findings of the archaeological field evaluation concerning the topography, ship's structure, find material, dating and the physical condition of the site.

Chapter Five gives an historical account of the Swedish man-of-war, the Princess Sophia Albertina, while Chapter Six presents conclusions, taking stock of all the data, setting out the key findings of the archaeological field evaluation and comparing them with those of the recreational divers and with the historical information in Chapter Five.

Chapter Seven assesses the site in accordance with the Dutch Archaeology Quality Standard (KNA). This is followed by recommendations on the future preservation or protection of the site.

1.5 Administrative information

Province	None (North Sea, Noorderhaaks fairway)
Municipality	None (North Sea, Noorderhaaks fairway)
Place	None (North Sea, Noorderhaaks fairway)
Toponym	Noorderhaaks 10; Sophia Albertina
Map sheet Top 25000	09C
RD coordinates (x/y)	102.222/559.566
Commissioning organisation	Cultural Heritage Agency (then ROB)
Competent authority	Cultural Heritage Agency (then ROB)
Executing party	NISA archaeological diving team (now Cultural Heritage Agency)
Project manager	A.D. Vos
Archis observation number	48090
Archis research registration number (CIS code)	6500 + 12811 (the latter was never implemented)
Archis research number	39885 + 39890
Archis find registration number	418824
Complex and ABR coding	ESCH (Shipping)
Period(s)	Early Modern Period B: after 1750 ± 6
Geomorphological context	Seabed
Maximum survey depth	19.8 m –NAP (tide)
Date of desk-based assessment	May 2004
Implementation of fieldwork	03-06-2004 – 03-08-2004 (17 days)
Deposited (date)	September 2004
Management and location of documentation and find material	RCE Ship Archaeology/National Depot for Ship Archaeology: Oostvaardersdijk 01-04, 8244 PA Lelystad
Type of survey	Archaeological: underwater archaeology, archaeological field evaluation
Author	A.B.M. Overmeer

2 History of the survey area

2.1 Discovery and reporting of the findspot

In 1989, amateur archaeologist Jan van der Wiel from Den Oever discovered a wreck near the Noorderhaaks sandbar in the North Sea, off the coast of Den Helder and Texel. A fishing net had become snagged on something, which a diving inspection then revealed to be a shipwreck. On 3 June, Van der Wiel reported the wreck to the then State Service for Archaeological Investigations (ROB). It was assigned the working name Noorderhaaks 18, after the Noorderhaaks sandbar near where the wreck was found. This name was later changed to Noorderhaaks 10.

Van der Wiel reported that only the ship's bottom was still intact and that cannons and stones lay scattered across the site. People had been diving at this site for years and fishermen from Wieringen had fished up at least five cannons.[5] In 1996 the RWS North Sea Directorate took underwater video-footage of the site using its remotely-operated hoisted platform (ROHP) and recovered at least one cannon.[6]

2.2 Findings and results from recreational divers

In 2002 the wreck was once again reported by recreational divers from West-Friesland who had salvaged a cannon from the wreck in 1997. This time, however, they had encountered a very special find. This account by diver Hugo Raven can be found on their website:

> 'A round, green rim protruding from the seabed suddenly caught my eye… I starting brushing away the sand and I couldn't believe my eyes as more of it was revealed! It turned out to be a ship's bell, firmly lodged in the seabed.' [7]

The bronze ship's bell, together with its wooden belfry, was brought to the surface, where the following text was revealed: 'G:MEIJER FEC: IHOLM: 1738'. The other side featured a cartouche

Illustration 2a: The ship's bell bearing the legend G:MEIJER FEC:IHOLM: 1738 (photograph: A. Vos, RCE, thanks to H. Raven). Whole image.

Illustration 2b: Detail of cartouche of laurel branches surrounding the letters FI or FJ topped by a crown (photograph: A. Vos, RCE, thanks to H. Raven)

5 *Information: J. van der Wiel, 21-11-1990.*
6 *Source: Archis, observation registration number 48090, retrieved 08-02-2012.*
7 *H. Raven's report, http://www.northseadivers.nl/joomla/index.php/verhalen/16-sophia-albertina, retrieved 08-02-2012.*

of laurel branches surrounding the letters FI or FJ topped by a crown (illustration 2). Raven made enquiries at the National Maritime Museum in Stockholm and was told that the bell had been made by Stockholm founder Gerhard Meyer. In view of the royal crown on the bell and the number of cannons at the site, Swedish researchers suspected that the ship was a Swedish man-of-war, probably the Princess Sophia Albertina, a ship of the line that sank off Den Helder on 20 August 1781 (Appendix 3). Raven contacted the Netherlands Institute for Ship and Underwater Archaeology (NISA) about the conservation of the wooden belfry, and was advised to have the object treated by controlled drying.[8]

In response to this report, by now the third on this site, Jef van den Akker of ROB's Maritime Policy department informed the divers that the shipwreck lay within Dutch territorial waters and was therefore subject to the 1988 *Monuments and Historic Buildings Act*. He also contacted the Swedish authorities to notify them of the possibility of a Swedish ship in Dutch waters.[9]

2.3 Landscape and historical maritime context of the survey area

2.3.1 Landscape context

The shipwreck is located in the North Sea, about 7.2 km southwest of the island of Texel and close to the Noorderhaaks sandbar (illustration 3). The wreck is submerged at all times, at a depth of 17 to 20 m at high tide. The area is used for shipping and fishing.

2.3.2 Historical maritime context

In the past this area was used for the same purposes – shipping and fishing – as it is today. Nearby is the Noorderhaaks sandbar, also known as the Razende Bol (raging dome). The sandbar formed at the place where water flowing out of the narrow Marsdiep channel

Illustration 3: Location of Noorderhaaks 10/Sophia Albertina shipwreck (source: Google Maps). Green flag indicates location.

[8] *Personal communication from L. van Dijk, archaeological materials specialist at RCE, March 2011.*

[9] *Information: letter from J. van den Akker, 03-10-2003, RCE file.*

at ebb tide encounters the rising tide from the North Sea. The two currents counteract one another, and the sand settles beneath the waters of the North Sea.[10]

The Noorderhaaks is what is known as a shifting sandbar, moving at a fairly rapid pace and following a constantly repeating pattern. It starts with an east-west axis and shifts slowly towards the island of Texel in a north-south direction, eventually attaching itself to the island. A new sandbar with an east-west axis then begins to form again at the old location.

This process can be seen very clearly on historical maps. At the end of the sixteenth century 'Noord Haken' was a long, narrow sandbar 12 km long and 2 km wide with a precise east-west axis.

[10] *Source: http://www.natuurinformatie.nl/ecomare.devleet/natuurdatabase.nl/io01047.html,retrieved18-08-2011.*

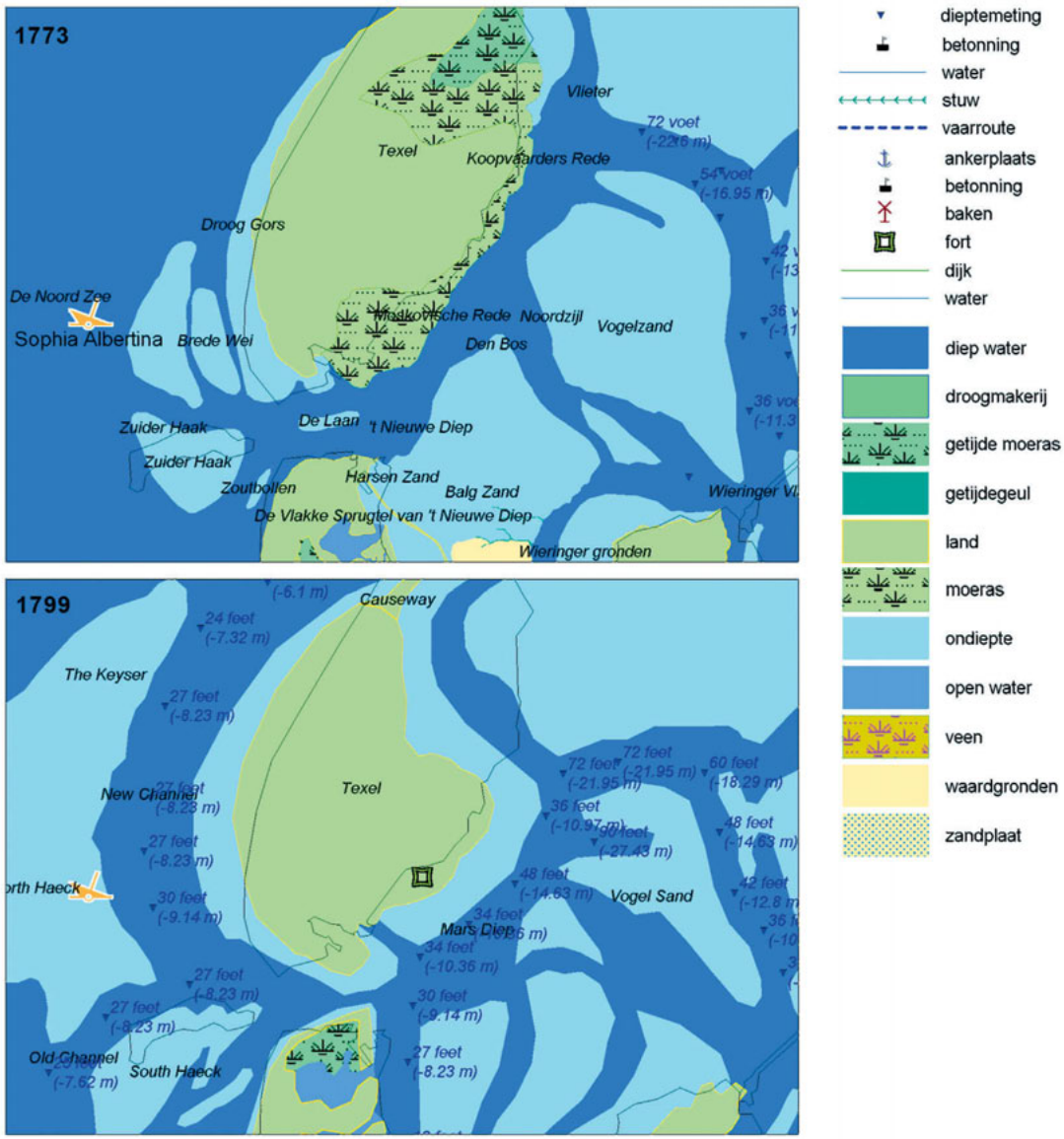


Illustration 4: The Noorderhaaks sandbar in 1773 and in 1799 (source: M. Kosian, voor MACHU GIS, machuproject.eu).

In the seventeenth century the sandbar was made up of two smaller sections, which together had roughly a southwest-northeast axis. On J.C. Sepp's map of 1773 we see that in the eighteenth century the 'Noorder Haaks' consisted of two small sections that together measured some 5 by 8 km. Twenty-six years later, according to an English Admiralty map, the sandbar had grown enormously. in size. It now measured 22 by 9 km and had roughly a north-south axis (illustration 4).[11] The original ship that is now called Noorderhaaks 10/Sophia Albertina ran aground in the period between these last two map dates.

The Noorderhaaks currently lies in a roughly southwest-northeast orientation. The sandbar is on the move again, shifting 100 m a year towards the Molengat and Marsdiep channels.[12]

Along with the Marsdiep and Schulpengat channels, the Molengat was traditionally one of the major fairways to the south of Texel. Ships would leave their anchorage at Texel via the Marsdiep, the channel between Den Helder and Texel, and could then proceed via the Molengat, the northern channel along the west coast of Texel, before sailing to destinations around the world.

[11] *Information from the MACHU GIS application of the MACHUproject (designed by M. Kosian, RCE): www.machuproject.eu.*

[12] *Source: http://www.natuurinformatie.nl/ecomare.devleet/natuurdatabase.nl/i001047.html, retrieved 18-08-2011.*

3 Methods and techniques

Illustration 6: The Coastal Digger in action during the 2004 fieldwork (photograph: H. Schraal. RCE).

Illustration 5: The field base at Den Hoorn (photograph: H. Schraal. RCE).

Illustration 7: The decompression tank was checked every morning (photograph: H. Schraal. RCE).

3.1 Logistics and diving methods

3.1.1 Logistics

The archaeological field evaluation of the Noorderhaaks 10/Sophia Albertina shipwreck was conducted between 3 June and 3 August 2004. The divers were not able to work at the site every day, and were obliged to divert to the Waddenzee in bad weather, heavy winds and rough seas. They spent a total of 17 days diving at the site.

During the survey, the divers used the NISA diving team's field base, located at the Royal Netherlands Institute for Sea Research (NIOZ), at Zuiderhaaks 7 in Den Hoorn, Texel (illustration 5). This is where they ate and slept, worked on their drawings and wrote up their dive reports. It is also where the briefings and debriefings took place. Ria Gerards was employed as cook and operations officer. A 20-foot container and water tanks were on site to process the finds. Two 20-foot containers with diving and maintenance gear belonging to the diving team were also transported to the Texel field base for the fieldwork period.

A boat was hired for the fieldwork from Rederij Waterweg BV in Den Helder, now part of the firm Acta Marine. This boat, the Coastal Digger, was 23.05 by 6.15 m, with a draught of 0.9 m.[13] It was equipped with a 35-tonne crane and had a spacious working deck and wheelhouse, making it an ideal support base for the archaeological work (illustration 6). A 10-foot container (to store diving gear and serve as a changing room for the divers) and a decompression tank were placed on board specifically for the diving work (illustration 7). Under the provisions of the Working Conditions Act ('Working in a pressurised environment'), a decompression tank must be available on-site for diving depths in excess of 15 m.

The Coastal Digger was equipped with various navigation systems, such as a video sounder (Furuno FCV-667) and a GPS (Furuno GP-150).

[13] *During the survey the Coastal Digger was commanded by skipper Peter Stam, apart from one week when skipper Arend Bergsma took on this role.*

Illustration 9: Diver Hans Schraal checks archaeologist Evelyne van Gent before she enters the water (photograph: R. Aartsen, NOB).

However, the main tools used to find the shipwreck and determine its exact position were the diving team's handheld GPS (Garmin GPS map 76 with a MapSource BlueChart program) and a fishfinder (Garmin Fishfinder 160).

At night the ship was berthed in Texel's Oudeschild harbour. The team departed from there each day and headed out to the site, which was located some 7 km offshore. This took a good 1.5 hours when sailing with the current and 2.5 to 3 hours against the current. On a few occasions the team opted to leave from the harbour of the Royal Netherlands Institute for Sea Research (NIOZ), which is located a short distance from both the field base and the site.

Since the current is fairly strong at this location, dives have to be made precisely at slack water. On some days the Coastal Digger left the harbour at 6.50 am and did not return until 12 hours later. On other days it left Oudeschild as early as 4.30 am.

3.1.2 Diving methods

In 2004 the ROB/NISA archaeological diving team comprised seven people (illustration 8): Arent Vos (head of the diving team, project manager), Léon Vroom, Frank Koppen (both diving technicians), Evelyne van Gent, Alice Overmeer (both researchers), Peter Leensen (archaeological assistant/field technician) and Hans Schraal (general diver).

The team carried out their work in accordance with their standard working methods.[14]
The diving equipment consisted of scuba diving apparatus, trilaminate drysuits and AGA full-face masks with a wireless communication system (OTS SSB 2001) (illustration 9). Scuba diving has proved to be a safe, reliable and efficient method for archaeological work. Each scuba set consists of a double set of 300 bar cylinders, with a total

Illustration 8: The full 2004 archaeological diving team (photograph: H. Schraal. RCE). From left to right, back row: Peter Leensen, Peter Stam (skipper), Frank Koppen, Alice Overmeer (author), Léon Vroom, Hans Schraal; front row: Arent Vos (project leader), Evelyne van Gent.

[14] *Thanks to L. Vroom, diving technician at the RCE, for supplying the technical details in this section.*

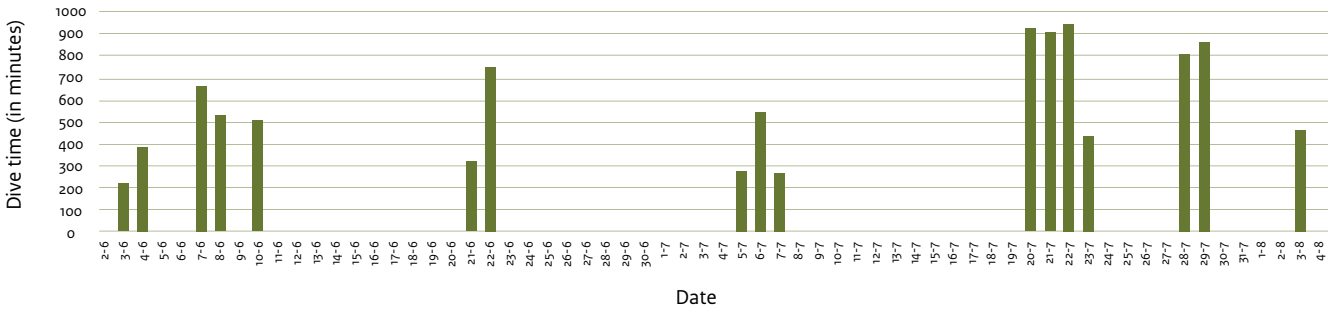
capacity of 14 litres. The cylinders were filled at the field base during the fieldwork period.

Given that the Noorderhaaks 10/Sophia Albertina site lay at a depth of 17 to 20 m, a decision was made to adopt an additional safety measure. Each diver was equipped with a bailout bottle, a reserve 2-litre supply of compressed air, and an additional half-face mask.

The team spent a total of 17 days diving at Noorderhaaks 10/Sophia Albertina (graph 1). The number of days lost was minimised because in times of bad weather and strong wind the divers were usually able to divert to the more sheltered Waddenzee, where they worked at several sites at Burgzand Noord over that same period. There were only four days when strong winds combined with waves over 1.5 m high made diving impossible.

The duration of the dives depended on the depth. Because the deepest point at the site was about 20 m (at high tide), the team could not use an ordinary air mixture as this would allow them to stay underwater for only 35 minutes before having to make a decompression stop.
Dives were therefore made using nitrox, an enriched air mixture in which the compressed air is supplemented with additional oxygen. The addition of more oxygen reduces the proportion of nitrogen, a gas that is not absorbed into the body. Gas bubbles can cause tissue damage if the diver ascends too quickly or fails to allow enough time for the gas to disappear naturally from the body. The addition of more oxygen to the diving mixture means that divers inhale less nitrogen and can extend their bottom times.

Dives at the Noorderhaaks 10/Sophia Albertina site were made using an enriched nitrox mixture with an oxygen content of 40%. The diving team always work in compliance with the Netherlands Diving Centre (NDC) tables, especially ND88, the table for air. These tables are adapted when nitrox is used instead of air. This involves calculating an equivalent air depth (EAD) for the maximum dive depth. The EAD for the expected maximum depth of the site (21 m) is 13.5 m. With this EAD, the maximum free dive time (i.e. with no decompression stops) is 60 minutes. If the dive depth does not exceed 19 m, the EAD is 12.0 m and the associated free dive time rises to 115 minutes.



Graph 1: Total number of dive minutes per day at 'Noorderhaaks 10/Sophia Albertina'

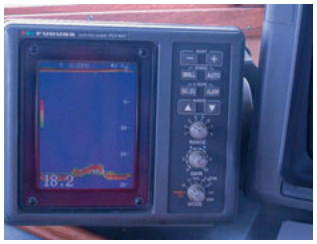


Illustration 10: 'Noorderhaaks 10/ Sophia Albertina' on the Coastal Digger's echo sounder (photograph: H. Schraal. RCE).

The total number of dive minutes came to 9591, which works out at 159.85 hours. The average length of dive per diver per day was 92.2 minutes. This is a considerable number, given that the depth and the risk of decompression significantly curtail the maximum dive time.

Underwater visibility generally ranged from 1 to 6 m, but on some occasions was particularly poor (0-40 cm) or particularly good. On one of the final days, visibility was as much as 8 m.

Since the shipwreck is located in a tidal zone, the diving team had to contend with a strong current. The rising tide passes over the shipwreck from south-southwest to north-northeast and is fast-moving. The ebb tide comes from a north-northeasterly direction and is also strong. The team usually dived at slack water, which is the transition period from ebb to flood tide or vice versa. Only then were conditions right for working; before and after the tide change, the current was too strong. This meant that the team were only able to dive during two brief periods on any given day.

3.2 Locating the findspot

On Wednesday 2 June 2004, the Coastal Digger made its way for the first time to the location where Noorderhaaks 10/Sophia Albertina was said to lie. Once at this location, whose coordinates were supplied by the Maritime Heritage department of RCE, the ship travelled back and forth several times, as the diving team kept an eye on the echo sounder.[15] At the stated coordinates, the shipwreck could be seen clearly, rising some 1.5 to 2 m above the sandy seabed (illustration 10).

The following day a grapnel hook attached to a buoy was thrown overboard at this location. The first diver went down at the buoy to inspect the site and to show where the Coastal Digger's main anchor could be positioned. The other divers were then able to enter the water.

3.3 Cleaning and forming an impression of the site

In terms of interpretation, the Noorderhaaks 10/Sophia Albertina shipwreck is one of the most difficult sites ever examined by the archaeological diving team.[16] Because of the sheer size of the site, its indistinct form, the large quantity of concreted iron and the degree of vegetation, it was quite some time before the team could establish what actually lay on the seabed. It took five days to form a picture of the site. Fishing nets, recreational fishing lines and fishing-net weights were scattered across the site. The site was also entirely covered in plumose anemones, other anemones and barnacles, which completely obscured the ship's structure, ballast, inventory and cargo. On the first day, divers laid out thin guide lines for orientation purposes. They then began removing the nets, lines and vegetation, using scrapers at first and, when that proved ineffective, a high-pressure hose and airlift (illustration 11).

[15] *The methods and techniques used by the diving team during an archaeological field evaluation are described in detail in Vos (2005b).*

[16] *Personal comment by A. Vos, 24-11-2010.*

These are drastic remedies, but they guaranteed that the underwater work could progress. As a result, on day five the divers were able to gain an overall impression of the structure and could make sketches. In his diving team leader report of 21-06-2004, project manager Vos concludes:

‘For this to be done efficiently, you really need to work with a larger boat, to anchor at four points and to stay at sea. But then we’d chew through the budget in three weeks.’

3.4 Measuring system (datum points and Web-it)

A basic measuring system was marked out in order to accurately map the site. The divers hammered stainless steel nails (200 x 6 mm) into the ship’s timbers at strategic points across the site. A label was attached to each nail with its own unique number, or datum point. Because, initially at least, so little timber protruded from the seabed, the divers also used tie-wraps to attach labels to rusted cannons, ballast bars and cannonballs. A total of 43 datum points were laid out, two of which were swept away by the current during the survey (table 1).

Illustration 11: Diver Peter Leensen working with the airlift (photograph: R. Aarsen, NOB).

Illustration 12: Diver Alice Overmeer measuring distances between the datum points (photograph: R. Aarsen, NOB).

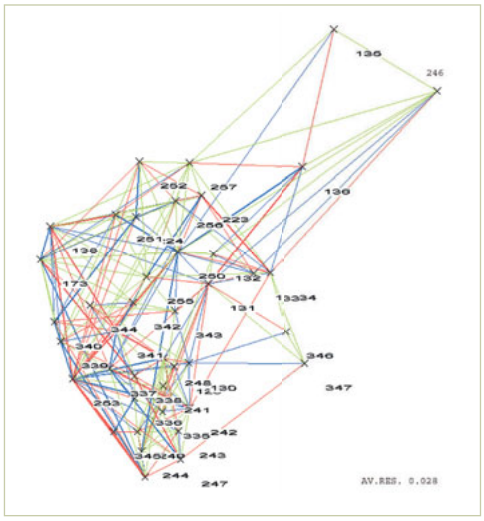


Illustration 13: Web-it plot which was used as a basis for the overall site plan (created by P. Leensen, RCE).

Table 1: Web-it measuring points

Datum point	Location	Date issued	Remarks
129	Cascabel knob from cannon	AOV 22-6-2004	
130	Cascabel knob from cannon	AOV 22-6-2004	
131	Cascabel knob from cannon	AOV 22-6-2004	
132	Cascabel knob from cannon	AOV 22-6-2004	
133	Cannon	AOV 5-7-2004	
134	Cannon	AOV 5-7-2004	
135	Cannon	AOV 5-7-2004	
136	Lead flap on cannon	AOV 5-7-2004	
138	Cannon	AOV 5-7-2004	
139	Cascabel knob from cannon	AOV 5-7-2004	Was exposed
172	Cascabel knob from cannon	AOV 22-6-2004	Was exposed
173	Central barrel of cannon	AOV 22-6-2004	
223	Iron bar	AOV 22-6-2004	
224	Iron bar	AOV 22-6-2004	
241	Framing timber	AOV 22-6-2004	Frame salvaged
242	South side of framing timber	AOV 22-6-2004	Frame salvaged
243	South side of framing timber	AOV 22-6-2004	On same framing timber as 249
244	Framing timber	AOV 22-6-2004	
246	Mooring ring	AOV 22-6-2004	
247	Mouth of cannon	AOV 22-6-2004	
248	Hull plank	AOV 22-6-2004	
249	North side of framing timber	AOV 22-6-2004	On same framing timber as 243

Table 1: continuation: Web-it measuring points

Datum point	Location	Date issued	Remarks
250	Central barrel of cannon	AOV 22-6-2004	Cannon in centre of mound
251	Central barrel of narrow cannon	AOV 22-6-2004	
252	Framing timber	AOV 22-6-2004	
253	Bar shot	AOV 22-6-2004	
254	Hull plank	AOV 22-6-2004	
255	Keelson, western tip	AOV 22-6-2004	
256	Keelson, centre	AOV 22-6-2004	
257	Keelson, eastern tip	AOV 22-6-2004	
335	Framing timber on north side	AOV 7-7-2004	
336	Iron bar	AOV 20-7-2004	
337	Iron bar	AOV 5-7-2004	
338	Iron bar	AOV 7-7-2004	
339	Iron bar	AOV 5-7-2004	
340	Cannon barrel	AOV 5-7-2004	
341	Iron bar	AOV 7-7-2004	
342	Concretion	AOV 6-7-2004	
343	Iron bar	AOV 20-7-2004	
344	Iron bar	AOV 20-7-2004	
345	Iron bar	LVR 28-7-2004	
346	Southeastern fragment	LVR 28-7-2004	
347	Southeastern fragment	LVR 28-7-2004	

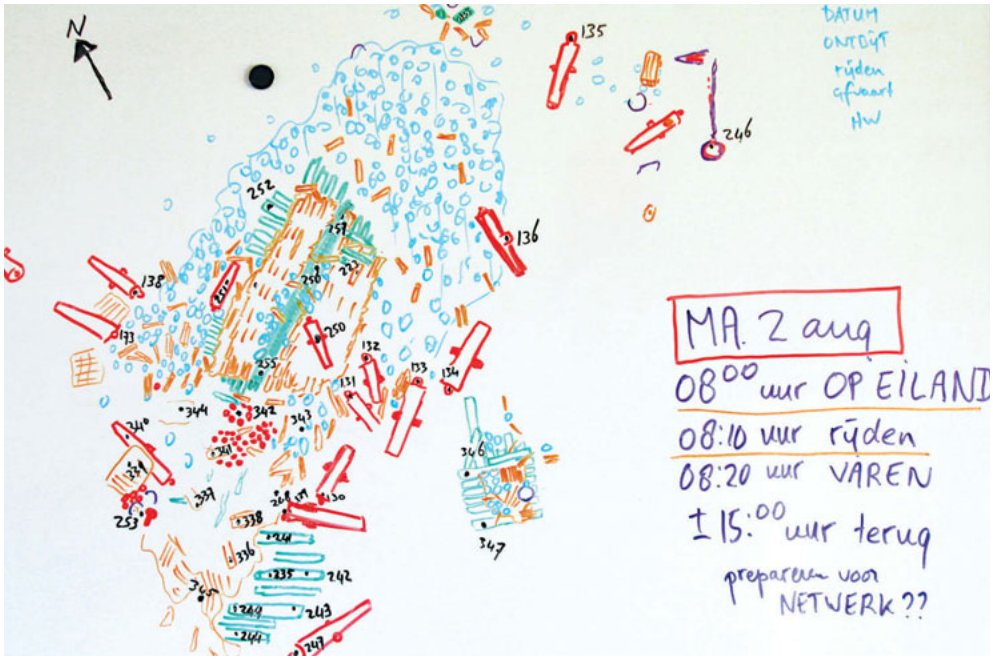


Illustration 14: Overall site plan of the Noorderhaaks 10 shipwreck during fieldwork (photograph: A. Vos, RCE).

