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THE IFMAF AND THE ZUIDERZEE
EDUCATION, RESEARCH, AWARENESS AND MANAGEMENT

PAGINA



GERRIT HEINRICH KROON
(1868-1945)

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SHIPS AND CITIES IN MARITIME ARCHAEOLOGY. THE VOC-
SHIP AMSTERDAM AND A BIOGRAPHICAL ARCHAEOLOGY OF
EIGHTEENTH-CENTURY AMSTERDAM

PAGINA

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SHIPS, AGENCY AND POWER
NEW DIRECTIONS IN MARITIME ARCHAEOLOGY

PAGINA

DRS. HENK DESSENS

WHO WILL TAKE THE HELM? AN INVESTIGATION INTO THE
POSITION OF MARITIME ARCHAEOLOGY IN THE NETHERLANDS

PAGINA

PROF.DR. G.J.R. MAAT

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WELCOME

Dear audience of the Kroon Lecture, dear reader of this publication,

On the occasion of the seventy-fifth 'dies natalis' of the Foundation for Anthropology and Prehistory in the Netherland (SNMAP), it was a great honour and pleasure to have welcomed you at the thirty-sixth Kroon Lecture. This unique event was the prime motive for the board of the foundation to create a platform for four scientists from the wide domain of science covered by our foundation, to express their thoughts in words and on paper for a varied and ever interested audience.

Year after year, you showed your enthusiasm and wish for collegial contact by your presence in large numbers at all lecturers with presenters from inland and abroad.

At the same time your interest was a firm support for the foundation to encourage applications for subsidy and to evaluate the proposals with care. In so doing, a vast amount of funds must have been assigned through the years. Indeed, these donations were not meant to finance whole projects, but to stimulate scientific developments in the fields of prehistory and physical anthropology. Due to the constant commitment of all boards during the past seventy-five years this has become true. Partly thanks to the foundation, the thirty-five Kroon Lecture volumes, the huge number of theses, the well composed books and other publications that were realized and that presently enrich our library, give testimony to that drive. To raise our mood of celebration, the foundation invited all to enjoy a common lunch prior to the presentations. And as usual after every Kroon Lecture, there was the toast, that 'liquid sign of respect', for the future.

A.F.L. VAN HOLK

MARITIME ARCHAEOLOGY, MIND-SET
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EDUCATION, RESEARCH, AWARENESS AND MANAGEMENT

INTRODUCTION

The provocative title of this paper may need some explanation. Maritime archaeology in the Netherlands, in particular with regard to its position at universities, has not yet come to its full fruition. The academic basis is unstable with regard to funding, policy is haphazard and lacks continuity (Van Holk, 2009a). For maritime archaeology in the Netherlands to become academically mature, a change of mind-set and stable, extensive funding are necessary. Although good initiatives exist, like the establishment of the International Field School for Maritime Archaeology Flevoland, as I hope to point out below, academic embedding is missing. You might ask is this a problem? In my opinion the archaeology