The divers then used a measuring tape to establish the distances between the underwater datum points (illustration 12). These distances and depths were entered into Web-it, a computer program specially developed for underwater archaeology. Web-it precisely calculates and maps the relative positions of all measuring points. This results in a file showing file showing the relative locations of the 31 datum points in a two-dimensional plane, the web (illustration 13). The depths of all datum points, measured at high or low tide within 30 minutes of each other using a wrist depth gauge, can also be recorded here to produce a three-dimensional web. The aim at all times is to achieve an overall accuracy of 2 cm or less. The most recent web file serves as the basis for the overall site plan (see section 3.5).

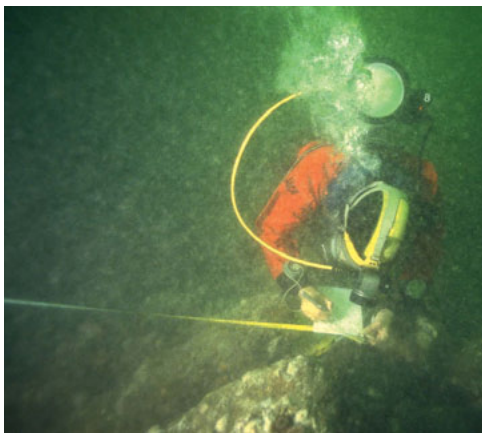


Illustration 15: Diver Alice Overmeer sketching part of the site under water (photograph: R. Aarsen, NOB).

A total of 235 measurements were taken and the end result was named Web16 of Sofia Albertina.dsm.[17] The web has a mean deviation of 2.8 cm. Three distances did not fit with the web; they had a very high deviation, perhaps the result of a measurement or reading error on the part of the divers, or because labels attached with a tie-wrap can still move at times. These three distances were deleted from Web16. The depths were not included in the calculations because the program used them to compensate for differences in distance.
As a result, some datum points were positioned as much as 3 m deeper or shallower, effectively making Web16 a two-dimensional web.

[17] *Information from the Sophia Albertina web report (Leensen 2004).*

3.5 Documentation (reports, sketches, field drawings, photos and film)

To ensure that the site was interpreted properly, briefings and debriefings were held each day in which the divers gave an account of findings and presented the current status on a white-board (illustration 14). In addition, all divers recorded their findings and their progress in a dive report. The daily leader also wrote an overall report of events and the current state of play.

Once the basic measuring system was laid out, the divers took with them plastic drawing boards, pencils and a folding ruler in order to map the site. They measured and drew the ship's structure protruding between each set of two datum points (illustration 15). They added dimensions, distances, compass directions and interesting details to their sketches while still underwater and then worked up the sketches on graph paper in the evening (illustration 16). The datum point web was then used to convert these drawings into an archaeological field drawing in plan view (illustration 19). The site was further documented by means of photographs and film images, with 35 minutes of film being shot.[18]

3.6 Sampling, material analysis and material conservation

Collecting find material is not one of the objectives of an archaeological field evaluation, which only permits the recovery of material for diagnostic and dating purposes (see section 4.3). The find material for dating purposes was recovered and labelled on board the Coastal Digger or at the field base. It was briefly described and packaged under the appropriate conditions (illustration 17).

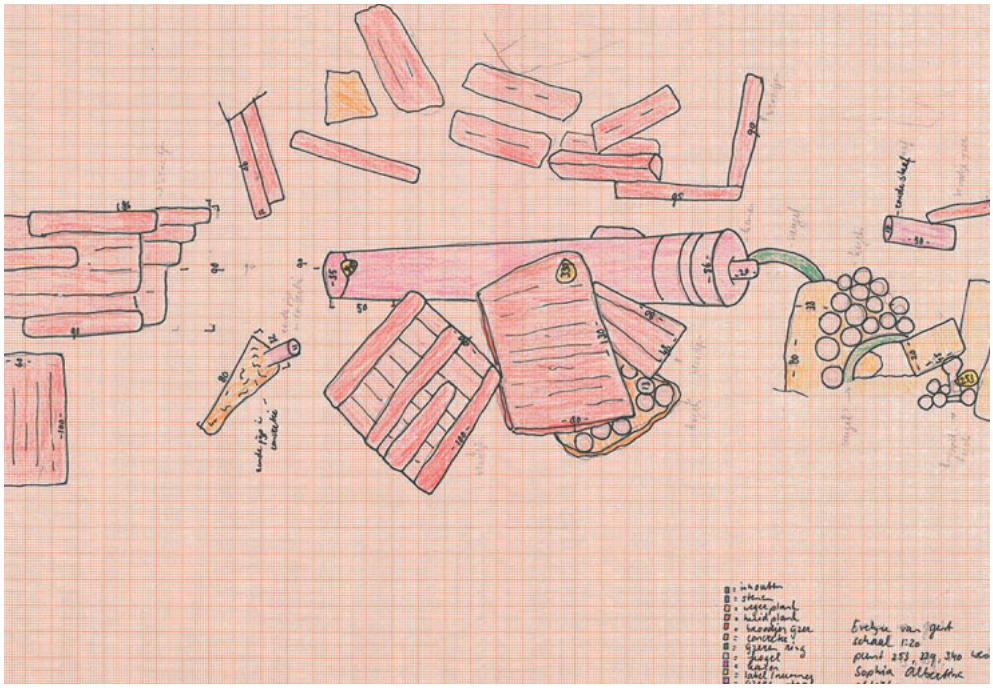


Illustration 16: Final sketch of western side (drawn by E. van Gent, RCE).

[18] *The film images are held at RCE's Ship Archaeology department in Lelystad, videotape number 2004-1 (film date 03-08-2004).*

Illustration 17: Evelyne van Gent and Alice Overmeer updating the find records on board the Coastal Digger.

In addition, several wood samples were recovered for dendrochronological analysis (see section 4.4). The following specialists examined the recovered find material:

- wood samples (for tree-ring analysis): T.J.J. Vernimmen (Stichting RING, Amersfoort)
- botanical samples (coconut): W. Kuijper (Leiden University)
- ceramics: P. Kleij (Municipality of Zaandam)
- other find material: A. Vos and A. Overmeer (RCE).

The find material was deposited in September 2004 at the National Depot for Ship Archaeology in Lelystad, where L. van Dijk and L. Koehler set about the work of conservation and restoration.

3.7 Preliminary results

The initial results were published by Arent Vos, head of the diving team, soon after the fieldwork was completed. The first report of the archaeological field evaluation appeared in the ROB newsletter in November 2004. In 2005 the site was discussed in *Archeologische Kroniek Noord-Holland over 2004*. Then, in 2008, a long article by Vos appeared in Archeobrief, Journal for Dutch Archaeology, with the eloquent title 'The Princess and the conservation of underwater heritage'.[19]

For some time, little was heard about the survey of the Noorderhaaks wreck. Low staff numbers meant that the archaeological field evaluation could not be worked up into a final report. Eventually, in 2010, the author was appointed to carry out this task.

3.8 Other documentation: media attention

Rob Aarsen, a diver and journalist working for *Onderwatersport Magazine,* paid a visit to the site on 21 July 2004 and took several excellent photographs of the wreck, the divers and their work underwater.[20] His article on the Sophia Albertina appeared in the magazine in October 2005 (Appendix 4).

On Tuesday 3 August, the final diving day at the Noorderhaaks 10/Sophia Albertina site, a camera team from the *Netwerk* current affairs programme visited. Reporter Vladimir Bartels, who is a qualified diver, was given an underwater tour by Arent Vos, the head of the diving team. The result was a fascinating 10-minute news item, which focused not just on the Sophia Albertina, but also on the fact that many underwater shipwrecks are being washed away. The item was broadcast on Friday 27 August 2004.[21]

[19] *See Vos 2004a; idem 2005a; idem 2008.*
[20] *Some of the photographs in this publication were taken by journalist/photographer Rob Aarsen.*
[21] *The item on Noorderhaaks 10/Sophia Albertina can be found at http://www.netwerk.tv/node/3550.*

4 Survey results

4.1 Topography and stratigraphy

The Noorderhaaks 10/Sophia Albertina shipwreck is located in the North Sea, approximately 7.2 km southwest of the island of Texel and 6 km northwest of the Noorderhaaks sandbar (illustration 18). The wreck lies about one mile northeast of the Noorderhaaks buoy.

The wreck is submerged at all times, at a depth of 17 to 20 m, measured at high tide. The upper part of the wreck mound is located at a depth of 17 to 17.5 m, and the edges of the mound at a depth of 19.8 m. In other words, the mound protrudes 2 to 3 m from the seabed.

The seabed surrounding the site is composed of a thick layer of sand. The topmost layer comprises North Sea sand, sediment that is in constant motion. This marine clay and sea sand layer belongs to the Holocene Naaldwijk Formation. In places this layer consists of a soft black substance, oxygen-poor sand containing a large amount of gas. Beneath this layer is the hard Pleistocene sand (Drenthe Formation).[22]

An airlift was used to dig a narrow test pit, at the bottom of which, above the Pleistocene sand, both old and very recent find material was revealed.

No geophysical survey was conducted at the site.

Illustration 18: Detail of the hydrographic map showing Texel and Noorderhaaks (source: Rijkswaterstaat).

[22] *Information from http://www.dinoloket.nl, retrieved on 18-08-2011.*

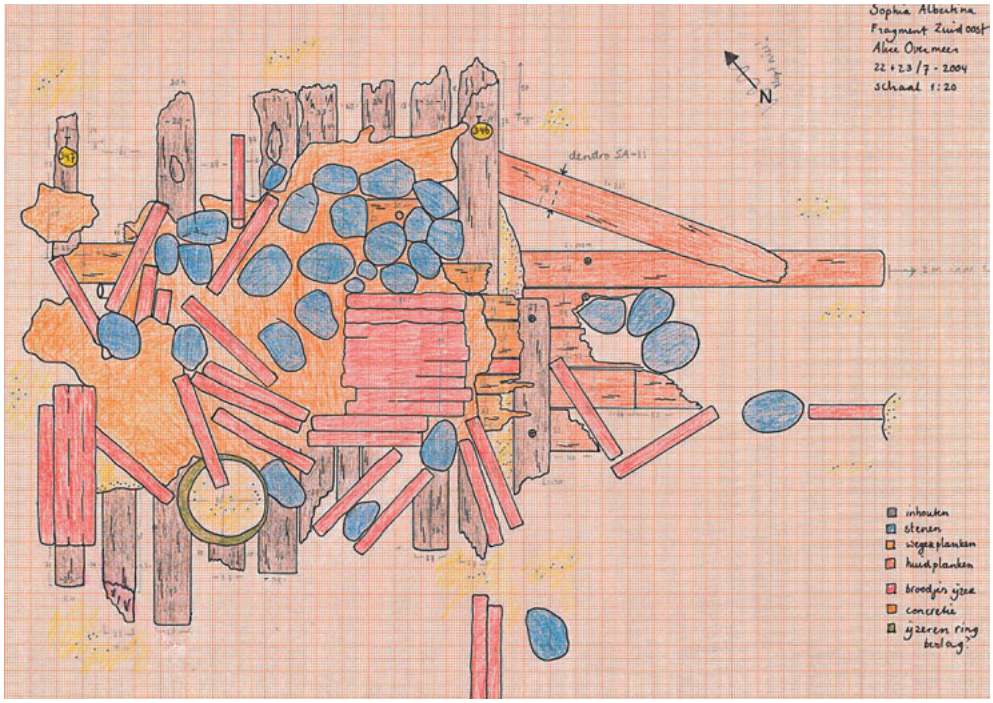


Illustration 19: Sketch of the fragment of ship's timbers in the southeast area of the site (drawn by A. Overmeer, RCE).

4.2 Ship's structure

4.2.1 Description of the site and damage to the ship

The site covers an area of some 55 by 30 m (illustration 20). The core of the site consists of a platform of neatly stacked iron bars that rise above their surroundings. Extending beneath this platform is a section of the ship's bottom, about 12 m long and 8.5 m wide and with roughly a northeast-southwest orientation. A 12 m beam, the keelson, which also has a northeast-southwest axis, is visible among the iron bars.

Other surviving elements of the ship's bottom include fragments of hull planks and timbers, which in places extend out from beneath the platform of iron. Surrounding the platform is a jumble of large boulders, individual iron bars and cannonballs encrusted together. Only sporadically is the ship's structure found in association. A second fragment of the ship measuring 8 by 6 m lies in the southern part of the site. It does not appear to be associated with the ship's structure under the platform of iron, but this has not been established with any certainty. This fragment is part of the ship's bottom that is broken at the turn of the bilge. It lies upside down; the eleven heavy floor timbers have been tapered on the western side to form a scarf joint and they display a slight curvature on the underside (see also section 4.2.4). Beneath the floor timbers are seven ceiling planks, the planking from the inside of the ship.

In the southeast of the site lies a third fragment of the ship (illustration 19). Measuring 6.5 by 4.5 m, it consists of a large lump of concretion beneath which lie ten timbers and several hull and ceiling planks, probably from the ship's bottom or side. In addition, there are at least sixteen cast iron cannons scattered across the site and a large iron anchor in the northeast.

Illustration 20: Overall site plan of the Sophia Albertina (drawn by E. van Gent, RCE)

SOPHIA ALBERTINA.

Overzichtstekening
get. E. van Gent
datum mei 2005

0 2 m.

Initial appearances suggest that all that remains of the original ship are a 12 by 8.5 m fragment of the bottom and two smaller sections of the structure in the south and southeast. However, it is quite possible that more ship's timbers are located under the mountain of ballast stones in the north and east and under the ballast iron and cannonballs in the west and south.

4.2.2 Keel, stem and sternpost

No remains of a keel have been observed at the site. Part of the keel is probably still present under the large platform of iron, beneath the floor timbers of the ship's bottom. The stem and sternpost are no longer present, making it almost impossible to establish, on the basis of the ship's structure, where the bow and the stern are located.

4.2.3 Planking

Remains of the ship's planking have been found on the northeast and southwest side of the bottom fragment, and in the fragments of ship's structure in the south and southeast.

The hull planks in the large bottom fragment have a northeast-southwest axis. In the northeast, five planks protrude from the northern side of the keelson and seven from the eastern side, from beneath the timbers and iron bars (illustration 21). These planks range in width from 24 to 38 cm, but most are about 30 cm wide. They are approximately 8 cm thick.

On the southwest side, a further five or six hull planks protrude from beneath the iron platform. The complete planks are 29-30 cm wide but their thickness has not been measured.

Six hull planks are visible on the northern side under the timbers of the separate southeast fragment. They lie directly adjacent to one another and are 27 to 32 cm wide and 8 to 9 cm thick. One hull strake shows clear evidence of a tapered scarf joint, but the length is not known. The treenails used to fasten the planking and frames together are visible. A sample was taken from one hull plank for dendrochronological analysis (SA-11, see section 4.4.1).

Almost no hull planks are preserved in the separate fragment in the south. This fragment lies upside down and the hull planks were probably completely unprotected. There may be a remnant of a hull plank west of datum point 249.

4.2.4 Framing timbers

Framing timbers extend from beneath the platform of iron bars on the northern, eastern and western sides and in the southwest corner. Ten timbers are visible on the northern side, protruding some 60 to 130 cm. These are floor timbers, the bottom parts of frames, and they range in width from 26 to 32 cm. Their thickness is unknown, but is probably roughly the same as their width. The timbers are spaced a short distance apart, 6 to 13 cm at most.

On the other side of the keelson, at the eastern edge of the fragment, there are three more floor timbers 28 to 29 cm wide and about 3 m long. They are spaced 10 to 28 cm apart. The few timbers that extend from beneath the southwest side of the iron platform are poorly preserved. One is 30 cm wide. Extending from beneath the western edge, immediately south of cannon 251, are a further five timbers, all in reasonable condition. These timbers are almost immediately adjacent to one another and range in width from 15 to 28 cm. The timbers that protrude from beneath the iron platform all have broken ends; not a single original end is still present.

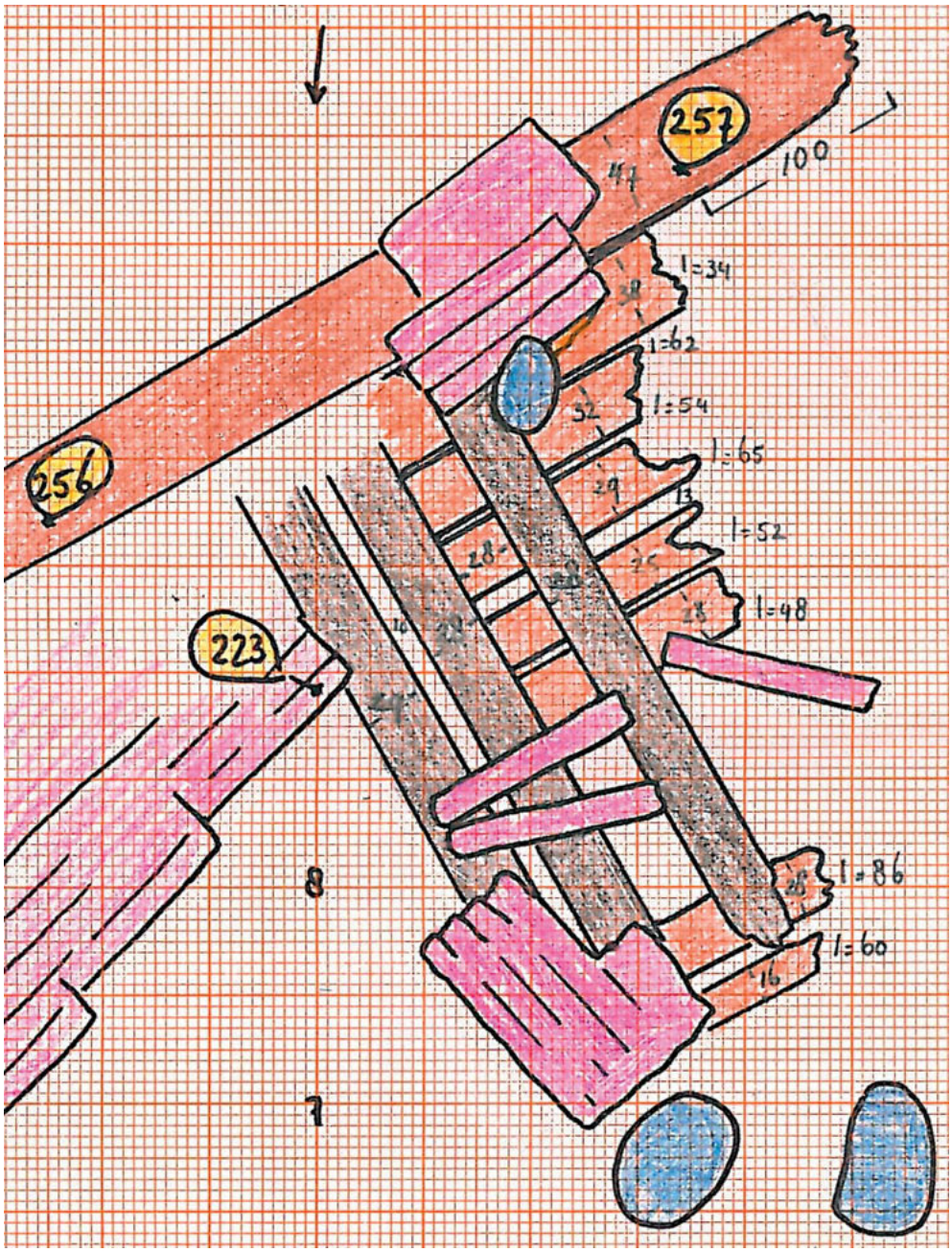


Illustration 21: Hull planks to the northeast of the iron platform (drawn by A. Overmeer, RCE).

Illustration 22: Recovered floor timber SA-10 with datum points 242 and 335 (only the latter is still attached). The curvature representing the turn of the bilge can still be clearly seen (photograph: H. Schraal, RCE).

Timbers with original ends have been found, however, in the separate southern fragment. Here there are eleven frame remnants, seven of which lie adjacent to one another without any gaps. Several have an original tapered edge on the western side; these are 20 to 30 cm-long scarf joints. The eastern side of all the timbers is broken off.

An interesting feature of this fragment is the fact that it is lying upside down, with the original tops of the timbers now underneath. This can clearly be seen, for example, in the recovered floor timber with datum points 335 and 242 (find number SA-10). The frame shows a slight curvature at one end, the turn of the bilge. However, datum point 335 has been attached to the underside, which is also the most degraded side (illustration 22).

This is therefore a fragment of the ship's bottom that is broken at the bilge. The framing timbers are 27 to 38 cm wide and thick. Most are 3 to 5 m long, and the recovered timber is no less than 6 m long.

The separate southeastern fragment still contains about eleven timbers. They are all oak, with a width of 23 to 33 cm wide and an equivalent thickness. Whereas most of the frames are immediately adjacent to each other, there is sometimes a small gap of 10 to 14 cm. The frames are fastened to the hull planking and the ceiling with treenails. They have severe shipworm damage on the western side, but the original ends can still be seen in some places on the eastern side. These are not tapered scarf joints, but straight ends butted together.

4.2.5 Keelson

A long, broad beam rests on the iron platform among the ballast bars. Like the hull planks, it has a northeast-southwest axis. It has a surviving length of 11.53 m, a width of 43 to 50 cm, and its height is unknown. The beam is in poor condition: it is broken at both ends, has been pulled slightly askew by a fishing boat (the net is still attached) and is damaged and eaten away along its entire length.

Everything points to this beam being part of the keelson (internal keel) rather than a keel fragment. No rabbets for the garboard strakes are visible. The beam lies more than half a metre higher than the adjacent frames and is flanked on each side, but not covered, by iron bars. No maststep has been observed in the keelson.

4.2.6 Ceiling

No ceiling (the internal planking of a vessel) was found in association at the core of the site, on the section of ship's bottom beneath the iron bars. Everything there has probably eroded away. To the southwest of the keelson sporadic finds of wood fragments have been made, though they are heavily degraded, lacking in detail, and not in association.

A further seven oak ceiling strakes protrude from under the concretion and ballast bars on the north and south sides of the separate fragment in the southeast. They are immediately adjacent to one another and are 19 to 31 cm wide and 10 cm thick.

Since the southern fragment is upside down, the planks extending from beneath its frames are also ceiling planks. On the south side are two ceiling planks, almost 1.5 m apart. Datum point 254 was affixed to one hull plank, which protrudes 2.25 m from beneath the frame. The planks are 28 and 30 cm wide; their thickness is unknown.

On one of the last diving days, a further six planks were washed free from among the timbers in the south. They too are ceiling planks. They are immediately adjacent to one another and are 28.8 to 32.5 cm wide and 8 to 9.5 cm thick. Treenails measuring 3.8 and 4.3 cm in diameter can be seen in the planks. One plank has a small repair, measuring 14 by 8 cm in size. A wide assortment of lead fishing-net weights, plus a plastic bag, were found on top of the planks, which shows that this whole section must have washed free at an earlier date.

4.2.7 Other ship's structure

No ship's structure from higher up the vessel, such as the remains of a deck, caprail, panelling or masts, was found at the site.

4.2.8 Ship's structure: conclusions

After the shipwreck, the original ship broke up completely. Only three fragments of the bottom structure have been observed, although more ship's timbers may be preserved under the ballast stones, the ballast iron and the cannonballs. No sections of an intact side or deck structure have been observed. The largely eroded structure tells us that this was a heavily built vessel. The floor timbers are substantial – 26 to 38 cm wide and thick – and are made of oak. The hull is carvel-built of oak planks approximately 24 to 38 cm wide and 8 to 9 cm thick. The individual planks in a single strake are joined by means of straight scarfs. The planking is attached to the timbers with treenails measuring 3 to 4 cm in diameter (exact dimensions unknown). The keelson is also sturdy, with a maximum width of 50 cm. The ceiling, also of oak, is a closed ceiling constructed of planks that are 19 to 31 cm wide and 8 to 10 cm thick.

The distance from the longest floor timber to the middle of the keelson is 4.30 m. Assuming that the keelson has shifted only slightly in relation to the ship's centre line, this means that the ship was at least 8.60 m wide. The timbers do not show the turn of the bilge, suggesting that the ship must in fact have been wider.

4.3 Inventory, cargo and ballast: find material

4.3.1 Distribution of finds

No actual find layer has been identified at the Noorderhaaks 10/Sophia Albertina site. Only the heavy ballast and iron artillery have survived. It is remarkable that only a single object of organic material was found (which possibly washed into the site) and that there are almost no small finds, such as clay pipes, pottery sherds or glass. Ordinarily, find material of this nature is invariably discovered at or near shipwrecks.

The core of the site is made up of a platform of iron bars, neatly stacked alongship on each side of the keelson. Outside this area, the bars are mainly found west and south of the platform, sometimes separate and not in association, sometimes in dozens encrusted together and stacked up to seven high.

There is a large mound of sizeable boulders in the northeast and east of the site. These ballast stones can also be found elsewhere at the site, where they are quite loosely scattered. Most of the boulders measure approximately 25 by 25 by 25 cm.

On the western and southern sides of the platform are various concentrations of iron cannonballs. Although occasionally found separately, these are mainly dozens of cannonballs concreted together and still stacked up to six high, with diameters ranging from 12 to 17 cm. Most are ordinary round cannonballs, but they also include bar shot: two balls joined by an iron bar (illustration 23).

Cannons are another important group of finds that immediately catch the eye underwater. In total, sixteen guns of various calibres have been discovered. In addition, recreational divers have certainly recovered a further seven cannons over the years. A concentration of cannons is located along the eastern perimeter of the wreck mound, with eight heavy cannons lying in a row, oriented roughly northeast-southwest.

Between 9 and 15 m northeast of the ship's bottom fragment and iron platform, there is another concentration of find material comprising two heavy cannons and a very heavy anchor. There are also several iron bars and individual ballast stones. Interestingly, there was still a thin find layer here. As well as a chest containing musket balls, the bulk of the recovered find material came from this area roughly between the chest and the anchor. Directly protruding from the seabed here is a wooden deadeye (18 cm in diameter) with a 40 cm band (illustration 27). This find was not recovered.

4.3.2 Description of finds material

Diagnostic find material was recovered in order to determine the date on which the ship foundered.

Illustration 23: Diver Frank Koppen by a piece of bar shot to which datum point 253 has been attached (photograph: R. Aarsen, NOB).

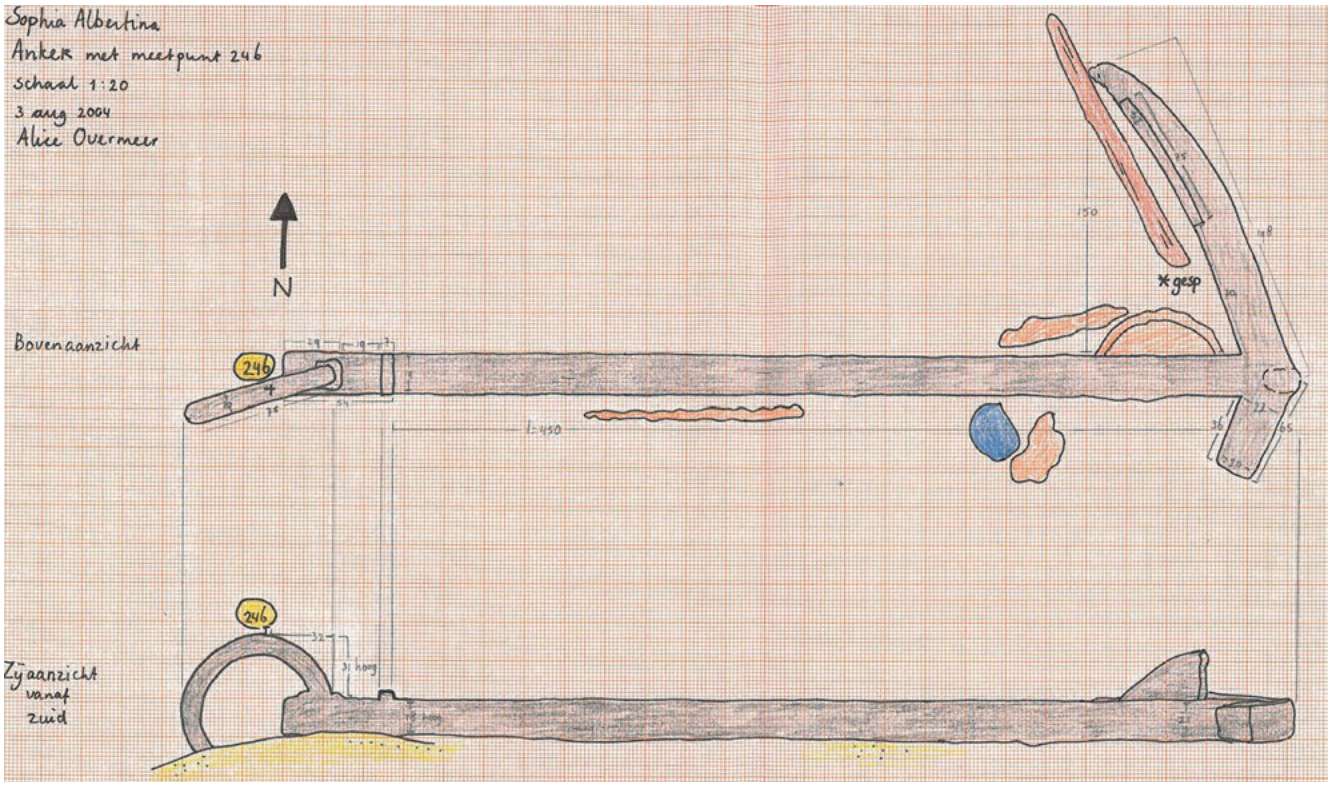


Illustration 24: Sketch of the six-metre-long anchor (drawn by A. Overmeer, RCE).

Sixty-six find numbers (SA-01 – SA-66) were assigned during the 2004 fieldwork period to more than 68 recovered objects (Appendix 5). More than half of the finds (35 in all) are made of metal – iron, copper, brass, lead, tin and possibly silver. The second find group is earthenware/stoneware/brick, comprising 20 objects in total. Finally, six wooden finds, three stone objects, an object of organic material and three objects of uncertain composition were collected. Of course, the recovered finds are only a selection of what protrudes from the seabed, but their relative proportions show that inorganic material predominates and that organic material is clearly underrepresented. The finds in each functional category are discussed below.[23]

4.3.2.1 Ship and accompanying equipment

Five finds (SA-10, SA-11, SA-58, SA-59 and SA-60) clearly belong to the ship. These are wooden samples taken from the ship's structure. Finds SA-10, SA-11 and SA-58 were intended for dendrochronological analysis (see section 4.4). SA-59 is a wood sample taken for sulphur analysis from the same frame (with datum points 242 and 335) as SA-10 and SA-58. No follow-up analysis was carried out, however. SA-60 is again part of that same frame (with datum points 242 and 335) and has been preserved in order to demonstrate the considerable size of the framing timbers.

Find numbers SA-29, SA-39 and SA-61 are three fragments of sheet copper. This may indicate that the ship's hull was plated with copper, but there is no evidence of this on the few surviving hull planks.

Anchor

A very large anchor lies in the northeast of the site, with roughly a north-northeast-south-

[23] *This originally more extensive classification into functional categories was developed by H.R. Reinders (Reinders 1985, 86).*

southwest axis. The anchor arms lie in the north and the anchor ring is in the south (illustration 24). The flukes lie flat on the seabed and the anchor ring protrudes vertically from the seabed. The anchor ring is 75 cm in diameter and 10 cm thick. Datum point 246 was affixed to the ring. The shank is 5.04 m long, 19 cm wide and 21 cm thick. One of the arms is broken at 65 cm; the other is still intact and is 1.98 m in length. No remains of an anchor stock have been found, but the shank features a raised area, above or below which a wooden stock may have been attached.

4.3.2.2 Military equipment

The musket balls, cannonballs, a lead plate and the cannons still lying on the seabed are all included in the military equipment (table 2).

Musket and pistolet balls
On 7 June 2004, one of the first diving days, a diver found a wooden chest filled with musket or pistol balls in the northeast of the site (illustrations 25 and 26). On subsequent days, however, the divers could find no trace of this special find.

Because the diving team had found almost no diagnostic find material thus far, they went in active search of the chest. Using the airlift to explore an area in the northeast of the site, they succeeded in locating it once again on 28 July (illustration 27). It was then recovered and assigned find numbers SA-46 and SA-47.[24] The chest measures 50 by 22.5 by 21.5 cm. It is constructed of softwood planks 2.5 to 3.5 cm thick that are nailed together. The chest lay at an angle in the seabed, with one side missing. The lid is still present and, at 55 cm, is slightly wider than the other planks. Hinge fittings and a lock can be seen on the chest (illustration 29). The fittings for the lid are on the inside and on the external surface of the back wall, which means that the lid had an internal hinge.
The chest was preserved in Lelystad, where it was freeze-dried, cleaned, drawn and reassembled (illustration 28). The chest was half filled with hundreds of small balls, with diameters ranging from 10.9 to 12 mm. The small lead balls with find number SA-1 also come from the chest. Find numbers SA-19 and SA-26, balls with similar diameters, come from the same area and are possibly also originally from the chest. Finds numbers SA- 27 and SA-41 were also found in the vicinity, but their dimensions are not clear.

Illustration 25: The munitions chest under water (photograph: P. Leensen, RCE).

Illustration 26: The munitions chest after recovery (photograph: H. Schraal, RCE).

[24] *The wooden chest complete with pistol or musket balls was too heavy to recover because the weight of the balls could have dislocated the chest. A large proportion of the balls were therefore removed from the chest and salvaged (find number SA-47). This then allowed the chest to be raised to the surface in a plastic container (find number SA-46).*

Table 2: Recovered finds: military equipment

Find no.	Description	Material	Dimensions	Find location
SA-1	6 musket/pistol balls, small	lead	10.9-11.7 mm in diameter	from chest containing balls on northeast side
SA-19	51 pistol balls, small, some with gnaw marks	lead	10.9-12.0 mm in diameter	by cannon 135
SA-26	36 musket/pistol balls, small	lead	11.0-12.0 mm in diameter	by cannon 135
SA-27	2 pellets (or musket/pistol balls, small)	lead	10.9-11.3 mm in diameter	by cannon 135
SA-41	35 musket/pistol balls	lead		approx. 6 m west of cannon 135
SA-46	wooden munitions chest for musket/pistol balls	wood, lead	55 x 22.5 x 21.5 cm	3.7 m west of cannon 135
SA-47	hundreds of musket/pistol balls from chest, small	lead		3.7 m west of cannon 135
SA-24	1 musket ball, large	lead	17.8 mm in diameter	by cannon 135
SA-43	3 musket balls, large	lead	17.4-17.9 mm in diameter	3.7 m west of cannon 135
SA-17	cannonball	iron	11.36 cm in diameter	on mound at 342
SA-55	cannonball	iron		
SA-56	cannonball	iron		
SA-57	square lead plate, bent and torn, no markings, complete	lead	26.5 x 23 x 0.3 cm	on cannon 136
Not recovered	16 cast iron cannons	iron		

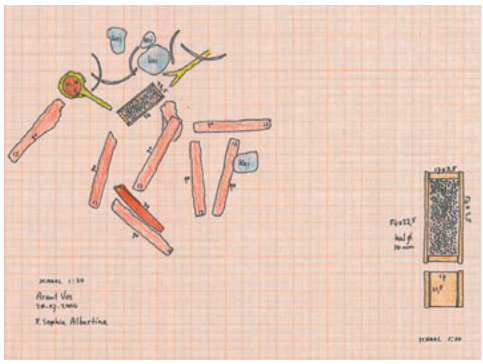


Illustration 27: Sketch of the chest in context under water (drawn by A. Vos, RCE).

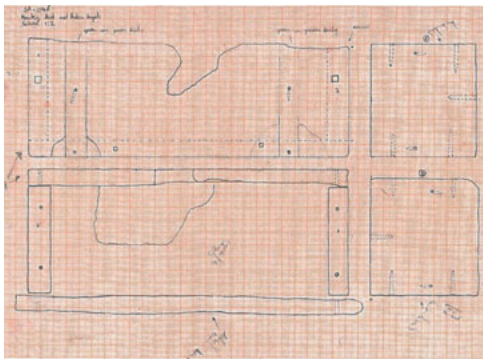


Illustration 28: Drawing of the musket ball chest after conservation (by M. van der Linden, RCE intern).

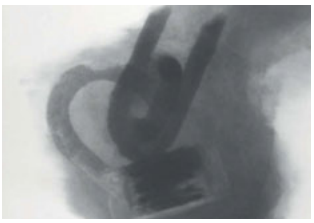


Illustration 29: X-ray of concretion around lock (photograph: L. van Dijk, RCE).

According to the original find list, SA-27 consisted of two pellets, whereas there are currently two small balls with diameters of 10.9 and 11.3 mm in the Depot. Either the description is inaccurate or the pellets have been lost. Find numbers SA-41 should consist of 35 (musket) balls, but these have not been found. These balls were probably small and were added to the large bulk of material from the chest during the conservation process (SA-47). The balls with diameters of 11 to 12 mm were made for a pistol or pistolet (illustration 30). Larger lead balls (SA-24 and SA-43) were also found in the same area, ranging in diameter from 17.4 to 17.9 mm (illustration 30). These larger balls were used for muskets.

Illustration 30: Handgun shot of various calibres (photograph: R. Schipper).

Illustration 31: Lead plate SA-57 (photograph: R. Schipper).

Cannonballs
Several clusters of cannonballs are located in the south and west of the site. Although corrosion has caused them to clump together, it is obvious that they were stacked up to six layers high. The cannonballs are of different calibres, between 12 and 14 cm in diameter in some places and between 14 and 18 cm in others.

Three iron cannonballs were recovered and have been assigned find numbers SA-17, SA-55 and SA-56. They were annealed in the kiln at the Ship Archaeology department and then treated with an epoxy resin to counteract further corrosion. Cannonball SA-17, with a diameter of 11.36 cm, was probably used for a 6- or 12- pound cannon. The other two are of a larger calibre, but are not described in any further detail. Other cannonballs found at the site also point to the presence of guns of a heavier calibre.

In addition to regular cannonballs, bar shot was found in some places (illustration 23). The balls of this barshot are 10 cm in diameter and the total length is 48 cm. The primary purpose of this type of ammunition was to damage the rigging of enemy ships.

Lead plate
Finally, a lead flap on cannon 136 warrants a mention. This is almost certainly a lead plate or apron that covered the vent (the touch hole where the fuse was ignited) to keep the fuse and the powder bag dry. The lead plate was recovered (find number SA-57, illustration 31). It is 26.5 cm long, 23 cm wide and 3 mm thick.

Cannons
At least sixteen cast iron cannons of various calibres have been found at the site (illustrations 32 and 33). They were measured and sketched underwater where possible (some were half-buried in sand). Table 3 presents the key measurements.[25]

Amateur archaeologist and diver Nico Brinck was invited to join the dive for several days to make a closer study of the cannons. Brinck is a specialist in the field of ship's artillery. Before his arrival, several guns were stripped of their concretion, so that specific features and any marks and descriptions could be seen more clearly. Brinck sketched the cannons with datum points 250 and 247 and drew and described the cannons with datum points 133, 134 and 136 (illustration 34).[26] He also attempted to reach a verdict on the calibre of the sixteen cannons, based on the breech diameters.

Two cannons, with datum points 250 and 251, are 6-pounders. Cannon 250 is the larger, with a total length of 240 cm (length of barrel + length of breech/cascabel knob) and a breech diameter of 35 cm. A reverse F, the mark of the Swedish Finspång foundry, is visible on the right-hand trunnion.[27] Such guns are commonly known as *finbankers*, a bastardisation of the name Finspång. The term finbanker was originally used only for cannons that were cast for export, not for those belonging to the Swedish navy. In the course of the eighteenth century, however, the name was adopted for all iron artillery from Sweden (Frantzen, 2001, 5).

According to Brinck, the cannons numbered 133, 134, 136 and 247 are 24-pounders. Cannon 134 is complete and has a total length of 3.61 m (length of barrel + length of breech/cascabel knob) and a breech diameter of 60 cm. Given their dimensions, cannons 130 and 340 can also be classified as 24-pounders,[28] although 135 and 138 are also very substantial. This means that there were at least eight 24-pounders on board. The three 24-pounders that Brinck examined have modern features for their time. There is a type of thickening

[25] *All measurements are approximate. As the cannons are encrusted with an unknown quantity of concretion, the original dimensions cannot be established with certainty without annealing and treating the cannons. The thick layer of concretion also renders any marks or inscriptions difficult or impossible to see.*
[26] *Information taken from dive reports by N. Brinck, 22 and 23-07-2004.*
[27] *Van der Wiel, who found the cannon, had already reported in 1989 that he had seen an F on a trunnion of one of the cannons. There may be more finbankers in the wreck.*
[28] *Personal communication from N. Brinck, 30-10-2010.*

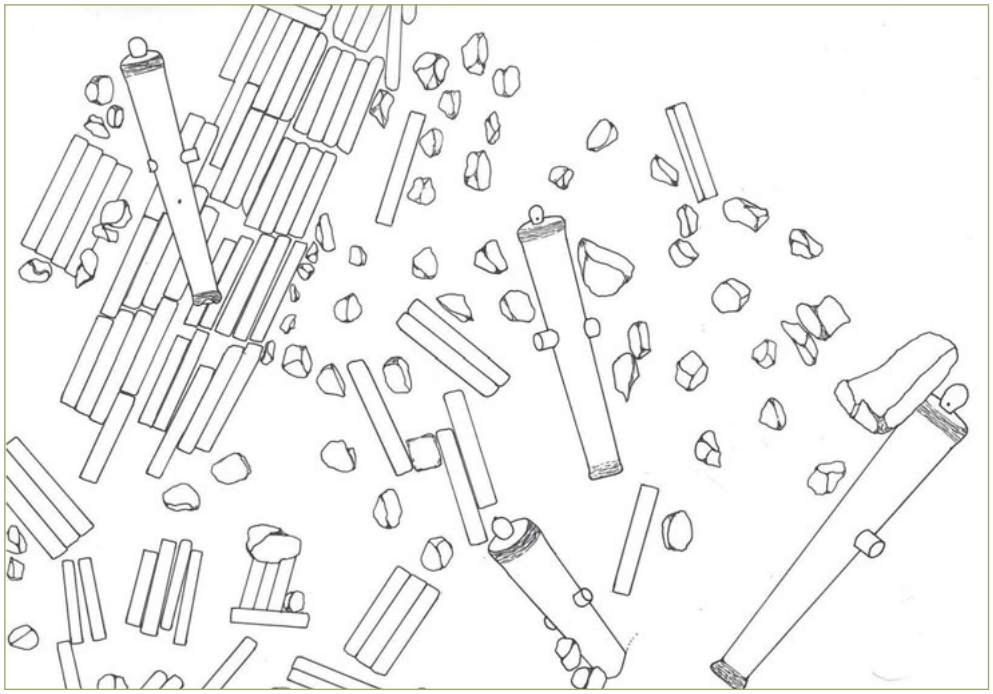


Illustration 32: Several cannons on the eastern side. Scale 1: 20 (drawn by P. Leensen, RCE).

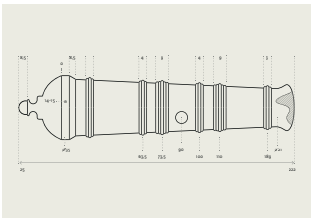
around both trunnions, the trunnion shoulders, which prompted project manager Vos to contact the Naval Museum in Karlskrona. Of the 150 cannons in the Museum's collection, the oldest with trunnion shoulders dates from 1775. Trunnion shoulders are also found on contemporaneous types of cannon, with the earliest model dating from 1768. Manufacturers' drawings in the museum's collection also show cannons with trunnion shoulders, with the most recent dating from 1759.[29] Based on a recent find, however, Brinck believes that trunnion shoulders were added to Swedish guns as early as about 1728 but were not a feature of French and English guns until the late eighteenth and early nineteenth centuries respectively (illustration 35).[30] Several numbers are visible on the trunnion of cannon 247, which may form the year 1780.[31] Year marks are a common feature on finbanker trunnions (Frantzen, 2001, 19).

Finally, in terms of their dimensions, three cannons are located precisely midway between the groups of 6-pounders and 24-pounders. These are the cannons with datum points 129, 131 and 132. Brinck believes that they could be 12-pounders.[32] The two unnumbered guns, referred to as 'cannon north of 138' and 'cannon between 135 and anchor', appear to belong to this group. No details of these cannons were measured or drawn, but they are probably also 12-pounders.

The site therefore contains 6-, 12- and 4-pounders. The two 6-pounders, 250 and 251, were found in a high position, on or close to the platform of iron. One is struck by the fact that eight cannons are virtually lined up along the eastern perimeter of the site, and have the same approximate northeast-southwest orientation as the fragment of ship's bottom. These cannons are both 12- and 24-pounders. Can we tentatively conclude that a deck level was located along this line?

In addition to these sixteen cannons, a further seven guns have been salvaged by recreational divers and by *Rijkswaterstaat* (Ministry of Infrastructure and the Environment), bringing the total artillery on board to no fewer than 23 cannons.

Illustration 33: Head of the diving team Arent Vos with cannon 134, which was half-buried in sand (photograph: R. Aarsen, NOB).



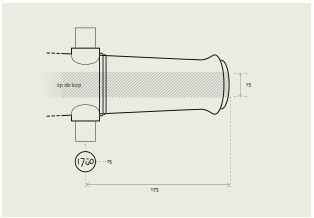


Illustration 34: Sketches of two cannons from the Sophia Albertina (drawn by N. Brinck, Terschelling).

29 *Information from M. Dunge, Naval Museum Karlskrona, 29-11-2004.*
30 *Personal communication from N. Brinck, 22-11-2010.*
31 *Information taken from dive report by N. Brinck 22-07-2004. Incidentally, another diver did not interpret this as the number 1780; information from dive report by E. van Gent, 29-07-2004.*
32 *Personal communication from N. Brinck, 30-10-2010.*

Table 3: Dimensions of cannons from 'Noorderhaaks 10/Sophia Albertina', based on measurements by diving team and N. Brinck.

Name of cannon	Length (cm)	Distance bet. trunnions	Diameter of cascabel knob (cm)	Diameter of breech (cm)	Diameter of muzzle (cm)	Diameter of bore (cm)	Diameter of trunnions (cm)	Markings	Calibre of cannon (acc. to Brinck)	Remarks
129	> 131 + 12 (nc)	131 (?)	12	43	?	?	15 cm	?	12pdr	Half buried in sand (muzzle end)
130	304 + 17		17	50	37/32	11			24pdr	Complete
131	> 170 + 13 (nc)	100	13	45	< 28	?	12	?	12pdr	Half buried in sand (muzzle end)
132	225 + 12	100	11.5	43	24	?	14	?	12pdr	Complete
133	325 + 20	136/122 (NB)	20	55	25	?	16.5 (right)	-	24pdr	Complete
134	342 + 21	165/130 (NB)	21 x 17	60	38/32	?	19 (trunnion shoulder)	?	24pdr	Complete, end damaged
135	340								24pdr?	
Bet. 135 and anchor	270								12pdr?	
136	314 + cascabel knob	128	broken	47	41	15	20 (trunnion shoulder)		24pdr	Damaged trunnion
138	> 230 + 15 (nc)	136	15	50	-	-	20?	?	24pdr?	Half buried in sand (muzzle end)
North of 138	> 100 + 15 (nc)	> 100	15	40	-	-	-	-	12pdr?	Half buried in sand (muzzle end)
173	280 + 15	135?	15	40	30/36	14			24pdr	
247	> 175 nc	?	-	-	33	15	15 (trunnion shoulder)	1780 (?) on trunnion	24pdr	Half buried in sand (breech end)
250	225 + 14	90	14	35	21	15	9 (right)	Reverse F on trunnion	6pdr	Finspång kanon, zundgat is 14-15 mm
251	209 + 15	-	15	30	22	7			6pdr	
340	310 + 20	-	20	56	35	?	-	-	24pdr	
vd Wiel cannon							(trunnion shoulder)?	3 crowns on muzzle face, anchor and CFF on muzzle	12pdr	Swedish 'hulbunder' cannon, late 18th / early 19th century. Tornqvist model 1759?
RWS cannon	246 + 23		23				(trunnion shoulder)	2 crowns on muzzle face	12pdr	Tornqvist model 1759
Raven cannon	239,5 + 15		15				conical	LDG	6pdr	Dated bet. 1627 and 1652

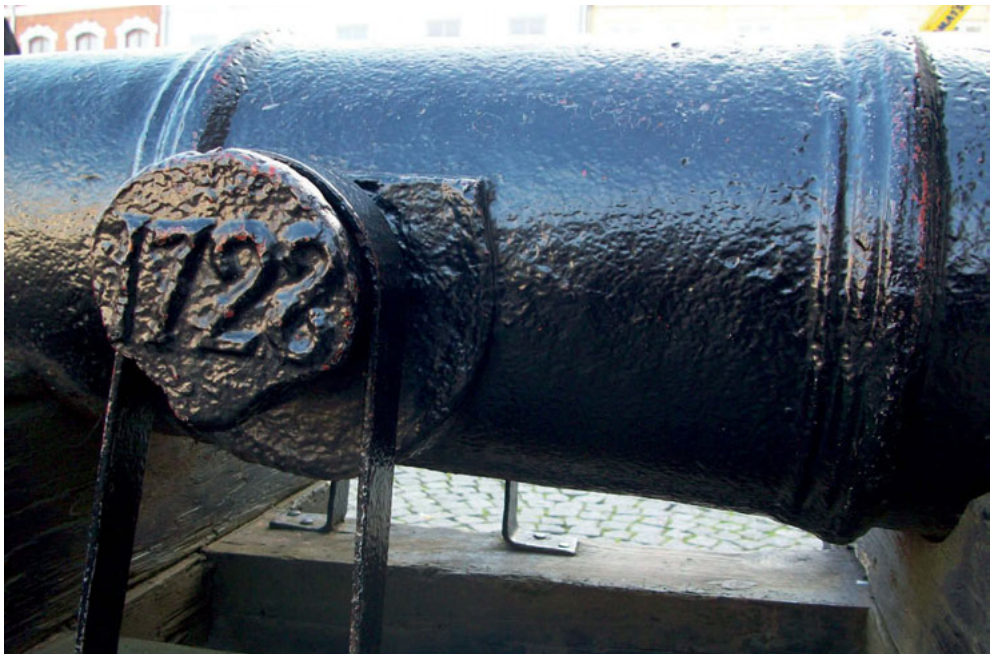


Illustration 35: Example of a cannon with trunnion shoulders and the year mark 1728, not found at Noorderhaaks 10/Sophia Albertina (photograph: N. Brinck)

Three cannons are known to us and have been described and drawn. One was recovered by amateur archaeologist Jan van der Wiel ('v/d Wiel cannon' in table 3, illustration 36a) and was examined by J.P. Puype, former curator at the Army Museum in Delft. It is a *hulbunder*, a Swedish cannon with a straight breech, dating from the late eighteenth/early nineteenth century. The muzzle face features three grouped crowns and an inscription of a clear anchor with the letters CFF on each side, a probable reference to the founder.[33]

In Brinck's view, there is a second similar cannon. 'RWS cannon' (table 3) was fished up in 1996 by *Rijkswaterstaat* and transferred to the then NISA. It is a cast iron 12-pounder, probably from Sweden, a hulbunder with two crowns on the muzzle face. The trunnions have trunnion shoulders. According to Brinck, it is of the Tornqvist type (illustration 36b).

A third cannon, 'Raven cannon' found by local diver Hugo Raven, is also made of cast iron and originates from Sweden. It is a 6-pounder, 2.4 m in length (illustration 36c). It features conical trunnions and many decorative rings and bears a mark with the letters LDG on the trunnion. The letters probably refer to Lodewijk de Geer, a magnate and arms dealer who took over the Swedish Finspång foundry in the early seventeenth century and turned it into a highly successful business. This puts the date of manufacture for the cannon between 1627 and 1652. If this dating is correct and the gun really does come from the Noorderhaaks 10/Sophia Albertina wreck, this means that the ship, in addition to several brand new cannons (those with trunnion shoulders), was also carrying artillery that was 120 to 150 years old. There is another possible explanation here: new life was often breathed into old, damaged cannons when they were taken on board as ballast or scrap metal cargo. The Noorderhaaks 10/Sophia Albertina site contains more damaged guns, such as cannon 136 with a damaged trunnion and broken cascabel knob, and cannon 134 with a damaged end. However, these cannons are unlikely to have served as

[33] *Information from J.P. Puype, former curator at the Army Museum in Delft, 13-11-1990. Noorderhaaks 10 Dossier, RCE.*

ballast or scrap because the presence of trunnion shoulders suggests that they were both fairly new. Did these cannons suffer damage during a battle at sea, or were they damaged in the shipwreck?

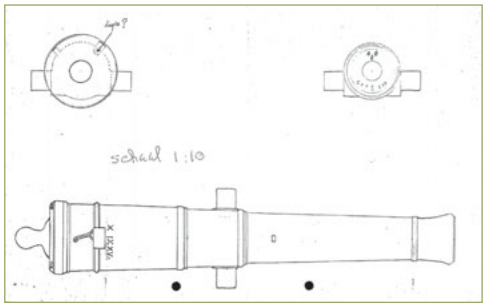


Illustration 36a

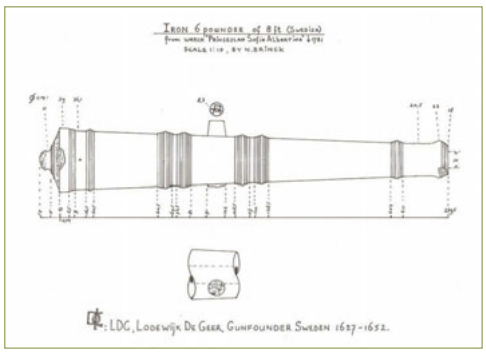


Illustration 36b

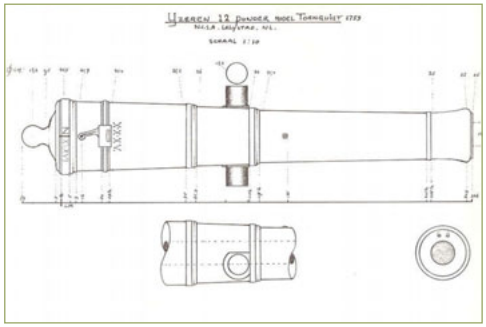


Illustration 36c

Illustrations 36a-36c: Three cannons recovered from the Sophia Albertina: v/d Wiel cannon (sketch by J.P. Puype), RWS cannon and Raven cannon (both drawn by N. Brinck, Terschelling).

4.3.2.3 Tools

Find number SA-5, a whetstone 17.5 cm long may have been a tool (illustration 37). There are no further details to report.

4.3.2.4 Galleyware, eating and drinking ware

Twenty find numbers relate to earthenware, stoneware or brick which were initially classified as belonging to the ship's inventory. An archaeological field evaluation always includes a special search for earthenware or stoneware objects. Because these items tend to be dateable, they can help to establish the date on which the ship foundered (illustration 38).

Three finds, SA-22, SA-34 and SA-51, are fragments of incomplete bricks. They will not be further discussed here. Seventeen finds were examined by earthenware specialist Piet Kleij, who classified them in accordance with the Deventer system (Appendix 6). Kleij came to the remarkable conclusion that almost the entire complex dates from the nineteenth or twentieth century. Finds SA-20, SA-25, SA-31, SA-42, SA-49 and SA-50 come from terracotta flower pots that could date from the period between 1600 to 1950. Five sherds (SA-3, SA-7, SA-30, SA-32 and SA-52) are of industrial, white-firing earthenware and should be dated to the period 1850-1950. Sherds SA-21 and SA-48 come from stoneware mineral water bottles, manufactured in the German Rhineland between 1800 and 1900. Find number SA-64, also stoneware, is a fragment of the base of a large oval object, possibly a bowl. The words `BOURNE MADE IN ENGLAND DENBY' and, adjacent to them `6pt', have been stamped on the base (illustration 39). This English pottery was established by the Bourne family in Denby in 1809. The same stamp can be found on the internet; it was used on the Danesby Ware Range, a series produced in the 1930s.[34] Two sherds, SA-2 and SA-6, are of

[34] *Source: http://www.clariceware.com/The%20Denby%20Pottery%20story.htm, retrieved: 08-02-2012.*

Illustration 38: Diver Léon Vroom showing the find of the day to diver Hans Schraal (photograph R. Aarsen, NOB).

European porcelain. SA-2 is part of a teapot spout; SA-6 comes from a bowl with a rippled rim. This material can be dated to between 1800 and 1950.[35]

Find number SA-33 is a corner fragment of a tile (illustration 40). It is made of white-firing clay and features landscape in purple showing a figure, perhaps a shepherd or a Biblical figure. Tiles of this kind were produced in the eighteenth century, including in the Netherlands.[36]

4.3.2.5 Personal possessions

Eight objects – three buckles and five metal buttons – fall into the category of personal possessions (table 4).

The buckles, which range in length from 4.9 and 6.3 cm and in width from 4.1 to 4.5 cm, were used to fasten a belt. Two buckles have a rectangular frame, whose inner mechanism (the bar and prong) is missing (SA-37 and SA-65a). The third buckle, SA-36, is rectangular with rounded corners; the prong and bar are still intact (illustration 41).

Two of the five buttons are almost identical. Both SA-40a and SA-40b are flat and have the same diameter. SA-40a, however, is better preserved and still has a visible triangular decoration. SA-40b has a layer of concretion from which a shank protrudes, which means it could be a copper nail. SA-9 and SA-44 are both convex buttons with a loop on the underside, but are different in size (illustration 42).

SA-28 is an unusual shape. The object consists of a bar with bent terminals to which round, flat knobs are attached. The knobs are decorated with a geometrical pattern (illustration 43). The button is possibly made of silver.

Illustration 37: Whetstone SA-5 (photograph: R. Schipper).

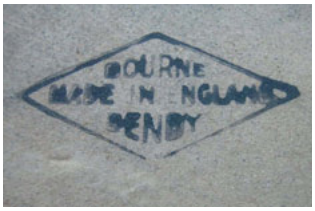


Illustration 39: Photograph of Bourne Denby ink stamp (photograph H. Schraal, RCE).

Illustration 40: Corner fragment of white-firing tile featuring a figure (photograph: R. Schipper).

Illustration 41: Three buckles from the wreck (photograph: R. Schipper).

[35] Kleij 2004, 2-3.
[36] Kleij 2004, 3.

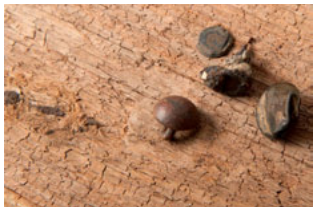


Illustration 42: Four buttons from Noorderhaaks 10/Sophia Albertina (photograph: R. Schipper).

Table 4: Recovered objects: personal possessions

Find no.	Description	Material	Dimensions	Find location
SA-9	Copper button, flat to convex with loop on underside; covered with unknown material with golden sheen	copper	diam. 1.75 cm	between 135, unnumbered cannon and 'stone'
SA-28	Bar with a round knob at each end, possibly a cufflink; knobs are decorated with geometric patterns	silver?	3 x 1.2 cm	by cannon 135
SA-36	Rectangular buckle with rounded corners, prong and bar intact	brass	4.9 x 4.1 cm	approx. 6 m west of cannon 135
SA-37	Rectangular copper buckle without inner mechanism	copper	6.35 x 4.29 cm, frame w. 0.9 cm	approx. 6 m west of cannon 135
SA-40a	Round flat copper button, without loop; engraved triangle on upper side	brass	head diam.1.2 cm	approx. 6 m west of cannon 135
SA-40b	Round flat copper button as with SA-40a, encrusted with concretion; could also be copper nail with shank	brass	head diam.1.2 cm, shank 2.4 cm long	approx. 6 m west of cannon 135
SA-44	Convex copper button, with loop on underside	brass	diam.1.46 cm	3.7 m west of cannon 135
SA-65a	Rectangular iron or copper buckle, without inner mechanism; frame decorated with 5 stripes in each corner	brass	5.3 x 4.5 cm, frame w. 0.5 cm	beside anchor fluke 246

4.3.2.6 Cargo and ballast

Scattered across the entire site are oblong iron bars. They are still *in situ* at the heart of the site, neatly stacked alongship on each side of the keelson (roughly northeast-southwest). Outside that area the bars are mainly found west and south of the iron platform/bottom fragment, sometimes individually and no longer in association, sometimes in dozens concreted together and stacked up to seven high.

Four of the many iron bars were recovered and assigned find numbers SA-12 to SA-14 and SA-54 (illustration 44). Many were measured underwater and appear to range in length from 65 to 120 cm and in width/thickness from 8 to 14 cm. A thick layer of concretion was evident on the bars when they were brought to the surface. An attempt was made during the diving season to remove the concretion from one bar (illustration 44), but it was soon abandoned because of the damage this caused to the original surface. A decision was therefore taken to anneal the bars (Appendix 7). Three of the four bars were heated to 850° C. After being exposed to the maximum temperature for about two hours, they then remained at that temperature for some time because of the very gradual cooling process.[37]

The surface of the bars was then cleaned using a broad chisel, which removed the layer of concretion fairly successfully. They were then glass-shot blasted in a blasting chamber at a pressure of 6 bars.[38]

It emerged that the original surface of the bars was not smooth but contained blowholes, impurities and bulges from the casting process. The iron seems to have been cast in rough moulds, perhaps in the ground. The iron used may have been contaminated to some degree. All of the bars feature recesses on the underside, probably made as handholds.[39] No brand marks were observed.

[37] *Van Dijk & Vos 2008, 1.*
[38] *Van Dijk & Vos 2008, 2-3.*
[39] *Van Dijk & Vos 2008, 4.*

Illustration 43: Silver button (photograph: H. Schraal, RCE).

Illustration 44: Head of the diving team Arent Vos attempting to remove the concretion from an iron bar (photograph: H. Schraal, RCE).

After being heated, the bars were measured and weighed. SA-13 is 78 by 10 by 8 cm and weighs 31 kg; SA-14 is 78 by 10 by 10 cm and weighs 41 kg; and SA-54 measures 90 by 12 by 11 cm and weighs 43 kg. SA-12, which was not annealed, measures 120 by 9.5 by 9.5 cm in its concretised state. The bar was not weighed, but its dimensions would suggest a weight of about 60 kg.

It is interesting to note that, according to Vos, Sweden began using iron bars as ballast alongside boulders from 1748 onwards because it allowed a more secure and efficient use of space in the hold.[40] Large natural stones also served as ballast. These are found in concentrations in the northeast and east of the site, while others are scattered across the site. Most boulders measure about 25 by 25 by 25 cm. Precisely what kind of stone they are is not known. It is possible that some cannons were used as ballast. Cannons 134 and 136, which are still *in situ*, are damaged at the cascabel and/or trunnions and at least one of the recovered cannons is known to have suffered damage. In any event, this particular cannon is 120 to 150 years old. The two *in situ* guns date from the last quarter of the eighteenth century. It is known that damaged cannons were reused as ballast or as cargo scrap (see Brouwershavense Gat 2).[41]

No evidence of cargo was found at the site.

4.3.2.7 Other find material

A substantial portion of the finds fall into the category of 'other'. This applies to 14 objects whose function is not entirely clear or which may have washed into the site and therefore do not belong to the wreck (table 5).[42] That fact that old and new find material was mixed together in the wreck makes it difficult to establish a clear boundary.

SA-4 is a flattened tin cauldron or pan, with an original diameter of 15 cm and a height of almost 6 cm (illustration 45). There was originally a ring on each side, attached to a kind of shank that was connected to the kettle. This is not the standard shape for a chamberpot, but rather a type of flowerpot. It is not therefore clear whether this object belonged to the ship.

There are also doubts about SA-18. It is the upper part of a coconut (Cocos nucifera) and the only object of organic material (illustration 46). It looks like a bowl and was perhaps used as a utensil (Appendix 8). The coconut bowl is encrusted both inside and out with marine organisms such as barnacles, bryozoa and polyps, indicating that it has spent some time on the seafloor. Coconuts grow in tropical areas and are commonly used and consumed. Today, they are

[40] *Vos 2008, 10.*
[41] *Vos 2004b.*
[42] *The finds of earthenware and stoneware were also probably washed into the site, but these have already been discussed in section 4.3.2.4.*

traded throughout the world.[43] Partly because of the degree of encrustation, we cannot say with certainty that this bowl was part of the inventory of the Noorderhaaks 10/Sophia Albertina.

SA-8 is possibly a utensil; it seems to be a handle, part of an enormous copper cauldron (illustration 47). The handle is very sturdy compared with the thin metal to which it is riveted.

The site still contains some large items of find material that have not been recovered. For example, wrought iron rings can be observed at several places in the wreck, including between cannon 135 and the anchor, and on the southeast fragment of ship's structure. Their function is unclear, but they could be spar fittings or cask hoops. One iron ring has a diameter of 68 cm and the edge is 3 to 8 cm thick. Other iron fittings are also in evidence in places, including two rods that are kinked in two places to form a kind of handle. One example is SA-65b. Round metal cylinders 11 to 17 cm in diameter and 50 cm long caked into the concretion are also found across the site. Finally, lead plates and sinker weights are common at the site.

4.3.2.8 Finds salvaged by third parties

Archis has reported the following finds, recovered by recreational divers:[44]

1. `v/d Wiel cannon': Cast iron cannon, probably Swedish. Breech is a hulbunder. The muzzle face features three grouped crowns and an inscription of a clear anchor with CFF on each side. Found by: J. van der Wiel.
2. `RWS cannon': Cast iron cannon, 12-pounder, probably Swedish. Length 2.46 m, two crowns on muzzle face. Transferred to NISA (iron label 4). Found by: RWS.
3. `Raven cannon': Cast iron cannon, an 8-ft 6-pounder. Swedish cannon measuring 2.395 m in length. Features conical trunnions and many decorative rings. Inscription LDG. Found by: H. Raven.
4. Bronze ship's bell with inscription `G:MEYER FEC:I HOLMEN: 1738' beneath a crown. Found by: H. Raven.
5. Wooden belfry, belonging to ship's bell. Found by: H. Raven.
6. Cargo of iron bars, approx. 100 x 10 x 10 cm. Found by: J. van der Wiel.
7. Leather cartridge with powder residue, from v/d Wiel cannon. Found by: J. van der Wiel.
8. Wrought iron bar shot, 12-pounder. Both balls are of cast iron, one is wrapped in hemp twine. Dimensions: 47.5 x 11 cm. Found by: unknown.

[43] *Kuijper 2005.*
[44] *Information from Archis, observation number 48090, retrieved 08-02-2012.*

Illustration 45: Flattened tin pan or cauldron SA-4 (photograph: R. Schipper).

Illustration 46: Coconut bowl SA-18 (photograph R. Schipper).

Table 5: Other find material

Find no.	Description	Material	Dimensions	Find location
SA-4	Tin pan or kettle, with round ring attached. Very misshapen, broken and affected by tin pest. No visible markings.	tin	h. 5.7, base diam. 15 cm, ring diam. 3.7 cm	under ship's structure north of 257
SA-8	Handle or grip with part of a cauldron or fitting still attached. Consists of a leaf-shaped plate with three copper rivets on a fragment of the original plate or cauldron and terminating in a thick square handle.	copper	handle l.10 cm, w. 7 cm, d.1.1 cm. Sheet thickness 0.1 cm. Rivets: outside 2.2 cm, inside 4.5 cm	between 135, unnumbered cannon and 'stone'
SA-15	Iron ring, from thimble? Concretion did not contain any iron and was therefore removed.	iron	10 x 3 cm	northeast side of wreck
SA-16	Hollow rod of uncertain material, resembles lead, but possibly a type of stone.	?	l. 20.8 cm, diam.1.57 cm	northeast side of wreck
SA-18	Upper part of coconut (Cocos nucifera), possibly used as a bowl.	organic	diam. 9 cm, h. 3 cm, thickness of shell 3-4 mm	at point 345
SA-23	Strip of metal, looks like tinplate.	metal	l. 23.2 cm, w. 6.8 cm, d. 0.05 cm	by cannon 135
SA-35	Fragment of slate.	stone	12 x 6 x 2.7 cm	by cannon 340
SA-38	Strip of copper, bent to form a circle. Has a 0.9 cm hole at each end, one with iron concretion.	copper	l. 61 cm, w. 3.1, d.1.4 cm,	approx. 6 m west of cannon 135
SA-45	Piece of flint or possibly a piece of glass that is worn smooth.	stone	4.6 x 2.5 x 0.5 cm	3.7 m west of cannon 135
SA-53	Triangular sherd of unknown material.	?	8 x 8 x 8 cm	approx. 6 m west of cannon 135
SA-62	Round concretion with golden sheen, perhaps a coin. Proved not to be a coin during conservation	concre-tion		next to anchor fluke 246
SA-63	Piece of stone, very shiny	?		next to anchor fluke 246
SA-65b	Iron U-shaped profile, from fitting. Composed of square iron bar, 2.3 x 2.1 cm. Ends flattened to 3.4 x 1 cm, with two nails/holes, but broken at end.	iron	35 x 16.5 cm, w. 2.3 cm, d. 2.1 cm	next to anchor fluke 246
SA-66	Lead plate folded double, four holes in the corners	lead	15.4 x 10.5 cm d. 0.25 cm	between ceiling strakes between 249 and 335

Illustration 47: Large copper handle from copper cauldron (photograph: R. Schipper).

The three cannons have been discussed in section 4.3.2.2. The discussion of the bronze ship's bell was brought forward to section 2.1, where its initial reporting is discussed. Illustration 48 shows where the bell was found. Although the sketch is very rough, the findspot seems to be located somewhere between the large anchor and cannon with measuring point 136. The other finds, the iron bars and the bar shot, are also consistent with the diving team's impression of the site.[45] One of the balls of the bar shot was encircled with hemp twine (Appendix 9). The leather cartridge containing powder also shows that a limited amount of organic material has survived at the site.

4.3.3 Find material: conclusions

The find material tells us that Noorderhaaks 10/ Sophia Albertina is a typical wreck location that was was exposed quite some time ago. Little organic material, including the timber, has survived. Finer inorganic material has disappeared, probably washed away by the current. It is predominantly the heavy, inorganic find material, such as ballast stones, ballast iron, artillery and lead and iron munitions, that is still present.

The find distribution tells the same story. Older find material, which probably belongs to the ship, was found at the same locations as more recent material, indicating a very large degree of disturbance at the site.

We can nevertheless draw a cautious conclusion from the distribution of the heavy material. The typical distribution of the ballast iron in the centre and south of the site, and of the ballast stones in the east and north, appears to suggest that ballast stone and iron were located in different parts of the hold, rather than being stacked together.

In addition, the position of the large anchor on the northwest side of the site might indicate that this is where the bow was. The concentration of cannonballs in the southwest suggests that this is the location of the stern. This is no more than a tentative interpretation because there is nothing else to indicate the position of the bow or stern.

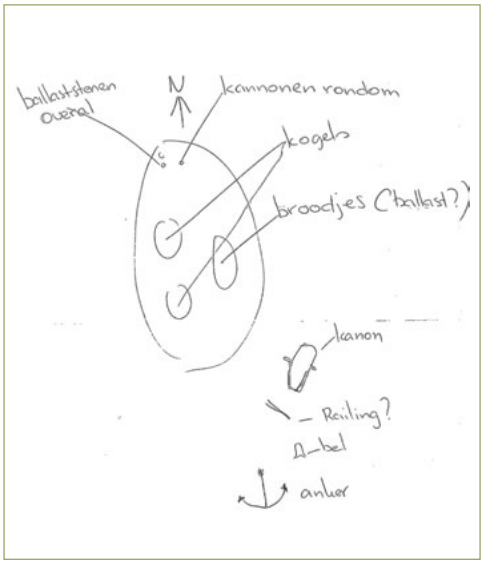


Illustration 48: Location of ship's bell sketched by H. Raven, who found it.

4.4 Dating and origin

4.4.1 Dating the building of the ship

Given that so few of the timbers has survived and that they are generally in very poor condition, divers were only able to find two suitable wood samples. One, SA-11, was taken from a hull plank in the southeast fragment. The other, SA-10, comes from a timber from the southern part of the site, to which datum points 242 and 335 are attached. Only sample SA-10 could be dated. It has 109 tree rings, three of which are core rings. There is no sapwood, however, making it impossible to pinpoint the felling date to a particular year. The sample was felled after 1750 ± 6 years (Appendix 10).[46] Although the construction date

[45] *With regard to finds by third parties, it is important to be aware that amateurs and professional researchers are sometimes not referring to the same wreck. This is definitely the same wreck, however, given the consistency between Raven's description of the wreck where he found the bell and what the archaeological diving team found at the location.*

[46] *Vernimmen 2004.*

cannot be conclusively established, it was definitely after 1744. Given the small number of tree rings, it is quite possible that the ship was built in the second half of the eighteenth century. The sample was dated using the EU6 chronology, the calendar for central and northern Scandinavia. The ship was at least partially built of Scandinavian timber. This does not allow us, however, to reach a verdict on the origin of the ship itself. There is only a single wood sample that provides rather slender evidence in this regard.

4.4.2 Dating the sinking of the ship

The divers recovered several diagnostic finds to help in determining the date the ship was wrecked. Their dating to the nineteenth and twentieth centuries suggests that the earthenware and stoneware recovered did not belong to the ship but must have washed into the wreck at a later date.

The recovered finds cannot therefore help to establish when the ship was wrecked. The cannons at the site do offer some clues, however. The trunnion shoulders point to a dating of the find assemblage in at least the second quarter, but probably the third or fourth quarter, of the eighteenth century. The bars of ballast iron also point to a dating from the middle of the eighteenth century, as iron bars were also used as ballast in Sweden from 1748 onwards.

4.5 Physical condition of the ship and site

The Noorderhaaks 10/Sophia Albertina shipwreck is in fair to poor physical condition. The little timber still present at the site is in very poor condition. The structure has broken up, is no longer in association and in some cases even lies upside down. The timbers are thickly encrusted with plumose and other anemones and barnacles and have been eroded by wood-eating organisms such as shipworm *(Teredo navalis)*. Based on the find material, which consists primarily of heavy, inorganic objects, we can also conclude that the wreck site has been washed clean for quite some time. In terms of the ship's inventory, the divers were unable to locate a proper find layer. Any small, fragile objects have been washed away or have decayed. Only the heavy items on board – the iron and stone
ballast and the artillery – have withstood the ravages of time. However, the cast iron cannons, cannonballs and ballast bars are all covered with a layer of concretion and it is doubtful whether much still remains of the original iron. Other metal objects, such as lead musket balls and copper buckles, are in fairly good condition.

Similar circumstances are also known at other shipwreck sites, most of them located in the North Sea. Several kilometres north of Noorderhaaks 10/Sophia Albertina is the Aanloop Molengat shipwreck, from which virtually only the heavy cargo of lead blocks, iron bars and rolls of tin has survived.[47] Sites of this kind can also be found off the coast of Zeeland.
In 2003 the diving team examined the Brouwershavense Gat 2/Steile Hoek (BHG2) shipwreck, which mainly consists of used and damaged iron cannons, destined for scrap.[48] An assessment of a sixteenth-century shipwreck in the Western Scheldt at Ritthem in 2005 revealed almost no find material apart from ballast stones and several very interesting cannons.[49]

These wrecks appear to have almost reached the final stage of the wreck-formation process. They demonstrate how within a few short years human activity and, above all, natural processes, can completely destroy wrecks that have been was exposed. Vos discusses these processes at length in *Natuurlijke processen als verstoorder*.[50]

The Noorderhaaks 10/Sophia Albertina site has also clearly lain exposed for years. Given the many sinker weights, sport fishing lines and pieces of commercial fishing nets that have

47 *Maarleveld 1993; Maarleveld, Overmeer and others, forthcoming [2012].*
48 *Vos 2004b.*
49 *Vos 2009.*
50 *Vos 2005c.*

come from far beneath the wreck structure, it is clear that recreational and commercial fishermen have known about the site for many years. Archaeologists have also been interested in the wreck for quite some time because it is known that at least seven cannons have been salvaged by amateur archaeologists and divers. We then have to ask ourselves how many cannons exist of which we are unaware.

The wreck needs to be monitored over a consecutive period of several years to determine the level of deterioration at the site. Given the number of known shipwrecks and the limited availability of ship archaeologists and professional divers at the Cultural Heritage Agency, this will be impossible to achieve solely using our own resources. However, we can also draw on the knowledge of local divers. Van der Wiel, the first to report the wreck, said in 1989 that only the ship's bottom was intact and that cannons and stones lay scattered about. In his report in 2002, Hugo Raven described how his group of divers came across the wreck. They made their first dive in 1998 and saw only a large mound of stones, iron, cannons and cannonballs. In 2002 they also spotted a large anchor and iron fittings protruding from the sand. These reports make little mention of ship's timbers, however. The area where they encountered their finds coincides with the location where our diving team discovered the bulk of the find material.

It would therefore appear that the site has remained fairly stable since its discovery in 1992. However, if one considers that this wreck is 'only' 200 years old, it is clear that it has deteriorated considerably in a short space of time. The iron platform now protrudes 2 to 3 m above the seabed and all the material has sunk into the surrounding trenches.

The site's popularity among divers also became apparent during the fieldwork. When the archaeological diving team arrived at the site early one morning, they saw a boat moored at the buoy leading to the anchor and from there to the site. The boat was empty and there was no sign of divers or others in the broad vicinity. Several sound signals from us brought the divers to the surface. They said they had just been down to have a look because 'there was a buoy here, so there must be something of interest underwater'.

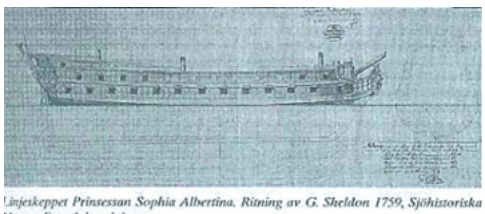
5 The Swedish man-of-war, the Princess Sophia Albertina

5.1 Introduction

A good deal is known about the Princess Sophia Albertina, the Swedish ship of the line. Christer Fredholm published a paper on this man-of-war in 2001, before the Swedish authorities were aware of the possible rediscovery of the ship.

5.2 Construction and features of the Princess Sophia Albertina

Construction work on the Princess Sophia Albertina began in Karlskrona on 12 February 1760 (illustration 49). The ship was designed by Gilbert Sheldon, a well-known shipwright. She was launched on 6 December 1764. According to charter, she was 48 m long, 12.6 m wide and had a hold 6.4 m deep. She was equipped (again, on paper) with 60 guns: twenty-four 24-pounders, twenty-four 12-pounders and twelve 6-pounders. The crew numbered about 450. The Sophia Albertina was regarded as a sound, seaworthy vessel. She was well-appointed and on various occasions had hosted royal passengers. In 1770 Prince Henry of Prussia sailed on the Princess Sophia Albertina from Germany to Karlskrona, and in 1771 the newly-crowned King Gustav III crossed the Baltic Sea on this vessel immediately after the death of his father.[51]



Linjeskeppet Prinsessan Sophia Albertina. Ritning av G. Sheldon 1759, Sjöhistoriska Museet. Foto: Johan Johnson

Illustration 49: Line drawing of the Sophia Albertina by shipwright Gilbert Sheldon (from: Fredholm 2001, Sjöhistorika Museet.)

5.3 The loss of the Princess Sophia Albertina

In the 1780s the Princess Sophia Albertina was deployed in neutral squadrons. The North Sea was certainly not a safe place for ships at that time as the Republic of the United Provinces was embroiled in the Fourth Anglo-Dutch War from 1780 to 1784. Foreign ships were also frequently plundered. To facilitate trade and shipping, the Swedish king organised neutral squadrons, convoys in which men-of-war escorted the merchant fleets along the trade route from Öresund via Cape Finisterre (on the northwest coast of Spain) to the Mediterranean Sea.

The year 1781 did not get off to a particularly good start for the Princess Sophia Albertina. The ship was once again part of a squadron, comprising ten ships of the line and two frigates, and lay at anchor in Karlskrona harbour. King Gustav III made a visit to Karlskrona to inspect the fleet on 4 June. A gun salute fired by the squadron to welcome the monarch caused a fire to break out on board the Sophia Albertina. Coming into contact with gunpowder, the fire spread rapidly and engulfed the entire artillery deck plus an officer and a petty officer. Complete panic ensued when the fire also threatened the powder stores. Men scurried to the sloops or jumped into the water until eventually a few men had the presence of mind to throw the powder kegs overboard. The Sophia Albertina was thus saved from destruction, but the ship suffered considerable damage and eleven men were drowned. The ship was quickly refurbished and was able to leave five days later and rejoin the squadron.[52]

[51] Fredholm 2001, 181.
[52] Fredholm 2001, 182-183.

Illustration 50: Fragment from the Leeuwarder Courant giving an account of the wreck of the Sophia Albertina (source: http://www.archiefleeuwardercourant.nl).

But bad luck continued to dog the ship. On the return voyage from Cape Finisterre the convoy ran into a heavy storm and thick mist, causing the Princess Sophia Albertina to become separated from the rest of the convoy. The next day the ship attempted to sail on with lanterns lit and by carrying out constant depth tests. Nevertheless, at about nine o'clock in the evening the ship ran aground with great force near Texel. The entire starboard side was torn open and the port side broke in half a few hours later. The ship disappeared for good beneath the waves some time between two and three o'clock next morning. Some of those on board managed to cling to wreckage and were rescued the following day by a man-of-war from the Republic.[53]

On 29 August 1781, among incoming reports about the Battle of Dogger Bank (the famous sea battle between the English and the Dutch Republic on 5 August 1781), the following account of the disaster appeared in the *Leeuwarder Courant* (illustration 50):

'On the 20th, at 11 o'clock at night, the Swedish man-of-war Sophia Albertina ran aground on the Haaks. Capt. Jan Gustaaf Malmschaf,[54] carrying 74 Guns and 554 Men, had 7 ships under Convoy from Cadix; at three o'clock in the morning, after the Masts had been brought down, the ship broke up; of the Crew 20 to 25 Men were saved, some of whom were rescued by Sloops from this Country's Men-of-War, lying at anchor, and the others reached the Shore; the latter included the Bosun, the only Officer known to have survived.' [55]

The 31 people on board who survived the disaster were a helmsman, a bosun, two corporals, five volunteers, three soldiers and nineteen ordinary crew members. The two captains, Ziervogel and Wetzell, did not survive the wreck. In the meantime, the other ships in the convoy, one of which was carrying Lieutenant Colonel Malmskiöld, had already reached Schleswig-Holstein.

The loss of the Princess Sophia Albertina was devastating for the people of Karlskrona. Many of the 450-strong crew came from the city and its environs. After the return of the survivors, an investigation was held into how the disaster could have happened. Although a report was drawn up, it was lost in the great fire of Karlskrona in 1790.[56]

In 1781 the Swedish king Gustav III announced his intention to build a new fleet, in order to recover the recently lost territory in southeast Finland from the Russians.[57] Was this decision also due to the loss of the Princess Sophia Albertina that same year or were these plans already afoot?

5.4 Historical information: conclusions

Bearing in mind the historical account of the Princess Sophia Albertina, we can speculate about what the ship looked like. It was a sizeable vessel, 48 m long, 12.6 m wide and 6.4 m deep. It was a 'ship of the line', the largest type of ship in the Swedish fleet. This term is derived from a battle strategy in which ships formed a frontline to fire simultaneously on the enemy. Ships of the line were heavily built so that they could carry heavy artillery.[58] According to the records, the ship had 60 guns on board.

53 *Fredholm 2001, 183.*
54 *Johan Gustaf Malmskiöld was lieutenant colonel of the squadron.*
55 *Source: http://www.archiefleeuwardercourant.nl, retrieved 03-01-2012.*
56 *Fredholm 2001, 183-184.*
57 *Tikkanen 2000, 72.*
58 *Tikkanen 2000, 73.*

The Sophia Albertina was probably not only a working man-of-war, but also an imposing and beautifully decorated ship. In the latter part of the eighteenth century, Swedish men-of war were decorated with the finest figureheads and mirror decorations. The hulls of eighteenth-century ships were normally painted with yellow oil paint or light pitch, with undulating lines in black, and had black or blue wales.[59] Because of its regular royal visitors, the Princess Sophia Albertina may have been even more lavishly appointed and decorated than other ships of the line.

Apart from the damage incurred during the voyage and the disaster, we have no other information about what the Princess Sophia Albertina looked like. She will have suffered damage as a result of the fire on board in Karlskrona harbour, and from the heavy storm on the return voyage. The shipwreck itself will also have left its mark. The masts were brought down soon after the ship ran aground, after which the ship was torn open along the starboard side and the port side then broke in two.

In the next chapter we will take stock the historical data on the ship of the line and the archaeological information about the shipwreck.

[59] *Tikkanen 2000, 74-75.*

6 Conclusions

6.1 Archaeological field evaluation: conclusions

The ROB/NISA archaeological diving team conducted an archaeological field evaluation of the Noorderhaaks 10/Sophia Albertina shipwreck from 3 June to 3 August 2004 (Appendix 11). The conclusions from the survey and the survey objectives are as follows.

The site comprises an area of some 55 by 30 m, across which ship's timbers, ballast and artillery are scattered. The core of the visible part of the site is a platform of iron bars, from beneath which protrudes a fragment of ship's structure in association. This core is fairly small, at approximately 12 m long and 8.5 m wide. In the south and southeast of the site are two more fragments of ship's structure, which are 8 by 6 m and 6.5 by 4.5 m respectively. More ship's timbers may have survived, but these would lie beneath the ballast stones and ballast iron that lie scattered across the site.

Two of the fragments of ship's timbers are sections of the bottom of the original ship. As for the third part, it is not entirely clear whether this is a fragment of the ship's bottom or of one of the sides. We can deduce from the structure that the original vessel was heavily built, at least 20 m long and 8.5 m wide.

Almost nothing has survived of the ship's inventory. The divers have encountered only heavy, inorganic objects, mainly munitions. The diving team found sixteen cannons of various calibres, different types and sizes of cannonballs and musket and pistol balls, and an iron ship's anchor almost 6 m long. The ballast iron that lies scattered across the site consists of cast iron bars, 65 to 120 cm in length and 8 to 14 cm wide and thick. There is also a large quantity of material that has washed into the site, disturbing it, including net weights and recent tableware.

The dendrochronological analysis of a floor timber from the south of the site indicates that the timber was felled after 1750 ± 6 years. The ship was most likely built in the second half of the eighteenth century.

The date of the shipwreck is harder to establish given that the recovered find material did not belong to the original ship or cannot be dated accurately. Nevertheless, there are several objects that can tell us more about the period in which the ship sailed the seas. The trunnion shoulders on various cannons point to a dating in at least the second quarter, but probably the third or fourth quarter of the eighteenth century. The iron ballast bars suggest a dating from the middle of the eighteenth century onwards, as iron bars were also used as ballast in Sweden from 1748.

The physical condition of the shipwreck is extremely poor. The few surviving ship's timbers have broken into pieces, are no longer in association, are thickly encrusted with plumose anemones and barnacles and have been eroded by wood-eating organisms such as shipworm. For the rest, there is almost no find layer. The find material comprises heavy, inorganic materials. The situation is typical of a site that was was exposed many years ago. Although the findings of recreational divers suggest that the situation has stayed the same for some years, it can by no means be described as stable. The iron platform now protrudes 2 to 3 m above the seabed and much of the find material has sunk into the surrounding trenches.

6.2 The wreck and the ship of the line: taking stock

Is the shipwreck that lies on the floor of the North Sea near the Noorderhaaks sandbar the Princess Sophia Albertina, the Swedish man-of-war, as conjectured? The survey carried out by the archaeological diving team has supplied enough information for this question to be answered.

First, the site. The wreck is highly disintegrated, with only fragments of the original ship remaining; one fragment even lies upside down. According to Fredholm, the Princess Sophia Albertina ran aground with such force that the entire starboard side was ripped open. Several hours later the portside was also torn in two. This would explain why so few ship's timbers have been found on the seabed: even as it sank, the ship was no longer intact.

Second, the dating and origin of the ship's timbers. The tree-ring analysis points to a felling date for the timber after 1750 ± 6 years, which would suggest a construction date in the second half of the eighteenth century. This ties in with the construction date for the Princess Sophia Albertina, which was built between 1760 and 1764.
The sample of ship's timbers that was analysed originates from central or northern Scandinavia, which might suggest origins and construction in Scandinavia. It should however be emphasised that this assumption is based on the analysis of a single wood sample.

Third, the ship's structure. The ship had heavy floor timbers 27 to 38 cm wide, and a sturdy keelson some 50 cm wide. Such a solid structure would appear to indicate a man-of-war, as these vessels had to be stronger and more robust than merchant ships. A considerable force was exerted when the ship's cannons were fired and men-of-war also had to be able to withstand enemy attack.

Fourth, the nature of the find assemblage. No traces of cargo were found, but heavy iron and stone ballast is present and there are sixteen cannons protruding from the seabed. This too would suggest a man-of-war rather than a merchant vessel. In Sweden, iron bars were included as ballast alongside stones after 1748 because this made for and more secure and efficient use of space in the hold.[60]

Finally, specific finds that provide further evidence for a positive identification. In terms of calibre, the cannons correspond with those that the Princess Sophia Albertina was reported to have on board. Several cannons are definitely of Swedish origin. One of the trunnions may even bear the date 1780.

The evidence collected by local divers is also important for identification purposes. It goes without saying that the ship's bell found by Raven was very important. The text on the bell – IHOLM – indicates where the bell was cast, namely Stockholm. The year 1738 seems rather early for a ship that was not aunched until 1764, and the ship's name is missing. According to Tikkanen, bells on Swedish men-of-war did not always state the name of the ship. The lifespan of a bronze bell was considerably longer than that of a ship, so one bell may well have been used on a number of ships.[61]

[60] *Vos 2008, 10.*
[61] *Tikkanen 2000, 75.*

6.3 Definitive conclusion

In short, the survey has yielded sufficient information to confirm that the wreck near the Noorderhaaks sandbar is the Swedish man-of-war, the Princess Sophia Albertina. A positive identification of a historical ship is rare in the Netherlands because of the difficulties associated with establishing a link between the historical and archaeological sources. Despite the fact that none of the finds bears the name of the ship or crew, the archaeological survey nevertheless enabled a positive identification. Having lain anonymously on the seabed for more than 200 years, this Swedish man-of-war may once again assume its own name – the Princess Sophia Albertina. This is indeed a special event.

7 Assessment and selection advice

7.1 Introduction

We used the assessment system of the Dutch Archaeology Quality Standard (KNA) to assess the site. However, as this system was developed for terrestrial archaeology, it is not entirely appropriate for assessing underwater sites or wrecks on land. Finds of this nature tend to score very poorly on 'perception' (underwater finds are fairly inaccessible) and 'group value' (certainly when it comes to stand-alone finds).

Table 6 shows the values with criteria and associated scores. The scores are explained below.

7.2 Perception

7.2.1 Aesthetic value

The shipwreck is not currently a visible landscape feature for most people because it is submerged at all times at a maximum depth of 17 to 20 m.

Recreational and other divers do, however, make regular visits to the wreck. In exhibition terms, the shipwreck itself is less important, given that few ship's timbers have survived.

7.2.2 Remembrance value

The shipwreck scores very highly in terms of remembrance value, for a number of reasons:

- The wreck has been positively identified as the Princess Sophia Albertina, a Swedish man-of-war, a rare occurrence among underwater shipwrecks.
- The Princess Sophia Albertina played an important role in Sweden's past.
- The account of the sinking is known in Sweden and also appeared in Dutch newspapers at the time.

For the Netherlands, the importance of the wreck as part of Swedish history is sufficient reason to treat the site with care and to display good stewardship towards this piece of underwater cultural heritage.

Table 6: Assessment of Noorderhaaks 10/Sophia Albertina site

Values	Criteria	Scores
Perception	Aesthetic value	NA
	Remembrance value	Worth preserving
Physical quality	Intactness	1 point
	State of preservation	1 point
Scientific quality	Rarity	2.75 points
	Information value	3 points
	Group value	NA
	Representativity	3 points
Total score		**10.75 = worth preserving**

7.3 Physical quality

7.3.1 Intactness

Only a small portion of the original ship has survived. This comprises two fragments of the ship's bottom (12 by 8.5 m and 8 by 6 m), in association, and a third fragment of the bottom or side (6.5 by 4.5 m). In total, this would amount to approximately 20% of the original structure, given that the Princess Sophia Albertina was 48 m long, 12.6 m wide and had a hold 6.4 m deep.

The find material is incomplete, with only the heavy, inorganic parts of the inventory, cargo and ballast surviving. The sixteen cannons at the site and the seven salvaged cannons account for 38% of the total of 60 guns that the Princess Sophia Albertina had on board. Over the course of time all the organic material has disintegrated or disappeared. The find material is heavily disturbed, with unrelated objects lying among related objects. Its relationship to the remains of the ship and the relationships between the various finds are not strong.

There is no stratigraphy outside the wreck mound. The uppermost layer of the surrounding seabed consists of North Sea sand that is in constant motion. There is a limited stratigraphy in the wreck itself: the ballast iron still lies neatly stacked alongship.

We can expect the site to deteriorate further in the future, mainly as the result of natural processes.

7.3.2 State of preservation

The protruding organic parts of the wreck are in a very poor state of preservation because of shipworm damage. We can assume that the ship's timbers lying beneath the cargo of ballast iron are still in good condition because they are not exposed to oxygen. Although no metal parts of the wreck have been found, they will certainly still be present in the form of iron nails, bolts and fittings. However, as iron objects are usually severely affected by salt water, they will be largely corroded.

No organic find material remains at the site; it has been washed away or has disintegrated. The state of preservation of lead, copper and brass objects is good. The condition of the iron objects – the cast iron cannons, cannonballs and ballast bars – can be described as fair. The iron is completely corroded, which has caused the objects to cake together. Fortunately, however, the original objects can still be identified within the concretion.

7.4 Scientific quality

7.4.1 Rarity

At present no clear criteria have been developed that allow an unequivocal assessment of a site's rarity for the period or region. Few examples of this type of ship (man-of-war, ship of the line) are known from this period (late-eighteenth

century), which makes the wreck a unique object. The fact that there is a man-of-war of Swedish origin in Dutch waters is in itself unique. The Princess Sophia Albertina may also be of interest to Swedish researchers, even though other wrecks of late-eighteenth-century Swedish men-of-war are known, such as that of the Crown Prince Gustav Adolf.[62]

7.4.2 Information value

Partly because the chapter on Maritime Archaeology in *the National Archaeological Research Agenda (NOaA)* is not yet complete, it provides no criteria on which to base conclusions about gaps in the geographical or scientific knowledge.

The ship is of Swedish origin and is of particular interest to Swedish researchers. It could yield additional information about the building of ships of the line in the eighteenth century. New insights into construction methods for foreign ships might also help Dutch researchers establish the origin of wrecks in future studies.

7.4.3 Group value

It is difficult to assess the group value of a shipwreck as the archaeological context bears no direct relationship to the vessel. The Princess Sophia Albertina did not operate in isolation, but was part of a neutral squadron charged with protecting the Swedish merchant fleet. It was, however, the only ship in the fleet that sank.

The same is true of the landscape context. The shipwreck probably ended up at this location coincidentally and it sank as the result of an accident. The sandbar on which the ship ran aground and broke up still exists today, but its shifting position means that it no longer occupies the same spot as it did then.

7.4.4 Representativity

The wreck of the Princess Sophia Albertina will certainly be representative of Swedish men-of-war in the second half of the eighteenth century.

7.5 Conclusion and selection advice

Firstly, it should be pointed out that clear criteria still need to be developed, particularly with regard to rarity (in terms of period and region), gaps in the geographical and scientific knowledge, and representativity. This makes it difficult to arrive at an unequivocal judgement based on these variables. Moreover, the 'perception' and 'group value' criteria do not really apply to underwater sites and should not therefore be taken into consideration.

The wreck scores particularly low on physical quality. Nevertheless, a decayed and degraded site can still be worth protecting. The archaeological field evaluation has shown that a good deal of information can still be gathered from sites of this nature.

[62] *Tikkanen 2000.*

The shipwreck scores particularly high on rarity value, information value, representativity and remembrance value – especially for Sweden. On the basis of these criteria, we can classify the wreck as worth preserving.

In situ preservation or protection of the site by covering it with nets would probably be difficult. The height differences are such that the process of sanding-up is likely to occur either very slowly, if at all.

Excavation may be the only way to safeguard the information still present in the ship. In any event, the wreck has great remembrance value for Sweden, partly because so many of those on board perished. The Netherlands will have to demonstrate careful and responsible management – in other words, good stewardship. This assessment provides a further building block for a well-considered decision as to what should happen to the wreck in the near future.

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Glossary of terms

Airlift
An underwater suction device that works on the basis of compressed air rising and expanding within a long pipe.

Archaeological field evaluation
Exploratory survey to establish the value of an archaeological findspot. This includes dating, dimensions, physical condition and uniqueness.

Ballast
eavy material, often boulders, that are placed in the hold to lower a ship's centre of gravity and improve stability.

Bar shot
Two balls joined by a bar, designed to bring down a ship's rigging.

Bilge
The transitional area between the bottom and sides of a ship.

Bow
Fore section of the ship located forward of the first mast.

Caprail
Plank atop the upper end of the frames and/or sides of small or medium-sized ships

Carvel planking
Method of construction whereby the hull planks are laid flush to form a smooth surface

Ceiling
Planking on the inner surface of the hull, attached to the frames, which adds to a ship's longitudinal strength. A closed ceiling is one in which the planks lie directly adjacent to one another; an open ceiling is one with gaps between the planking.

Concretion
'Clump' of material formed by the oxidation of iron objects in fresh or salt water, whereby material from the immediate vicinity (finds and sand) clump to together to form a single mass, sometimes rock-hard.

Deadeye
Round block with convex sides, encircled by a rope or an iron band and usually with three transverse holes.

Dendrochronological analysis
Scientific method whereby timber, especially old timber, can be dated using tree-ring patterns.

Floor timber
Part of a frame. Straight piece of timber that connects the bottom planking and the keel.

Frame
Transverse reinforcing member made up of one or more components, such as floor timbers and futtocks.

Garboard strake
The first strake of planking on each side of the keel.

Hold
The depth of the hull, measured amidships, from the top of the ship's bottom to the main deck.

Hull plank
Plank on the ship's hull, on both the bottom and sides.

Keel, keel beam
Heavy longitudinal timber, projecting below the bottom planking amidships, upon which the stem, sternpost and ship's bottom are mounted; the backbone of the hull.

Keelson
The backbone of the ship; a heavy centreline timber that lies above the keel over the floor timbers and adds to the longitudinal rigidity of the hull.

Maststep
A support for the heel of a mast or a heavy block with a rectangular recess, or a rectangular recess in the keelson.

Planking
The outer lining of the hull made up of planks.

Port, port side
Left side of a ship when facing the bow.

Sapwood
The outermost, not yet 'mature', rings of a tree, between the heartwood and the bark.

Scarf
A join between two planks in which the planks overlap longitudinally.

Ship's bottom
Part of the hull that forms the bottom of the ship.

Side
The entire side of a ship above the bilges.

Site
Location where archaeological finds are made.

Starboard, starboard side
Right side of a ship when facing the bow.

Stem
Longitudinal reinforcing member rising from the forward end of the keel and into which the outer planking in the bow is rabbeted.

Timbers
A general term for the wooden hull members that form the skeleton of the ship, providing transverse bracing and bracing the planks themselves.

Treenail
A wooden peg driven through planks and timbers to join them.

Trunnion
Metal projection on either side of a cannon that fits into recesses in a gun carriage.

Stern
In a broad sense, the ship's hull aft of the main mast; in a narrow sense, the back part of a ship.

Sternpost
Longitudinal reinforcing member rising from the aft end of the keel into which the outer planking in the stern is rabbeted.

Strake
A continuous line of hull or ceiling planks running from stem to sternpost.

Wale
A thick strake of planking along the outside of the ship's side to protect the ship and to improve longitudinal strength.

Descriptions derived from:

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Appendices

1. Archis observation report 48090
2. Archis research registration report 6500
3. Correspondence with Statens Sjöhistoriska Museer, 27-8-2002, 11-9-2002 and 7-11-2002
4. OnderwaterSport article (R. Aarsen)
5. List of finds from Noorderhaaks 10/Sophia Albertina shipwreck 2004
6. Sophia Albertina ceramics identification report (P. Kleij)
7. Report on conservation of iron bars (L. van Dijk & A. Vos)
8. Botanical analysis report (W. Kuijper)
9. Photograph and drawing of barshot (N. Brinck)
10. RING dendroreport (T. Vernimmen)
11. Navis identification list

Appendix 1:
Archis observation report 48090

Uitgebreide Rapportage Waarnemingen

Waarnemingsnr:	48090	**Vondstmelding:**	**Extern nr:**
Objectcode:	09CN-106		**Onderzoeksmelding:**
Coördinaten:	102223 / 559566		
Toponiem:	Noordzee Noorderhaaks 10; Sophia Albertina		
Plaats:	Noordzee		
Gemeente:	Noordzee		
Provincie:	Zee/Buitenland		
Vinder/datum:	Wiel van de / 03-06-1989		
Invoerder/datum:	van der Wens-Poulich / 11-02-2004		
Beschrijver/datum:	Wiel van de / 03-06-1989		
Verwerving:	Niet archeologisch: waterwerk en ex	**Geomorfologie:**	Laagte
Grondgebruik:	Water/geul/bank/plaat	**NAP maaiveld:**	

Beschrijving

WERKNAAM/DOSSIER: Noordzee Noorderhaaks 10, volgnr. vdWiel N18.
GEOPOS: 53°01,272'NB en 04°36,120'OL (ED50) ofwel 53°01,23'NB en 04°36,04'OL (WGS 84), positie H.Raven, waaruit x en y. RWS: UTM zone 31, N5875944,29 en E607442,90 waaruit 53°01,2674'NB en 04°36,1050'OL (ED50). Andere, maar afwijkende positie is radar 3,96' uit Texel wat 53°01,31'NB en 04°36,00'OL (102.090/559.638) oplevert. HP 39, 1998, Blok L17, wraknr. 2843.
Afm. ca. 25 m.L x 10 m.B en steekt ca. 2,5 m. boven zeebodem. Ligging: NW-ZO.
DIEPTE: 17,5 m. (LW of HW?).
1e MELDER: op 20-06-1989, J.B.S.P. van de Wiel, Amsteldiepstraat 50, 1779BT Den Oever. Mededeling: er zijn 5 kanonnen opgevist, 1 door WR 54 en 4 door WR 23, ook de WR 34 heeft er een opgevist maar niet zeker of het van dit wrak afkomstig is.
2e MELDER: Rijkswaterstaat directie Noordzee, datum vondst 07-08-1996. Mededeling R.Lambij 28-04-2004: sonarbeelden gemaakt van wrak, komt hier later op terug.
3e MELDER: op 18-11-2002, H.A.M. Raven, Murillolaan 38, 1619VB Andijk, tel.0653-446670, datum vondst 16-08-1997.
ONDERZOEK: 2004: waardestellend onderzoek door NISA duikteam.

Vondsten

Complex:	Scheepvaart	**Cultuur:**	Niet van toepassing
Aantal:	9999	**Toestand:**	Onbekend
Materiaal:	Metaal		
Code algemeen:	Staaf	**Begindatering:**	Nieuwe tijd B: 1650 - 1850 nC
Code specifiek:	Niet van toepassing	**Einddatering:**	Nieuwe tijd B: 1650 - 1850 nC
Toelichting:	Lading ijzeren (of lood?) staven, afm. ca. 100 x 10 x 10 cm.		

Complex:	Scheepvaart	**Cultuur:**	Niet van toepassing
Aantal:	1	**Toestand:**	Onbekend
Materiaal:	Leer/huid/bont		
Code algemeen:	Foedraal/etui	**Begindatering:**	Nieuwe tijd B: 1650 - 1850 nC
Code specifiek:	Niet van toepassing	**Einddatering:**	Nieuwe tijd B: 1650 - 1850 nC
Toelichting:	Kardoes met kruitresten.		

Complex:	Scheepvaart	**Cultuur:**	Niet van toepassing
Aantal:	1	**Toestand:**	Onbekend
Materiaal:	IJzer		
Code algemeen:	Vuurwapen (onderdeel)	**Begindatering:**	Nieuwe tijd B: 1650 - 1850 nC
Code specifiek:	kanon	**Einddatering:**	Nieuwe tijd B: 1650 - 1850 nC
Toelichting:	Kanon Raven: gietijzeren 6-ponder van 8 ft. uit Zweden, afm. 2,395 m.L. Wrsch. gemaakt tussen 1627-'52. Voorzien van konische tappen en vele sierringen. Inscriptie: "LDG" (gieter Lodewijk de Geer).		

Uitgebreide Rapportage Waarnemingen

Complex:	Scheepvaart	**Cultuur:**	Niet van toepassing
Aantal:	1	**Toestand:**	Onbekend
Materiaal:	Hout/houtskool		
Code algemeen:	Schip/boot (onderdeel)	**Begindatering:**	Nieuwe tijd B: 1650 - 1850 nC
Code specifiek:	Niet van toepassing	**Einddatering:**	Nieuwe tijd B: 1650 - 1850 nC
Toelichting:	Zweeds lijnschip/oorlogsschip "PRINSESSAN SOFIA ALBERTINA". Gebouwd in Karlskrona tussen 1760 en '64, gezonken op 19-08-1781. Alleen vlak intact, verspreid liggende kanonnen en stenen. Oorspr. afm. 47,5 m.L x 12,47 m.B x 6,38 m.D (160,5 x 42 x 21,5 ft.).		

Complex:	Scheepvaart	**Cultuur:**	Niet van toepassing
Aantal:	1	**Toestand:**	Compleet
Materiaal:	IJzer		
Code algemeen:	Vuurwapen (onderdeel)	**Begindatering:**	Nieuwe tijd B: 1650 - 1850 nC
Code specifiek:	kanon	**Einddatering:**	Nieuwe tijd B: 1650 - 1850 nC
Toelichting:	Kanon v.d.Wiel: gietijzeren wrsch. Zweeds kanon, het kulas is een zgn. 'hulbunder'. Drie gegroepeerde kroontjes op het trompvlak. Inscriptie op het trompvlak: een klaar ankertje met aan weerszijden "CFF" (gieter).		

Complex:	Scheepvaart	**Cultuur:**	Niet van toepassing
Aantal:	1	**Toestand:**	Onbekend
Materiaal:	Brons		
Code algemeen:	Klok/bel	**Begindatering:**	Nieuwe tijd B: 1650 - 1850 nC
Code specifiek:	Niet van toepassing	**Einddatering:**	Nieuwe tijd B: 1650 - 1850 nC
Toelichting:	Scheepsbel met inscriptie "G:MEYER FEC:I HOLMEN:1738" (Gieter Gerhard Meyer, Stockholm, 1738) en kroon bovenop.		

Complex:	Scheepvaart	**Cultuur:**	Niet van toepassing
Aantal:	1	**Toestand:**	Onbekend
Materiaal:	Hout/houtskool		
Code algemeen:	Schip/boot (onderdeel)	**Begindatering:**	Nieuwe tijd B: 1650 - 1850 nC
Code specifiek:	Niet van toepassing	**Einddatering:**	Nieuwe tijd B: 1650 - 1850 nC
Toelichting:	Klokkestoel.		

Complex:	Scheepvaart	**Cultuur:**	Niet van toepassing
Aantal:	1	**Toestand:**	Compleet
Materiaal:	IJzer		
Code algemeen:	Vuurwapen (onderdeel)	**Begindatering:**	Nieuwe tijd B: 1650 - 1850 nC
Code specifiek:	kanon	**Einddatering:**	Nieuwe tijd B: 1650 - 1850 nC
Toelichting:	Kanon RWS: gietijzeren 24-ponder uit Zweden, afm. 2,46 m.L., 2 kroontjes op trompvlak, "ijzeren label 4".		

Complex:	Scheepvaart	**Cultuur:**	Niet van toepassing
Aantal:	1	**Toestand:**	Onbekend
Materiaal:	IJzer		
Code algemeen:	Vuurwapen (onderdeel)	**Begindatering:**	Nieuwe tijd B: 1650 - 1850 nC
Code specifiek:	kogel/projectiel (rond of met punt)	**Einddatering:**	Nieuwe tijd B: 1650 - 1850 nC
Toelichting:	Staafkogel 12-ponder van smeedijzer, bollen van gietijzer waarvan een bol is omwikkeld met henneptouw. Afm. 47,5 x 11 cm.		

Documentatie

Type:	Tekening
Beheerder:	Brinck, N.
Toelichting:	Kanon.

Uitgebreide Rapportage Waarnemingen

Type: Tekening
Beheerder: Particulier
Toelichting: Kanon.

Type: Brief
Beheerder: Puype, J.P.
Toelichting: Beschrijving van kanon.

Type: Brief
Beheerder: Brinck, N.
Toelichting: Beschrijving van kanon.

Type: Brief
Beheerder: Brinck, N.
Toelichting: Beschrijving van kogel.

Type: Foto
Beheerder: Particulier
Toelichting: Kanon.

Type: Foto
Beheerder: Particulier
Toelichting: Bel/klok.

Type: Verslag
Beheerder: Particulier
Toelichting: Meldformulier Onderwatervondsten.

Literatuur

Vos, A. 2008 De prinses en de zorg voor erfgoed onder water, in: Archeobrief 3

Appendix 2:
Archis research registration report 6500

Uitgebreide Rapportage Onderzoeksmeldingen

Onderzoeksmelding:	6500	**Kaartblad:**	09C	**Coördinaten:**	102220 / 559565
Naam onderzoek:					
Toponiem:	Noorderhaaks 10; Sophia Albertina				
Plaats:	Noordzee				
Gemeente:	Noordzee				
Provincie:	Zee/Buitenland				
Type onderzoek:	Archeologisch: onderwaterarcheologie				
Uitvoerder:	Nederlands Instituut voor scheeps- /onderwaterarcheologie				
Projectleider:	Nederlands Instituut voor scheeps- /onderwaterarcheologie				
Opdrachtgever:	Niet van toepassing				
Bevoegd gezag:	Niet van toepassing				
Aanmelding:	10-05-2004	**Aanvang:**	03-06-2004	**Geschatte duur:**	0
Motief:	Wetenschappelijk onderzoek				
Ingevoerd door/op:	wwens / 12-05-2004				

Toelichting
Kaartblad: 09CN
Coordinaten: 102.223/559.566
Toponiem: Noorderhaaks 10 (Sofia Albertina)
Gemeente: -
Provincie: -
Type onderzoek: monitoring/kartering
Aanvang: 01-06-2004
Beeindiging:
Geschatte duur: 11 weken
Onderzoeker(s): duikteam NISA
Complextype(n): Scheepvaart
Datering: NTB
Notitie A. Overmeer, 11-10-2004: duikonderzoek in de periode 3 t/m 10 juni, 21 t/m 22 juni, 5 t/m 7 juli, 20 t/m 29 juli, 3 augustus 2004 (17 dagen). Coordinaten: 102.222/559.566. Werkzaamheden: Verkenning van scheepswrak. Over een oppervlakte van .. x .. m liggen tientallen kanonnen, broodjes ballastijzer, ballaststenen en ijzeren kogels verspreid. Onder deze zware lading is sporadisch hout zichtbaar, wat huidplanken, inhouten en wellicht een zaathout of kielbalk. Het wrak is ingemeten, getekend en gefilmd. M.b.v. de airlift is er getracht daterend materiaal als geschikt hout voor dendrodatering en gidsfossielen, te verzamelen. Het hout wordt gedateerd na 1750 AD +/- 6 jr (RING). Het vondstmateriaal moet nog bekeken worden.

Appendix 3:
Correspondence with Statens Sjöhistoriska Museer, 27-8-2002, 11-9-2002 and 7-11-2002

STATENS SJÖHISTORISKA MUSEER

SJÖHISTORISKA MUSEET
VASAMUSEET
MARINMUSEUM

Karlskrona den 11 sep 2002 Dnr. 140/02-53

Hugo Raven
Murillolaan 38
1619 VB Andijk
Nederländerna

Ship´s bell

Thank you for your mails.

We now believe we have the name of the Swedish wreck found on the westside of the island Texel. It must be the Swedish Ship of Line "Prinsessan Sophia Albertina" (The Princess Sophia Albertina).

This ship was lost 19 of august 1781 near Den Helder. Only 31 persons were saved of a crew about 500 men. The ship was built in Karlskrona, Sweden 1764. I add a copy of an article in Swedish about this disaster. I have also been in contact with the author of the article the Re. Commander Christer Fredholm. He was very interested to hear you have found the wreck and the bell and he will perhaps take contact with you.

You are also in your last mail asking if inscriptions on the bell was not enough to find out what ship it was? I don't think so as the bell was founded 1738, 26 years before the ship was launched. The bell could perhaps have been used on another ship before 1764 but we do not know that.

I add a copy from the magazine "Tidskrift i Sjövåsendet , nr. 2/ 2001", page 180 – 184.

Yours sincerely

Manne Dunge, Mr
Senior Curator

STATENS SJÖHISTORISKA MUSEER

SJÖHISTORISKA MUSEET
VASAMUSEET
MARINMUSEUM

Karlskrona den 27 aug 2002 Dnr.140/01-53

Hugo Raven
Murillolaan 38
1619VB Andijk
Nederländerna

Shipsbell

Dear Sir,

I have tried to send you this short message as I-mail but failed.

Today I have got your mail of 31 July about the ships bell found in a Wreck in the North Sea. The bell seems to be made in Stockholm 1738 by the bell founder Gerhard Meyer.

As the ship had about 50 large guns and the bell has a royal crown I Guess it must have been on a warship. But I have not found out the history of the ship yet so I will write to you again later on.

Manne Dunge, Mr
Senior Curator

I-mailadress: manne.dunge@sshm.se

STATENS SJÖHISTORISKA MUSEER

SJÖHISTORISKA MUSEET
VASAMUSEET
MARINMUSEUM

Karlskrona den 7 nov 2002 Dnr. 140/02-53

Mr. Hugo Raven,
Murillolaan 38,
1619 VB Andijk,
Holland.

Re. Shipp's bell

Dear Mr. Raven,
Thank you for your e-mails.

Your enquiry in regard to the ship's bell from the Swedish man of war Prinsessan Sophia Albertina has given rise to several stimulating discussions amongst my colleagues at our Naval and Maritime museums. These deliberations have resulted in the following conclusions.

The remains of wrecks from the past located within territorial waters are more often than not protected by national laws governing the protection of Ancient Monuments. These laws can also be applied to foreign vessels, including warships and other vessels employed in the service of the State, as was the case with those Swedish warships that during the eighteenth and nineteenth centuries went to the bottom in Danish and Finnish waters. They were not protected by Sweden's Ancient Monument laws, but fell under the jurisdiction of the relevant sovereign State. However, the legal framework does differ from country to country, and in particular concerning the protection of vessels engaged in government service.

In general there is no common legal structure governing wrecks in international waters, although in July 2001 UNESCO approved a Convention in this matter. The main principle in this Convention is the importance of protecting the wreck in situ, but to date it has not been possible to reach a consensus as to how the problem of wrecks in international waters should be approached. In this context, considerable importance must be attached to the question of naval and other vessels in the service of the State.

In the case of the ship's bell from the wreck of the Sophia Albertina we feel that the relevant national legal structure is perfectly satisfactory. However, it is our intention to write to the Dutch authorities in order to ascertain their policy towards the protection of wrecks of foreign vessels from the past in Dutch territorial waters. For the time being therefore, we do not wish to say more until we know of their position in this question, but will be in contact with you as soon as we receive their reply.

Yours sincerely,

Manne Dunge
Senior Curator

Copy: Christer Fredholm

Box 27131 S-102 52 Stockholm Tel 08-519 549 00 Fax 08-519 549 59

Appendix 4:
OnderwaterSport article (R. Aarsen)

Reportage

Duikende archeologen bewaren verleden voor de toekomst

Op zoek naar Sofia Albertina

TEKST EN FOTO'S: **ROB AARSEN**

De Coastal Digger is er dit seizen voor gecharterd. Van rederij Waterweg. Vanuit het NIOZ-haventje op Texel vaart de boot er met de stroming mee in twee uurtjes naar toe. De duikplek die door het duik-team van het Nederlands Instituut voor Scheeps- en onderwaterArcheologie wordt gezocht is klein. Ongeveer 35 bij 35 meter en ligt op twintig meter diepte in de Noordzee.

Het wrak van de Sofia Albertina is bekend bij sportduikers. Er zijn kanonnen gevonden, ijzeren broodjes en massa's ballaststenen. Onder de zuidpunt van het eiland door gaat het de Noordzee op, een stuk naar het noorden en dan om een grote zandplaat heen de open zee op. Texel blijft zichtbaar als een streep aan de horizon. Er staat bijna geen wind maar het is bewolkt en af en toe valt er een spat regen. Goed duikweer dus, maar het duikteam van het Nederlands Instituut voor Scheeps- en onderwaterArcheologie doet ook onder de moeilijkste omstandigheden haar werk. Op de bodem van de zee brengt het team oude scheepswrakken in kaart, neemt monsters en verzamelt spullen die iets kunnen vertellen over de tijd waarin het schip ooit dienst deed. En daarna: zand erover.

BAGGERSPECIE Zodra het duiktrapje niet meer wappert in de stroming, gaan de eerste duikers al te water. Voor de anderen is het nog even wachten tot de hoogwaterkentering dichterbij is gekomen. Het water dat aan dek nog zo uitnodigend flessengroen lijkt, blijkt onderaan de ankerlijn toch meer weg te hebben van baggerspecie. Het is donker, het zicht is soms een meter maar het grootste deel van de duik niet meer dan vijftig centimeter. Na diep adem te hebben gehaald wordt de ankerlijn los gelaten. Net voordat zijn force fins door het duister worden opgeslokt. Arent Vos en zijn mensen maken twee tot drie van dit soort duiken per dag, vijf dagen in de week voor een periode van ongeveer twaalf weken in de zomer. Vos is hoofd van het duikteam van het Nederlands Instituut voor Scheeps- en onderwaterArcheologie, kortweg NISA.

ZEVEN MENSEN Het NISA is de thuishaven van de enige professionele ploeg onderwaterarcheologen in Nederland, en een afdeling van de Rijksdienst voor het Oudheidkundig Bodemonderzoek. Het team van zeven mensen onderzoekt een wrak waarvan het vermoeden bestaat dat het gaat om het Zweedse oorlogsschip Sofia Albertina dat hier in 1781 is gezonken. Archeologisch onderzoek moet uitwijzen of die aanname klopt; wanneer het schip is gebouwd en vergaan, hoe ze bewaard is gebleven en wat de wetenschappelijke waarde is van de plek.
Het water rond Texel is bekend terrein voor hem. Vos: 'Hier en in wat vroeger de Zuyderzee was, vinden we de meeste wrakken.' Het komt doordat er daar altijd veel is

'EEN WRAK IS EEN KLEIN PAKKETJE GESCHIEDENIS, KEURIG BIJ ELKAAR EN GOED VERPAKT'

gevaren. De Zuyderzee was omringd door handelssteden: Harderwijk, Elburg, Kampen, Hoorn, Medemblik, Enkhuizen en niet te vergeten Amsterdam. In de toptijd, in de Gouden Eeuw, waren er alleen al tussen Nederland en de Oostzee zo'n 3.000 tot 3.500 scheepvaartbewegingen per jaar. Onder meer voor de handel in graan, bosproducten en metaal – dat is geregistreerd in de Sonttolregisters.

GROOTSTE RISICO De VOC kwam tussen 1602 en 1795 tot bijna 8.000 uit-en thuisreizen, waarvan veel schepen op de rede van Texel met lichters werden geladen of gelost. En een tweede reden dat hier zo veel wrakken liggen, is volgens Vos dat een schip juist bij de kust het grootste risico loopt om te vergaan. 'Vaargeulen verschuiven. Je hebt te maken met ondieptes en de betonning was in de 16e eeuw nog niet zo betrouwbaar.'
Aangezien er in hele zware stormnachten wel eens veertig of meer schepen tegelijk vergingen, liggen er in het gebied honderden wrakken te wachten op een bezoek van het duikteam. 'Zo'n wrak is enorm waardevol,' vindt Alice Overmeer, één van de archeologen in het team. 'Zeker als het onder een beschermende laag zand ligt, is het een klein pakketje geschiedenis, keurig bij elkaar en goed verpakt.' Ook al hebben stroming, zout water en paalwormen (Teredo Navalis) het hout weggevreten, dan nog kan de wetenschappelijke waarde hoog zijn.

GOUDEN BRON Arent Vos verhaalt in dat kader van een wrak bij het Brouwershavense gat. Het stak misschien al dertig jaar boven het zand uit. 'Dus over de constructie kwamen we niet zo veel te weten. Maar de lading bleek te bestaan uit afgedankte kanonnen en zelfs in stukken gezaagde delen van geschut en munitie. Een gouden bron voor onderzoek naar de artillerie uit die tijd.'
Zo kan ieder wrak bijdragen aan de kennis over de periode waarin het schip werd gebouwd en dienst deed. 'Er zijn veel mensen met interesse in de maritieme geschiedenis van Nederland,' aldus Vos. 'Kijk maar naar de

belangstelling voor de Bataviawerf (daar wordt nu een replica gebouwd van de Zeven Provinciën – zie kader), en de aandacht in de pers als er weer een Romeins schip is gevonden in een oude tak van de Rijn. Nederland heeft een rijk maritiem verleden en veel mensen willen daar meer van weten. De rijkdom van Nederland in de Gouden Eeuw was grotendeels te danken aan de scheepsbouw en scheepvaart.'

SMERIGE WIJN Met het onderzoek van het duikteam van het Nederlands Instituut voor Scheeps- en onderwaterArcheologie worden die verhalen naar boven gebracht. 'Door middel van de objecten, de tekeningen en hoe we dat uiteindelijk aan het publiek presenteren. Daar zit een romantische kant aan, ook. Zeker als je door een vondst dicht bij de men-

sen van toen komt. Zo hebben we een keer wijn opgedoken en die laten onderzoeken door een panel van beroeps-wijnproevers. Heel smerig overigens, maar ze waren dolenthousiast.'
Die romantiek is nauwelijks voor te stellen op de bodem van de Noordzee, terwijl grote vlokken alg om de oren vliegen. Soms klaart het even op en dan trekt er weer een gordijn van alg of stof over de duikplaats die het zicht tot bijna nul reduceert. Overal zijn plastic labels in de bodem geslagen. Alice Overmeer is onverstoorbaar in de weer met een meetlint, zonder oog te hebben voor de scholen steenbolk die om haar heen dartelen. Ze probeert nauwkeurig de afstand te bepalen tussen twee labels, geen sinecure als de stroming aan je meetlint trekt.

AIRLIFT Een stukje verderop worstelt Peter Leensen, een van de andere duikers, met de airlift. Dat is een lange pvc buis waar aan de onderkant perslucht in wordt geblazen. Door de zuigende werking die in de buis ontstaat, kunnen delen van het wrak mooi zandvrij worden gemaakt. In deze omstandigheden zijn daar wel spierballen voor nodig. Arent Vos wijst de weg naar een groot kanon dat onder een blok ligt. Er liggen meer kanonnen op een rij, half begraven in het zand.
Overal liggen ook projectielen, waaronder een zogenaamde 'kneppelkogel' die half uit het wrak steekt. Dat is een soort halter die werd afgeschoten om de tuigage van de tegenstander te vernielen. Er zijn op z'n minst vol-

Het Verdrag van Malta

Sinds het Verdrag van Malta is getekend in 1992, zit de archeologie weer in de lift. Dat geldt vooral voor de land-archeologen, want in het verdrag is geregeld dat als er ergens wordt gebouwd, de archeologen eerst de kans moeten krijgen om te kijken of er iets van waarde in de bodem zit. En als dat zo is dan krijgt de bescherming van het cultureel erfgoed even voorrang boven de bouw van een nieuwe Vinexwijk of spoortunnel. Dat wil zeggen dat er op kosten van degene die de grond verstoort (meestal de projectontwikkelaar of het bouwbedrijf), eerst archeologisch onderzoek wordt gedaan en de gevonden resten adequaat worden beschermd voor het nageslacht. Hoewel de Tweede en Eerste Kamer het verdrag dit jaar nog steeds in wetgeving moeten omzetten, wordt deze werkwijze wel al overal in ons land toegepast.

Onderwaterarcheologen hebben daar niet zo veel aan. Op de zeebodem is de natuur en niet het bouwbedrijf de grootste vijand van het erfgoed. Stroming, beweging van de zandbodem, zout water en paalwormen zorgen ervoor dat een wrak snel uit elkaar valt. Dus blijft de duikploeg van het NISA grotendeels afhankelijk van (afnemende) overheidsbudgetten.

doende aanwijzingen om te denken dat het hier om een oorlogsschip gaat. 'Je hebt vrijwel nooit honderd procent zekerheid over de identiteit van een wrak,' zegt Alice Overmeer. 'Tenzij je de bel met de scheepsnaam of een naamplaat vindt, maar dat gebeurt zelden. Dus verzamelen we aanwijzingen die ons zo dicht mogelijk bij een identificatie kunnen brengen.'

TIEN KEER ZO MOEILIJK De methodes van de onderwaterarcheologen verschillen niet veel van die van hun collega's aan land. Onder water is alles alleen tien keer zo moeilijk. 'We kunnen twee tot drie keer per dag een uur werken: die beperkte tijd legt extra druk op je. En het is gekker werken. We hebben meestal een netje bij ons met een paar leitjes, potloden en zakjes waarin we monsters kunnen verzamelen. Dat moet je goed organiseren. Anders doe je je netje open; drijven die zakjes weg in de stroming. Of je potlood floept naar boven. Erg frustrerend als je maar één potlood hebt meegenomen.'
De eerste melding van dit wrak is van 1987. Het ligt dus al lang 'vrij', zoals archeologen dat noemen als een wrak boven het zand uitsteekt. 'De zeebodem is voortdurend in beweging, en het wrak dus ook,' vertelt Arent Vos. 'De stroming slijpt geulen rond de constructie. Het hout verteert en dan valt het wrak uit elkaar, in de slijpgeulen. Daarom is de toestand van het wrak altijd een momentopname.'

ORIËNTATIEDUIKEN Een verkenning begint als regel met een aantal oriëntatieduiken. 'Kijken of ik een structuur herken, of ik bijvoorbeeld de kielbalk kan vinden zodat je de centrale as van het schip kunt bepalen. We vormen ons een idee van de lading. Tegelijkertijd zetten we gidslijnen uit, zodat we bij iedere duik de in- en uitgang op het wrak kunnen vinden. Onderwatertijd is kostbaar dus je wilt zo weinig mogelijk tijd kwijt zijn met de weg zoeken.'
Na haar eerste duik verdiept Alice Overmeer zich in de de notities die ze op haar leitje heeft gemaakt. 'Bij iedere verkenning plaatsen we meetpunten in de vorm van labels aan de buitenkant van het wrak en op herkenbare punten daarbinnen,' legt ze uit. 'Door de afstand tussen alle punten te meten, maken we een web als basis van de overzichtstekening. Als we gaan tekenen, dan maak je per duik een schets van een klein stukje van het wrak. Op ons leitje tekenen we letterlijk wat

we zien. Eenmaal boven, dan kun je aan de hand van de meetpunten jouw stukje tekening in het web plakken. Zo krijgen we een exacte overzichtstekening van het wrak.'
Daarnaast verzamelen Alice Overmeer en haar collega's houtmonsters en objecten die meer kunnen vertellen over de periode waaruit het schip stamt. 'Op basis van jaarringenonderzoek kunnen we soms tot op het jaar nauwkeurig vaststellen wanneer een schip is gebouwd. Bij de datering helpen ook zogenaamde 'gidsfossielen'. Aardenwerken pijpjes bijvoorbeeld, of munten waar een jaartal in staat. Ook aan de hand van de kanonnen kunnen we vaak bepalen hoe oud een schip minstens moet zijn.'

BLOEMPOT Léon Vroom, een ander lid van het team, meldt zich met blikkerige stem door de intercom. 'Ik heb iets gevonden, het lijkt een beetje op de bloempot van m'n oma. Mag ik het meenemen?' Vos vraagt eerst waar het ligt. Als de precieze plek is genoteerd, neemt Vroom het ding mee naar boven. Het blijkt een platgedrukte, tinnen ketel te zijn, een van de weinige vondsten die het wrak nog prijsgeeft.
Arent Vos heeft in z'n team verschillende kwaliteiten verenigd. Hijzelf, Alice Overmeer en Evelyne van Gent zijn opgeleid als archeoloog. Léon Vroom, Frank Koppen en Peter Leensen komen uit de beroepsduikerij. Vroom en Koppen zijn opgeleid bij het 108 Duikerpeloton van de Genie. Vroom is daarna direct bij het NISA-duikteam gekomen,

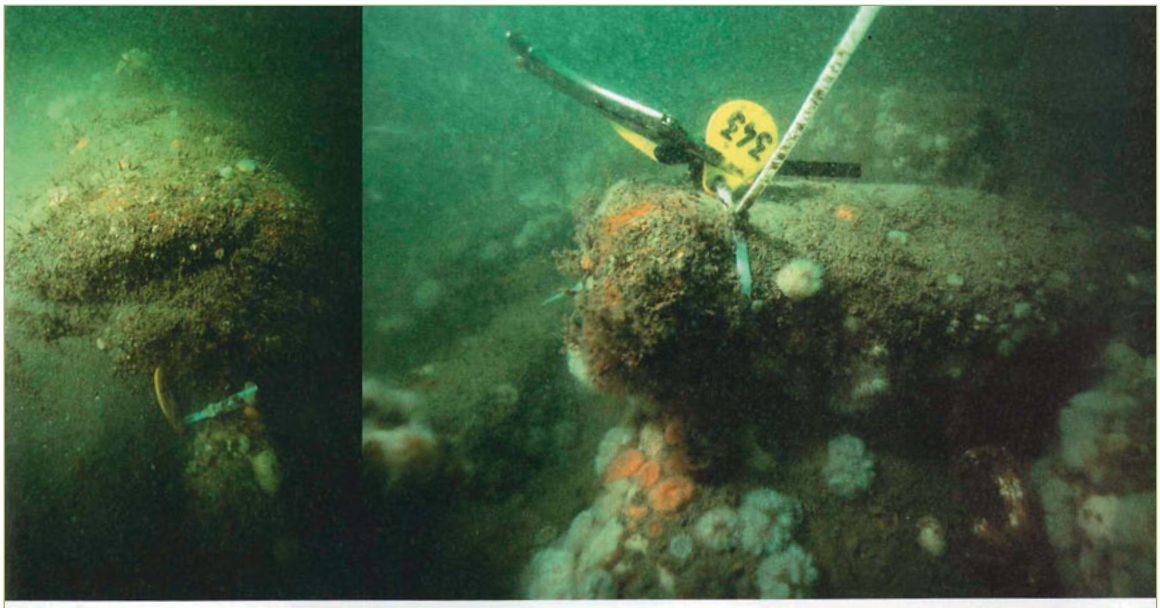
'EEN PASSERTJE MET EEN NAAM EROP, DAAR KRIJG IK ZO'N ENORME KICK VAN'

Koppen heeft eerst nog bij Smit gewerkt. En Hans Schraal is als oppervlakteassistent bij het team gekomen en heeft later leren duiken. 'Ze treden op als archeologisch assistent, cameraman, ze kunnen tekenen en hebben gouden handen,' zegt Vos.

DUIKGEK Het team heeft verstand van duiktechniek, elektronica en zelfs van installatietechniek. Vos: 'Onze onderkomens op Texel hebben we bijvoorbeeld zelf gebouwd.' Naast gevoel voor archeologie is de tweede gemene deler dat ze allemaal duikgek zijn. Alle teamleden hebben een beroeps-duikopleiding gevolgd: NDC-A en soms –B (Nationaal Duik Centrum) en MAD-A (Medische Aspecten van het Duiken). Allemaal zijn ze in staat de decompressietank te bedienen. Vijf duikers hebben het NDC-certificaat duikploegleider.
Als het vakantie is, maakt Arent Vos het liefste verre duikreizen. De meeste leden van het duikteam zijn namelijk ook sportduiker en Léon Vroom speelt onderwaterhockey bij GOV. Zo'n gespecialiseerde ploeg brengt volgens Vos ook weer een risico met zich mee: 'Als er een vacature is, komt het voor dat we daar niemand voor kunnen vinden die direct inzetbaar is. Dan maak ik me soms wel zorgen over de continuïteit van ons werk. Mijn leven draait voor een belangrijk deel om de onderwaterarcheologie. En hoewel we de pionierstijd – we hadden geen cent te makken, stonden met tentjes in moestuinen – voorbij zijn: er is nog steeds geen echte opleiding voor scheepsarcheologie. Je hebt mensen nodig die naast de studie maritieme geschiedenis en archeologie ook nog het beroepsduiken willen leren.'

SOLO Want een veilige duik is de belangrijkste voorwaarde voor succesvol onderzoek. Als beroeps duiken ze solo, maar dan wel met flessen in plaats van een slang vanaf de oppervlakte ('Te onpraktisch als je met vijf man tegelijk op een relatief klein gebied duikt'). Er worden geen decompressieduiken gemaakt. Door de 300 bar tien liter flessen of dubbel zevens te vullen met Nitrox 36%, halen ze volgens de NDC-tabellen op twintig meter diepte een bodemtijd van een uur.
Er wordt uitsluitend met Aga maskers gedoken, met een Metalsub mijnwerkerslamp (eigen ontwerp) erop en voorzien van communicatie. Er is via de intercom mondeling contact met alle duikers beneden en er staat altijd een standby duiker gereed aan dek. Voor Alice Overmeer biedt die werkwijze voldoende veiligheid: 'Je zit op een klein gebied dat is omlijnd, dus je weet als regel waar je bent. En we duiken niet zo diep. In geval van nood kunnen we zelf opstijgen, eventueel geholpen door een collega- of de standby duiker. De communicatie is ons belangrijkste veiligheidsmiddel. Als we te water gaan en nogmaals onderaan de ankerlijn, doen we altijd een communicatiecheck.'

BUITEN KENTERING Om de tijd zo goed mogelijk te benutten, wordt ook buiten de stroomkentering gedoken. 'Dat gaat best. Je kunt alleen in de volle stroom niet alles doen: een hefballon gebruiken bijvoorbeeld, of meten.' Op deze plek maakt het team maximaal drie duiken per dag, met een interval van twee uur. Alleen al aan boord zijn ze tien uur in touw, vijf dagen van de week. Geen wonder dat Evelyne van Gent zich na haar laatste duik even uitstrekt op het voordek. Energie verzamelen voor de debriefing en het uitwerken van haar aantekeningen, dat nog diezelfde avond moet gebeuren.
De verkenning van het wrak heeft sterke aanwijzingen opgeleverd dat het inderdaad gaat om de Prinzessan Sofia Albertina, het vlaggeschip van de Zweedse oorlogsvloot. 'In de tijd van de Vierde Engelse Zeeoorlog tussen Engeland en Nederland (1780-1784) was ze in onze omgeving actief om konvooien te beschermen,' vertelt Arent Vos. 'De archieven zeggen dat ze in 1781 in een storm bij Texel aan de grond is gelopen en vergaan. Van de ongeveer 460 bemanningsleden, hebben elf de ramp overleefd. We hebben hier op dit wrak dertig kanonnen teruggevonden. En van dusdanig zwaar kaliber, dat alleen gedacht kan worden aan een oorlogsschip. Bij sommi-



ge van deze kanonnen zien we kenmerken die in het derde kwart van de 18e eeuw zijn geïntroduceerd, wat duidt op een ondergang op zijn vroegst in die periode. Dat past bij een ondergang in 1781.'

Volgens Alice Overmeer wijst het onderzoek van de houtmonsters ook in de richting van de Zweed: 'De datering past bij onze aanname. En wat heel bijzonder is: dit is Scandinavisch hout terwijl Hollandse schepen in die tijd werden gebouwd van Duits hout.'

OP DE BODEM Na een verkenning besluit het team of een wrak wordt opgegraven of afgedekt. In de geschiedenis van het NISA is ooit nog maar van één schip (een 16e eeuwse koopvaarder) de lading opgegraven, en van vier gedeeltelijk. Er is te weinig tijd en geld voor de conservering van vondsten en voor onderzoek. Dus dekt het duikteam een wrak na de verkenning als regel af met een soort zeil dat het zand vasthoudt. Zo blijft het wrak op de zeebodem bewaard tot een volgende generatie archeologen misschien wel tijd, geld en betere methodes heeft om het karwei af te maken.

Alice Overmeer vindt dat jammer: 'Aan de context, de vraag waarom een schip daar ligt, komen wij niet toe. Dat doet onze kennisontwikkeling op het gebied van maritieme geschiedenis geen goed. Ik doe meer dan duiken, het onderzoek komt voor mij toch op de eerste plaats.' Arent Vos sluit zich daarbij aan: 'Echter, de keuze – onder meer over budgetten – wordt gemaakt door de politiek en niet door ons. Afdekken is op dit moment de best haalbare oplossing. Als we dat niet eens deden, dan zouden de wrakken met al hun informatie voor altijd verloren gaan!'

'AAN DE VRAAG WAAROM EEN SCHIP DAAR LIGT, KOMT ONZE GENERATIE NIET TOE'

TERUG IN DE TIJD Niettemin maakt het – letterlijk – directe contact met de maritieme geschiedenis het werk voor Alice Overmeer en haar collega's meer dan de moeite waard. 'Je gaat terug in de tijd door je te verdiepen in de bouw van het schip, de bewapening en het leven aan boord. Soms duik je iets op en dan kun je achterhalen wie de eigenaar was, hoe hij leefde en waar hij woonde. Dan besef je dat het gewoon mensen waren als jij en ik. Een paar schoenen, of een passertje met een naam erin gegraveerd, dan denk ik wow! Daar krijg ik zo'n enórme kick van. De geschiedenis komt dan heel dichtbij.' En wie weet roept een nazaat van Alice Overmeer dat ook wel in 2305, als zij met een mini-ROV over deze plek scheert om in anderhalf uur een 3-D scan van het wrak te maken. 'Wow, plastic labels! Laat ik die maar meenemen. Dat is uit de tijd dat ze nog petroleum hadden...'

De geschiedenis aanraken

Een compleet Romeins schip. Laarzen en handschoenen, navigatieinstrumenten, kleine en grote wapens rij na rij in lange kasten. Een collectie ankers, roeren en andere wrakdelen. Wie wil weten wat het NISA op de zeebodem aantreft kan het onderzoekscentrum in Lelystad gewoon bezoeken. Het zit in een markant gebouw (naar verluidt een schip dat op z'n kop staat) in Lelystad, op het terrein bij de Bataviawerf. De geschiedenis is daar zelf aan te raken.

Het Nederlands Instituut voor Scheeps- en onderwaterArcheologie doet onderzoek naar de maritieme geschiedenis. Het duikteam doet dat op de bodem van de zee of af en toe in een rivier, zoals in de Maas bij Maastricht (zie Onderwatersport juni 2005). Het NISA heeft ook nog een veldteam dat schepen opgraaft die onder land liggen. Denk aan de Romeinse schepen die vorig jaar zijn gevonden bij Woerden en in Leidsche Rijn bij Utrecht.

Als ze niet in het veld werken, dan conserveren en bestuderen de medewerkers de vondsten, maken overzichtstekeningen, modellen en documenteren de resultaten voor later. Een grote ruimte is voorzien van een soort sprinklerinstallatie waarmee houten wrakdelen nat worden gehouden. Het hele conserveringsproces is er goed te volgen. Nadat de wrakdelen zijn geconserveerd, gaan de vondsten bij het NISA in depot. Alles wordt in Lelystad bewaard en soms uitgeleend aan musea.

Het gebouw van het NISA vormt samen met de Bataviawerf het Nationaal Scheepshistorisch Centrum. Bij de Bataviawerf ligt een exacte kopie van het VOC schip 'Batavia' uit 1627 voor anker en is open voor publiek. Nu is ook een replica in aanbouw van de Zeven Provinciën, het vlaggeschip van Michiel de Ruyter.

Toegang via de hoofdingang van de Bataviawerf, Oostvaardersdijk 01-09, Lelystad. De Bataviawerf is iedere dag geopend van 10.00 tot 17.00 uur. Relevante websites: www.bataviawerf.nl, www.archis.nl/nisa, www.geheugenvannederland.nl

Appendix 5:
List of finds from Noorderhaaks 10/ Sophia Albertina shipwreck 2004

Vondstnr	Beschrijving	Materiaal	Afmetingen	Vondstlocatie	Duiker	Datum	Categorie
SA-001	6 musketkogels, klein formaat.	lood	diameter tussen 10,9 en 11,7 mm.	uit kistje met kogels aan noordoostzijde	ple	20040607	militair
SA-002	Scherf van porseleinen theepot.	aardewerk	10 x 6 cm		avo	20040706	kombuisgoed/eetgerei
SA-003	Bodemscherf industrieel witbakkend aardewerk.	aardewerk	dia bodem 8,4, h; 5,5 cm	onder constructie ten noorden van 257	lvr	20040721	kombuisgoed/eetgerei
SA-004	Tinnen bak of ketel, met rond erop gezet oor. Sterk vervormd, kapot en met tinpest. Geen merken zichtbaar.	tin	h: 5,7, dia bodem: 15 cm, dia oor: 3,7	onder constructie ten noorden van 257	lvr	20040721	overig
SA-005	Wetsteen.	steen		tussen 135, kanon zonder nr en 'steen'	fko	20040722	gereedschap
SA-006	Rand- en bodemscherf van ovale porseleinen schaal.	aardewerk	12 x 9 cm	tussen 135, kanon zonder nr en 'steen'	fko	20040722	kombuisgoed/eetgerei
SA-007	Bodemscherf industriel witbakkend aardewerk.	aardewerk	dia bodem 4,3 H; 3 cm	tussen 135, kanon zonder nr en 'steen'	fko	20040722	kombuisgoed/eetgerei
SA-008	Handvat of oor met aanzet van een ketel of beslag. Bestaat uit een bladvormige plaat met drie koperen klinkbouten aan een fragment van de oorspronkelijke plaat of ketel en loopt uit in een dik vierkant handvat.	koper	handvat fors l:10 b: 7 d: 1,1 cm. Plaat	tussen 135, kanon zonder nr en 'steen'	fko	20040722	overig
SA-009	Koperen knoop, plat tot bolrond met draadoog aan onderzijde. Bedekt met onbekend materiaal met gouden glans.	messing	dia: 1,75 cm	tussen 135, kanon zonder nr en 'steen'	lvr	20040722	persoonlijk
SA-010	Dendro A, spant 242.	hout		zuidwestkant wrak	lvr	20040723	schip
SA-011	Dendro B, huidplank.	hout		zuidoostfragment	lvr	20040723	schip
SA-012	Ballastbroodje, groot formaat.	ijzer	120 X 9.5 x 9.5	tussen 337, 338, 341 en 248	avo	20040723	ballast
SA-013	Ballastbroodje, klein formaat.	ijzer	78 x 10 x 8 cm, 31 kg.	tussen 337, 338, 341 en 248	avo	20040723	ballast
SA-014	Ballastbroodje, klein formaat.	ijzer	78 x 10 x 10 cm, 41 kg.	tussen 337, 338, 341 en 248	avo	20040723	ballast
SA-015	IJzeren ring, van kous? Concretie bevatte geen ijzer en is dus afgevoerd.	ijzer	10 x 3 cm	noordoostkant wrak	nbr	20040723	overig
SA-016	Hol staafje van onduidelijk materiaal, lijkt op lood, maar mogelijk soort steen.	?	l: 20,8 cm dia: 1,57 cm.	noordoostkant wrak	nbr	20040723	overig
SA-017	Kanonskogel.	ijzer	Diameter : 11,36 cm	op built bij 342	avo	20040728	militair
SA-018	Bovenkant van kokosnoot (*Cocos nucifera*), mogelijk gebruikt als bakje.	organisch	dia: 9 cm, H: 3 cm, D wand: 3-4 mm.	bij punt 345	avo	20040728	overig
SA-019	51 musketkogeltjes van pistolet klein formaat. Sommige met knaagsporen.	lood	diameter tussen 10,9 en 12 mm	bij kanon 135	lvr	20040728	militair
SA-020	Randscherf roodbakkend aardewerk van bloempot.	aardewerk	9,5 x 8 cm	bij kanon 135	lvr	20040728	kombuisgoed/eetgerei
SA-021	Wandscherf steengoed mineraalwaterfles 'jeneverkruik'.	steengoed	4,5 x 3 cm	bij kanon 135	lvr	20040728	kombuisgoed/eetgerei
SA-022	fragment van gele baksteen.	baksteen	5 x 4 x 3 cm	bij kanon 135	lvr	20040728	kombuisgoed/eetgerei
SA-023	Strip metaal, lijkt op blik.	metaal	l:23,2, b:6,8 d: 0,05 cm	bij kanon 135	avo	20040728	overig
SA-024	1 musketkogel, groot formaat.	lood	17,8 mm	bij kanon 135	fko	20040729	militair
SA-025	Randscherf roodbakkend aardewerk van bloempot (NL, It, W-Europa)	aardewerk	6 x 5 cm	bij kanon 138	aov	20040729	kombuisgoed/eetgerei
SA-026	36 musketkogels, klein formaat.	lood	diameter tussen 11 en 12 mm	bij kanon 135	lvr	20040729	militair
SA-027	2 hagelkorrels/2 musketkogels klein formaat.	lood	diameter tussen 10,9 en 11,3 mm	bij kanon 135	lvr	20040729	militair
SA-028	Staafje met aan beide uiteinde twee ronde knoppen, mogelijk manchetknoopje. Knoppen zijn versierd met geometrische patronen.	zilver?	3 x 1,2 cm	bij kanon 135	lvr	20040729	persoonlijk
SA-029	Fragment bladkoper.	koper	3,5 x 2,8 x 0,5	bij kanon 135	lvr	20040729	schip
SA-030	Randscherf industrieel witbakkend aardewerk met koperoxide.	aardewerk	9 x 10,5	bij kanon 135	lvr	20040729	kombuisgoed/eetgerei
SA-031	Wandscherf roodbakkend aardewerk (van bloempot?).	aardewerk	3,5 x 3,5 cm	ca 6 m west van kanon 135	lvr	20040729	kombuisgoed/eetgerei
SA-032	Wandscherf industrieel witbakkend aardewerk.	aardewerk	6 x 4 cm	ca 6 m west van kanon 135	lvr	20040729	kombuisgoed/eetgerei
SA-033	Hoekscherf witbakkend aardewerk van tegel, decoratie met figuur (herder- of bijbelse tegel?).	baksteen	7,5 x 7 x 0,7 cm	ca 6 m west van kanon 135	lvr	20040729	kombuisgoed/eetgerei
SA-034	Fragment baksteen.	baksteen	7,5 x 2,5 x2,5 cm	ca 6 m west van kanon 135	fko	20040729	kombuisgoed/eetgerei
SA-035	fragment leisteen.	steen	12 x 6 x 2,7 cm	bij kanon 340	evg	20040729	overig
SA-036	Rechthoekige gesp met afgeronde hoeken, angel en tussenstijl aanwezig.	messing	4,9 x 4,1 cm	ca 6 m west van kanon 135	lvr	20040729	persoonlijk
SA-037	Rechthoekige koperen gesp zonder binnenwerk.	koper	6,35 x 4,29 cm, B lijst: 0,9 cm.	ca 6 m west van kanon 135	lvr	20040729	persoonlijk
SA-038	Strip van roodkoper, rond gebogen. Aan uiteinden gat van 0,9 cm, een met ijzeren concretie.	koper	b:3,1, d: 1,4 cm, l: 61 cm.	ca 6 m west van kanon 135	lvr	20040729	overig
SA-039	Fragment bladkoper.	koper	7,1 x 4,1 cm	ca 6 m west van kanon 135	lvr	20040729	schip
SA-040.1	Ronde platte knoop van koper, zonder oog. Ingegraveerde driehoek op bovenkant.	messing	dia kop 1,2 cm	ca 6 m west van kanon 135	lvr	20040729	persoonlijk
SA-040.2	Ronde platte knoop van koper als SA-40.1, bedekt met concretie. Kan ook koper zijn met nageltje met schacht zijn.	messing	dia kop 1,2 cm, L schacht 2,4 cm.	ca 6 m west van kanon 135	lvr	20040729	persoonlijk
SA-041	35 musketkogels.	lood		ca 6 m west van kanon 135	lvr	20040729	militair
SA-042	Randscherf roodbakkend aardewerk van bloempot?	aardewerk	3 x 2,5 cm	ca 6 m west van kanon 135	lvr	20040729	kombuisgoed/eetgerei
SA-043	3 musketkogels, groot formaat.	lood	17,4-17,9 mm	3,7 m west van kanon 135	avo	20040729	militair
SA-044	Koperen bolrond knoopje, met aan onderzijde een draadoog.	messing	dia 1,46 cm	3,7 m west van kanon 135	avo	20040729	persoonlijk
SA-045	Stuk vuursteen, of mogelijk een afgerond stuk glas.	steen	4,6 x 2,5 x 0,5 cm	3,7 m west van kanon 135	avo	20040729	overig
SA-046	Houten kistje met musketkogeltjes.	hout lood	54 x 22,5 x 21,5 cm	3,7 m west van kanon 135	ple/avo	20040729	militair
SA-047	Honderden musketkogels uit kistje, klein formaat.	lood		3,7 m west van kanon 135	avo	20040729	militair
SA-048	Wandscherf steengoed mineraalwaterfles 'jeneverkruik'.	steengoed	7 x 5,7 cm	ca 6 m west van kanon 135	fko	20040729	kombuisgoed/eetgerei
SA-049	Randscherf roodbakkend aardewerk van bloempot?	aardewerk	12 x 5,5 cm	ca 6 m west van kanon 135	fko	20040729	kombuisgoed/eetgerei
SA-050	Randscherf roodbakkend aardewerk van bloempot?	aardewerk	7,5 x 4,5 cm	ca 6 m west van kanon 135	fko	20040729	kombuisgoed/eetgerei
SA-051	Fragment van baksteen.	baksteen	6,5 x 3,5 x 1,5 cm	ca 6 m west van kanon 135	fko	20040729	kombuisgoed/eetgerei
SA-052	Randscherf industrieel witbakkend aardewerk van bord of schaal.	aardewerk		ca 6 m west van kanon 135	fko	20040729	kombuisgoed/eetgerei
SA-053	Driehoekige scherf van onbekend materiaal.	?	8 x8 x8 cm	ca 6 m west van kanon 135	fko	20040729	overig
SA-054	Ballastbroodje.	ijzer	90 x 12 x 11 cm, 43 kg.	afkomstig van plateau	avo	20040729	ballast
SA-055	Kanonskogel.	ijzer			avo	20040729	militair
SA-056	Kanonskogel.	ijzer			avo	20040729	militair
SA-057	Bijna vierkante loden zundplaat, gebogen en gescheurd, zonder merken.	lood	26,5 x 23 x 0,3 cm	op kanon 136	avo	20040729	militair
SA-058	Dendro C van spant 335-242.	hout		zuidzijde wrak	fko	20040729	schip
SA-059	Houtmonster voor suifer-onderzoek van spant 335.	hout		zuidzijde wrak	fko	20040729	schip
SA-060	Blok hout van spant 335.	hout		zuidzijde wrak	avo	20040729	schip
SA-061	Fragment bladkoper.	koper	4 x 3 cm	naast vloei van anker 246	lvr	20040803	schip
SA-062	Ronde concretie met gouden glans, wellicht een munt.	concretie		naast vloei van anker 246	lvr	20040803	overig
SA-063	Stukje steen, zeer glimmend.	steen?		naast vloei van anker 246	lvr	20040803	overig
SA-064	Bodemscherf van steengoed bord? Inktstempel met BOURNE MADE IN ENGLAND DENBY en 6PT.	steengoed	19,5 x 14,5	bij anker 246	avo	20040803	kombuisgoed/eetgerei
SA-065.1	IJzeren of koperen rechthoekige gesp, zonder binnenwerk. Lijst is versierd met 5 strepen in elke hoek.	messing	5,3 x 4,5 cm, B lijst: 0,5 cm.	naast vloei van anker 246	lvr	20040803	persoonlijk
SA-065.2	IJzeren U-vormig profiel, van beslag. Opgebouwd van vierkante ijzeren staaf van 2,3 bij 2,1 cm. Uiteinden platgeslagen naar 3,4 x 1 cm, met twee spijkers/gaten, maar gebroken aan eind.	ijzer	35 x 16,5 cm, b: 2,3, d: 2,1.	naast vloei van anker 246	lvr	20040803	overig
SA-066	Loden plaatje dubbelgevouwen, vier gaten in de hoeken.	lood	15,4 x 10,5 cm d: 0,25	tussen wegers bij 249 en 335	evg	20040803	overig

Appendix 6: Sophia Albertina ceramics identification report (P. Kleij)

Verslag ceramiekdeterminatie Sophia Albertina

P. Kleij
December 2004

Inleiding

De ceramiek is per vondstnummer bekeken en beschreven volgens het 'Deventersysteem' (zie Clevis en Kottman 1989, blz. 77, Bartels 1999, blz. 519 en 526). De cijfers van de determinatie van Deventer-systeem staan voor de volgende zaken:

1. vondstnummer/catalogusnummer.
2. typencode. Dit is de code die het voorwerp in het Deventersysteem heeft. Hierdoor kan op eenvoudige wijze het voorwerp worden vergeleken met voorwerpen uit andere vondstcomplexen.
3. datering. Dit is de datering van de periode waarin het voorwerp is vervaardigd.
4. maximale diameter (zonder oren, tuiten etc.), maximale hoogte (zonder oren, tuiten etc.) en maximale diameter van de voet in cm.

5a. baksel.
5b. glazuur
5c. versiering
6a. bodem
6b. oor
6c. overig

7. functie of naam
8. productiecentrum
9. literatuur
10. tekening of fotonummer. Wordt hier gebruikt om aan te geven of een voorwerp zou moeten worden getekend.

Hieraan zijn voor dit determinatierapport aan toegevoegd:

11. Compleetheid van het voorwerp.
12. Past aan. Hier wordt aangegeven of scherven van het voorwerp passen aan scherven uit een ander vondstnummer. Voorbeeld: de scherven van SA 302 passen aan die van SA 303 dan komt achter 12.: SA 303

Wanneer bij 2. geen typencode vermeldt staat maar 'nieuw nummer' dan moet bij een eventuele publicatie van dit complex een tekening en de beschrijving van het voorwerp worden opgestuurd naar Peter Bitter (Gemeentelijk archeoloog van Alkmaar) die een nieuw typencode aan dit voorwerp uitdeelt.

Blijken verscheidene scherven uit één vondstnummer niet bij elkaar horen dan worden de scherven in aparte groepen verdeeld die elk achter het vondstnummer een subnummer krijgen. Bijvoorbeeld: SA 305 bestaat uit zeven scherven waarvan er vier bij elkaar horen, twee eveneens bij elkaar maar niet bij de eerste vier en één noch bij de eerste vier, noch bij de andere twee. Het vondstnummer wordt dan opgesplitst in SA 302/1 (vier scherven), SA 302/2 (twee scherven) en SA 302/3 (één scherf).

1. Beschrijving ceramiek Sophia Albertina

1.1. Associatie met het wrak

De ceramiek van de vindplaats Burgzand Noord 8 heeft een lastige datering vanwege het recente karakter van de vondsten. Vrijwel het gehele complex dateert uit de 19e of 20e eeuw, een periode waarover weinig archeologische literatuur is gepubliceerd. De indruk bestaat dat het merendeel van het aardewerk uit de periode 1850-1950 dateert. De enige uitzonderingen zijn een fragment van een 18e eeuwse tegel (SA 33) en een bodemfragment van een ovale schaal van Engels steengoed (SA-64).

Voor een omschrijving van de kenmerken van de verschillende ceramieksoorten wordt verwezen naar Bartels 1999, blz. 105 tot 146. Hierin wordt enig materiaal uit de periode 1750-1900 besproken.

1.2. Beschrijving en functie van de ceramiek

1.2 1. Roodbakkend aardewerk

Het roodbakkende aardewerk bestaat uit zes scherven van ongeglazuurde potten (SA-20, SA-25, SA-31, SA-42, SA-49 en SA-50). De drie randscherven (SA 20, SA-25 en SA-50) zijn duidelijk afkomstig van bloempotten. Het baksel van de drie andere scherven, allemaal wandscherven, vertoont zoveel overeenkomsten met dat van de randen zodat er vanuit gegaan kan worden dat dit ook bloempotscherven zijn.

De drie randscherven verschillen zowel in diameter, vorm en versiering zodanig van elkaar dat ze wel van drie verschillende potten afkomstig moeten zijn. Geen van de zes scherven past aan een ander.

De scherven zijn afgesleten door de werking van de zee. Met moeite kunnen bij de grotere draairibbels worden onderscheiden. Het zijn dus handgemaakte potten geweest. De productie en verkoop van handgemaakte bloempotten vond in Nederland tot aan de Tweede Wereldoorlog plaats. Elders in Europa werden ook tot diep in de 2oe eeuw bloempotten gedraaid. Het baksel vertoont zeer veel overeenkomsten met het aardewerk uit Bergen op Zoom en Oosterhout zodat een herkomst uit dit gebied mogelijk is. Echter ook in Italië en andere landen is dergelijk fijn, roodbakkend aardewerk vervaardigd zodat een herkomst uit dit land, of andere delen van West-Europa, niet moet worden uitgesloten.

Bloempotten worden reeds eeuwenlang gemaakt. De in het wrak SA gevonden bloempotscherven kunnen uit de periode 1600-1950 dateren.

1.2.2. Industrieel witbakkend aardewerk

Uit het wrak komen vijf scherven witbakkend aardewerk, alle vijf industrieel vervaardigd. SA-3 is de bodem van een met kleurige banden versierde pot of kan. SA-7 lijkt een bodemfragment van een kommetje of kopje. De groene scherf SA-30 is ook van een kom of pot. De randscherf SA-52 komt van een versierde schaal of bord. Van welke vorm de scherf SA-32 afkomstig is, kan niet worden gezegd. De scherven SA-5 en SA-30 hebben duidelijk slijtsporen.

Wat vorm en versiering betreft lijken SA-6 en SA-30 in de 20e eeuw thuis te horen, alhoewel een vroegere datering (vanaf 1850) niet moet worden uitgesloten. De andere kunnen uitsluitend in de periode 1850-1950 worden gedateerd.

1.2.3. Steengoed

Het steengoed valt in twee groepen uiteen. De eerste groep bestaat uit twee wandfragmenten van één of twee handgemaakte mineraalwaterkruiken (SA 21 en SA 48). Flessen van dit type zijn tussen 1800 en 1900 in het Duitse Rijnland vervaardigd.[1]

De tweede groep bestaat uit één scherf, de bodem van een groot, ovale voorwerp, mogelijk een schaal (SA-64). Op de bodem staat een vrij modern stempel met de tekst 'Bourne Made in England Denby' (of Benby). Naast het stempel staat een tweede stempel met de tekst '6pt'. De letters van de stempel doen modern aan zodat een datering in de 20e eeuw voor de hand ligt. De herkomst van de scherf is duidelijk.

1.2.4. Europees porselein

Twee scherven Europees porselein komen uit het wrak. De aanzet tot de tuit van een theepot (SA-2) en een flink fragment van een in reliëf versierde schaal (SA-6). Op de bodem van deze schaal is de letter M gekrast. Mogelijk is dit het merk van de vorm waarin de schaal gemaakt is. Een datering in de tweede helft van de 19e eeuw of in de 20e eeuw ligt bij deze scherven voorde hand. Over de herkomst kan weinig gezegd worden. De theepot en de schaal kunnen in verschillende Europese landen zijn vervaardigd.

1.2.5. De tegel

Het tegelfragment SA-33 is de hoek van een paarse herder of bijbelse tegel uit de 18e eeuw. Dit soort tegels werd in Nederland gemaakt.

2. Conclusies

Van het wrak op vindplaats SA is vrijwel alle ceramiek afkomstig uit de 2e helft van de 19e of de eerste helft van de 20e eeuw. De mineraalwaterkruiken dateren niet uit de 20e eeuw maar bekend is dat dergelijke kruiken regelmatig werden ingezameld en hergebruikt zodat het best mogelijk is dat ze na 1900 nog gebruikt zijn. Ze zijn in ieder geval geen bewijs dat het complex van voor 1900 moet dateren. De enige scherf waarvan de datering duidelijk na 1900 lijkt te liggen is de bodemscherf van de ovale schaal uit Engeland. Deze heeft sporen van zeepokken wat betekent dat hij boven in het wrak gelegen heeft en dus later ingespoeld kan zijn. Daarom zegt hij niets over de datering van het complex. De scherf van de 18e eeuwse tegel valt ook geheel buiten de datering van de rest van het complex zodat deze scherf ook een inspoeling kan zijn. Niet uitgesloten moet echter worden dat hij onderdeel uitgemaakt heeft van een haard of versiering aan boord van het schip. De datering van de ceramiek (1850-1950) kan ook de datering zijn van de periode waarin het schip, dat nu bekend staat als wrak SA, ten onder is gegaan.

Over de herkomst van het schip kan weinig worden gezegd, daar is te weinig ceramiek voor gevonden.

Opvallend is het hoge aantal bloempotfragmenten. Normaal worden die nooit aan boord van schepen aangetroffen. Mogelijk heeft een deel van de lading uit bloempotten bestaan.

Samenvatting

Het wrak SA is waarschijnlijk tussen 1850 en 1950 vergaan. Mogelijk bestond een deel van de lading uit bloempotten van roodbakkend aardewerk.

[1] Bartels 1999, 71-79

Determinatielijst/catalogus

1. SA-2
2. ep-the-?
3. 1800-1950
4. -/-/-
5a. Europees porselein
5b. -
5c. -
6a. -
6b. -
6c. -
7. theepot
8. Europa
9. -
10. -
11. een scherf, 2%
12. -

1. SA-3
2. iw-?
3. 1850-1950
4. -/-/-
5a. industrieel witbakkend
5b. in- en uitwendig loodglazuur
5c. uitwendig twee oranje en een blauwe lijn
6a. drie, in totaal waarschijnlijk zes kleine, brede standlobjes
6b. -
6c. -
7. -
8. Europa
9. -
10. -
11. een bodem scherf, 10 %
12. -

1. SA-9 → 6 ?
2. ep-sch-?
3. 1800-1950
4. -/-/-
5a. europees porselein
5b. -
5c. in reliëf bladmotief, geschulpte vorm met golvende rand
6a. ovale standring
6b. -
6c. op de bodem een ingekraste M
7. schaal
8. Europa
9. -
10. -
11. een scherf van de bodem tot aan de rand, 15%
12. -

1. SA-7
2. iw-?

3. 1850-1950
4. -/-/4,0
5a. industrieel witbakkend
5b. in- en uitwendig loodglazuur
5c. -
6a. hol standvlak
6b. -
6c. slijtage aan de onderzijde
7. -
8. Europa
9. -
10. -
11. een bodemscherf, 15%
12. -

1. SA-20
2. r-blo-?
3. 1600-1950
4. 12,5/-/-
5a. roodbakkend aardewerk
5b. -
5c. -
6a. -
6b. -
6c. ronde rand
7. bloempot
8. Nederland? Italië? West-Europa?
9. -
10. -
11. randscherf, 10%
12. -

1. SA-21
2. s2-fle-4
3. 1800-1900
4. -/-/-
5a. steengoed
5b. uitwendig zoutglazuur
5c. -
6a. -
6b. -
6c. -
7. mineraalwater fles ('jeneverkruik')
8. Duitse Rijnland
9. -
10. -
11. wandscherf, 2 %
12. -

1. SA-25
2. r-blo-?
3. 1600-1950
4. 20,0/-/-
5a. roodbakkend
5b. -

5c. twee siergroeven onder de rand
6a. -
6b. -
6c. ronde rand
7. bloempot
8. Nederland? Italië? West-Europa?
9. -
10. -
11. randscherf, 5%
12. -

1. SA-30
2. iw-?
3. 1850-1950
4. -/-/-
5a. industrieel witbakkend
5b. in- en uitwendig loodglazuur met koperoxide
5c. horizontale ribbels
6a. -
6b. -
6c. slijtsporen op ribbels
7. -
8. Europa
9. -
10. -
11. randscherf, 10%
12. -

1. SA-31
2. r-?
3. 1600-1850
4. -/-/-
5a. roodbakkend
5b. -
5c. -
6a. -
6b. -
6c. -
7. waarschijnlijk bloempot vanwege de andere roodbakkende scherven
8. Nederland? Italië? West-Europa?
9. -
10. -
11. wandscherf, 1%
12. -

1. SA-32
2. iw-?
3. 1850-1950
4. -/-/-
5a. industrieel witbakkend
5b. in- en uitwendig loodglazuur
5c. -
6a. -
6b. -
6c. -

7. -
8. -
9. -
10. -
11. wandscherf, vreemde vorm, ? %
12. -

1. SA-33
2. tegel
3. 1700-1800
4. -/-/-
5a. witbakkend
5b. bovenzijde tinglazuur met loodglazuur
5c. beschilderd in paars, landschap met mannetje in medaillon, hoek ossenkop: herder- of bijbelse tegel.
6a. -
6b. -
6c. -
7. -
8. -
9. -
10. -
11. hoekscherf, 20%
12. -

1. SA-42
3. r-?
3. 1600-1850
4. -/-/-
5a. roodbakkend
5b. -
5c. -
6a. -
6b. -
6c. -
7. waarschijnlijk bloempot, gezien de andere roodbakkende scherven
8. Nederland? Italië? West-Europa?
9. -
10. -
11. een scherf, 2%
12. -

1. SA-48
2. s2-fle-4
3. 1800-1900
4. -/-/-
5a. steengoed
5b. uitwendig zoutglazuur
5c. -
6a. -
6b. -
6c. -
7. mineraalwater fles ('jeneverkruik')
8. Duitse Rijnland
9. -

10. -
11. wandscherf, 5 %
12. -

1. SA-49
2. r-blo-?
3. 1600-1950
4. 21,0/-/-
5a. roodbakkend aardewerk
5b. -
5c. -
6a. -
6b. -
6c. platte rand
7. bloempot
8. Nederland? Italië? West-Europa?
9. -
10. -
11. randscherf, 10%
12. -

1. SA-50
2. r-blo-?
3. 1600-1950
4. 13,5/-/-
5a. roodbakkend aardewerk
5b. -
5c. -
6a. -
6b. -
6c. ovale rand
7. bloempot
8. Nederland? Italië? West-Europa?
9. -
10. -
11. randscherf, 10%
12. -

1. SA-52
2. iw-bor-?
3. 1850-1950
4. -/-/-
5a. industrieel witbakkend
5b. in- en uitwendig loodglazuur
5c. geometrische motieven in reliëf
6a. -
6b. -
6c. -
7. bord, schaal
8. Europa
9. -
10. -
11. wandscherf, 2 %
12. -

1. SA-64
2. s3-?
3. 1900-1950
4. -/-/-
5a. steengoed met glazuur
5b. zoutglazuur
5c. -
6a. dubbele standring
6b. -
6c. ruitvormige stempel met daarin BOURNE MADE IN ENGLAND DENBY (of BENBY), ernaast het stempel 6PT. Alles in zwarte inkt en moderne letters. Begroeid met zeepokken.
7. -
8. Engeland (Bourne?)
9. -
10. -
11. bodemscherf, 15%
12. -

Appendix 7:
Report on conservation of iron bars
(L. van Dijk & A. Vos)

De conservering van drie baren ballastijzer uit het wrak van de Sophia Albertina
door Lucas van Dijk en Arent Vos

Woensdag 29 oktober zijn drie van de vier ijzerbaren (ballast) uit het wrak van het Zweedse oorlogsschip *Prinzessan Sophia Albertina* gegloeid in de eigen oven. De vierde baar is daarvoor te lang. In overleg hebben LvD en AV besloten het *gietijzer* in drie uur op te warmen naar 850 ° C (temperatuur mede gebaseerd op publicatie Tøjhusmuseet, 1966), 2 à 3 uur op die temperatuur te houden en voor vertrek 's avonds de oven uit te zetten. Helaas is het in het oven-softwareprogramma niet mogelijk een uitdraai te maken van het feitelijke temperatuurverloop. Na opstart in het begin van de morgen (09:00 uur) bleek dat het even duurde voor de baren ijzer op temperatuur kwamen. De gewenste temperatuur van 850 ° C werd pas bereikt tussen 13:45 en 14:00 uur. De oven is uitgezet omstreeks 16:00 uur. Het ijzer is derhalve circa 2 uur actief op 850 ° C verhit geweest, maar ook daarna is het nog wel even op temperatuur gebleven. Het afkoelen ging zeer geleidelijk: donderdagochtend was het in de oven nog circa 400 ° C en vrijdagochtend nog ruim 200 ° C. De oven is maandagochtend geopend bij een inwendige temperatuur van 33 ° C.

Foto 1) De ijzerbaren, zoals ze eruitzagen na berging: met een laagje concretie. Ofschoon de concretie redelijk loskwam, ging dat toch niet 100% zonder beschadiging van het object, dus is verder gekozen voor gloeien.

Om een reducerend (zuurstofarm/-loos) milieu te krijgen en om een medium te creëren, waarin vrijgekomen chlorides zouden kunnen neerslaan, is een ruime portie hout meegestookt. Na opening van de oven was al het hout volkomen verkoold, maar totaal niet ver-ast. Hieruit leiden we af, dat er in ieder geval geen vuur is geweest: het hout is niet verbrand. Het hout was ook totaal niet wit uitgeslagen, waaruit we afleiden, dat er blijkbaar weinig chlorides in zijn neergeslagen. Mogelijk betekent dit, dat er nauwelijks

chlorides in het ijzer zaten. Ofschoon eerdere ervaring (namelijk dat aanwezige chlorides wit neerslaan in het houtskool) deze conclusie lijkt te rechtvaardigen, willen we dat toch nog een keer expliciet vaststellen middels een proef met ijzer, dat zeker nog chlorides bevat.

Foto 2, links) Het ijzer en hout direkt na opening van de oven. Het hout is verkoold, maar niet verast.

Foto 3, rechts) De ijzerbaren vóór de eerste, oppervlakkige schoonmaak: een ruw uiterlijk, hier en daar een rode kleuring, barsten en sporen houtskool

Foto 4, links) Detail van het ruwe oppervlak na het stoken.

Foto 5, rechts) De baren ná het stralen. De rood-kleurende laag blijkt voornamelijk oppervlakkig en het ijzer heeft veeleer een donkergrijze kleur. Is dit origineel oppervlak met hamerslag, of toch nog een laagje concretie, dat eraf gestraald kan?

De eerste indruk van het ijzer was, dat er mogelijk toch ietsje zuurstof bij is geweest en dat het oppervlak (voorzover zichtbaar tussen of onder de concretie) enigszins is verbrand; het vertoont namelijk “hamerslag”.[1] De concretie, die niet erg dik blijkt, was op het eerste gezicht niet zo goed langs het originele oppervlak losgekomen als eigenlijk verwacht en er vertoonden zich een paar scheuren, die (diep) in het ijzer leken door te lopen.

De baren zijn vervolgens eerst oppervlakkig schoongemaakt met een brede beitel en daarbij kwam de laag concretie toch wel redelijk goed los. Het bleek ook, dat het oppervlak van de baren oorspronkelijk al niet mooi glad was. Reeds bij het gieten waren gietblazen, verontreinigingen en uitstulpingen ontstaan.

[1] Hamerslag is een oxidatielaag, die ontstaat bij (grote) verhitting van ijzer. Om dit te krijgen is dus een hoge temperatuur nodig en de aanwezigheid van zuurstof.

Daarna zijn de drie baren gestraald in de straalcabine (glasparel, 70-110 mu). Weliswaar werd gewerkt met de maximale druk van 6 bar, maar in beginsel werd vrij oppervlakkig gestraald om niet te snel door het originele oppervlak heen te blazen. Het blijkt niet makkelijk of met stelligheid te bepalen wat het originele oppervlak was. We hebben daarom de baren eerst even “opzij” gelegd om ze goed te bekijken en te bezien hoe dit oppervlak zich houdt.

Ook na het schoonmaken (stralen) van de baren blijft LvD van mening, dat het oppervlak iets van hamerslag vertoont, wat duidt op de genoemde combinatie van hoge temperatuur en aanwezigheid van (enig) zuurstof. Dit is niet de gewenste situatie. Blijkbaar is de oven toch niet helemaal 100% luchtdicht en dus zuurstofloos tijdens het gloeien, zelfs niet met hout erin? In hoeverre dit opgaat is nog een vraag, waar we nu niet helemaal zeker het antwoord op weten, want het hout is niet opgebrand, dus veel zuurstof kan het niet geweest zijn. Zouden we het gloeien nog eens kunnen overdoen, dan zouden we mogelijk tot iets lagere temperatuur stoken (800 ° C), maar vooral de naden van de ovendeur afdichten door er klei op aan te brengen.

Het schoongemaakte ijzer vertoont een ruw oppervlak van het gieten en is blijkbaar gegoten in ruwe vormen, mogelijk in de grond, en mogelijk met enigszins verontreinigd ijzer. Dit kan/moet nog nader bekeken en beschreven worden. In ieder geval zijn (nog) geen merktekens gezien. Een vraag is of we al helemaal op het originele oppervlak zitten, of dat er hier en daar nog een soort concretielaagje overheen zit. Als het laatste het geval is, is het in ieder geval nog slechts dun en zijn we er op een paar plekjes reeds doorheen.

Foto 6) De baren na het stralen. Het ijzer is donkergrijs met nog slechts een dun laagje, dat iets rood tekent.

Foto 7) Detailopname van het schoongemaakte en (licht) gestraalde ijzer. De vorm is vrij strak, maar met hier en daar gietblazen, uitgebrande holtes van waarschijnlijk voormalige insluitingen en uitstulpingen van het gieten. Let op de aan de onderkant aangebrachte uitsparingen als handvatten. Deze zijn op alle baren aanwezig.

Aldus, LvD & AV, 10-11-2008

Appendix 8:
Botanical analysis report (W. Kuijper)

EEN STUKJE KOKOSNOOT IN HET SCHEEPSWRAK SOPHIA ALBERTINA

Op 28-7-2004 werd bij punt 345 in het wrak van de Sophia Albertina een deel van (waarschijnlijk) een kokosnoot verzameld. Het vondstnummer is SA-018. Duiker: A. Overmeer.

Door ondergetekende werd het voorwerp nader onderzocht. Het bleek inderdaad om het topgedeelte van een kokosnoot (*Cocos nucifera*) te gaan. Er zijn drie lijsten op de buitenzijde zichtbaar die elkaar in het midden ontmoeten, hierdoor ontstaat het bekende 'Mercedes' embleem.
Kokosnoten groeien in tropische gebieden. Zowel de noten als andere onderdelen van deze palmboom worden veel door de mens gegeten en gebruikt. De noten worden (tegenwoordig) over de gehele wereld verhandeld.
In ons geval hebben we vrijwel zeker te maken met een gebruiksvoorwerp. Het topgedeelte van de noot lijkt op een bakje en kan voor allerlei doeleinden gebruikt zijn.

Het exemplaar van de Sophia Albertina is 9 cm in doorsnede en 3 cm hoog, de wanddikte bedraagt 3 à 4 mm. Op de basis zien we een roestvlek. Het geheel (binnen, buiten, rand) is begroeid met zeeorganismen (zeepokken, mosdiertjes, poliepen). Het is een teken dat de noot een tijdje aan het oppervlak (zeebodem) heeft gelegen.

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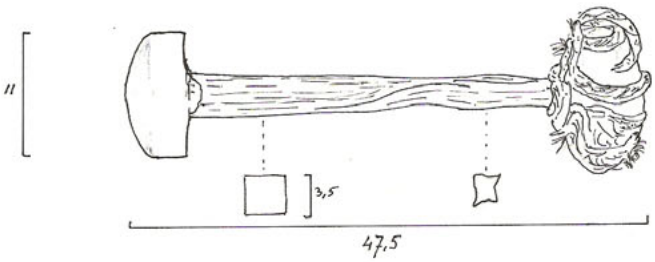
februari 2005
Wim Kuijper

Appendix 9:
Photograph and drawing of barshot (N. Brinck)

12 Pdr STAAFKOGEL

"PRINCESSAN SOFIA ALBERTINA" 1781 ↓



DE STAAF IS VAN SMEEDIJZER, DE BOLLEN VAN GIETIJZER. ÉÉN KANT IS OMWIKKELD MET HENNEPTOUW, WAARDOOR DE DIAMETER IS TOEGENOMEN TOT ± 14 CM, MISSCHIEN OM HET PROJECTIEL TE GEBRUIKEN IN EEN 24 pdr. KANON, WAARBIJ DAN OOK DE BUITENSTE PROP NIET MEER NODIG WAS.

Appendix 10:
RING dendroreport (T. Vernimmen)

T. Vernimmen, *RING Intern Rapport* **2004(066)**, Amersfoort, 2 pp.

ring

Nederlands Centrum voor Dendrochronologie / Stichting RING
Rijksdienst voor het Oudheidkundig Bodemonderzoek (ROB)
Kerkstraat 1, 3811 CV (Postbus 1600, 3800 BP) Amersfoort
Tel (033) 422 75 14; Fax (033) 422 77 99
E-mail e.hanraets@archis.nl

RAPPORTAGE DATEREND ONDERZOEK

Lokatie en Object: Noorderhaaks, Noordzee ten westen van Texel; coörd.: 102.221/559.566
Oorlogsschip *Prinzessan Sophia Albertina* (S)

Aanvrager
Naam : A. Overmeer
Instantie : ROB/NISA (duikteam)
Straat/postbus : Oostvaardersdijk 1-4
Postcode, Stad : 8244 PA Lelystad
Onderzoekers
Naam : drs T.J.J. Vernimmen
Instantie : RING/ROB
Datum onderzoek : augustus 2004

Resultaten van het onderzoek

Vondstno./ Object	Dendro-naam	kern	spint	wankant	n	referentiecurve	datering	t	%PV	p
SA-010/ inhout	ksa 1.1	+ca.3	-	-	109	EU 6	1622-1730	6,64	73,6	0,0001

Toelichting op de resultaten

kern	=	(afstand tot) de eerstgevormde (oudste) jaarring in de stam
spint	=	aantal ringen spinthout.
wankant	=	laatstgevormde jaarring (direct onder de bast), nodig voor een absolute datering van de veldatum
n	=	totaal aantal jaarringen in het houtmonster
%PV	=	"Gleichlaufigkeit" (Duitse term) of "Percentage of Parallel Variation" (Engelse term); het percentage van de ringen in het onderzochte jaarringpatroon die aan de referentiechronologie identieke toe- en afnames van de breedte vertonen op de door de datering van het patroon aangegeven positie t.a.v. de referentiechronologie. De significantie van dit percentage is een functie van de lengte in jaren van het onderzochte jaarringpatroon en de referentie chronologie.
t	=	De waarde die resulteert uit een Students t-test op de kruiscorrelatie die behoort bij de beste "match" tussen het onderzochte jaarringpatroon en de referentiechronologie.
P	=	De kans (uitgedrukt als een fractie van 1) dat de gevonden waarde voor %PV per toeval optreedt, dus niet op een datering duidt.
EU 6	=	Kalender voor Midden en Noord Scandinavië, gemaakt door H.H. Leuschner (ongepubliceerd) in het kader van EU- onderzoek (1992-1996) waaraan ook RING deelnam (contractnr. ENV4-CT95-0127.

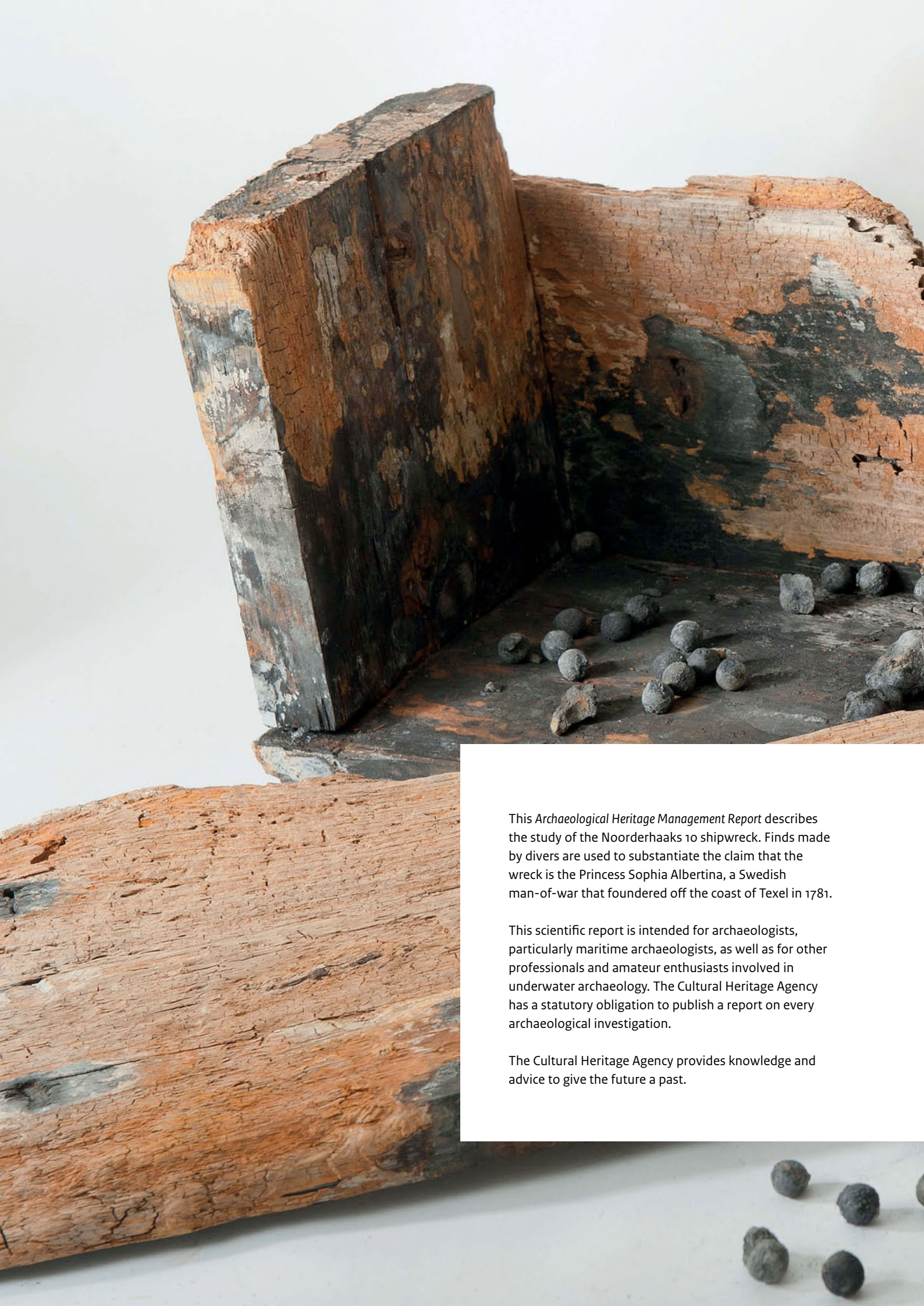
Interpretatie van de datering

Vondstnr./Object	Dendronaam	Einddatering	Schatting ontbrekend spinthout	Veldatum
SA-010/ inhout	ksa 1.1	1730 AD	> 20 ±6	ná 1750 AD ±6

Voor de berekening van het geschatte aantal ontbrekende spintringen gaan we uit van een gemiddeld aantal spintringen van 16 ± 5 bij een boom tot 100 jaar oud, 20 ± 6 bij een boom van 100 tot 200 jaar oud, en 26 ± 8 bij een boom ouder dan 200 jaar (Hollstein, 1980). Als er helemaal geen spintringen meer op het monster aanwezig zijn, is het onbekend hoeveel *kernhoutringen* er ook nog ontbreken, en ligt de veldatum dus een onbekend aantal jaren ná de einddatering + de schatting van het ontbrekende aantal spinthoutringen.

Appendix 11:
Navis identification list

Find name	Noorderhaaks 10/ Sophia Albertina
Subject Type	Shipwreck
Country	The Netherlands
Site	Noordzee
Findspot	Noorderhaaks 10, Noordzee
Longitude/Latitude	53º01.226'/04º36.040' (WGS 84)/53.023100/4.601330
Local coordinates	102.222/559.566
Depository	Wreck still in situ, c. 60 finds deposited in / National Depot for Ship Archaeology in Lelystad, the Netherlands
Year of discovery	1989
Year and type of research	2004, archaeological field evaluation
By	Archaeological diving team ROB/NISA
Cultural context	Age of the Swedish Empire (AD 1690-1890)
Century	Third quarter of the 18th century AD
Original name ship	Prinsessan Sophia Albertina (Swedish man-of-war)
Exact Dating	Dendrochronological dating of ship's timber is after AD 1750 ± 6 Wreckage date is August 20, 1781
Function	Man-of-war
Operational environment	Seagoing: Europe/the world
Ship type	Ship of the line
DImensions	Original dimensions: 48 x 12.6 x 6.4 meter Dimensions wreck: three fragments of 12 x 8.5 m, 8 x 6 m and 6.5 x 4.5 meter
Material	Oak
Propulsion	Sailed
Constructional features	Carvel built, shell first, single oak hull
Cargo/inventory	Only 16 guns, ballast stones and iron bars
Archive, finds and contact address:	RCE Department for Ship Archaeology/ National Depot for Ship Archaeology, Oostvaardersdijk 01-04, 8244 PA Lelystad, The Netherlands



This *Archaeological Heritage Management Report* describes the study of the Noorderhaaks 10 shipwreck. Finds made by divers are used to substantiate the claim that the wreck is the Princess Sophia Albertina, a Swedish man-of-war that foundered off the coast of Texel in 1781.

This scientific report is intended for archaeologists, particularly maritime archaeologists, as well as for other professionals and amateur enthusiasts involved in underwater archaeology. The Cultural Heritage Agency has a statutory obligation to publish a report on every archaeological investigation.

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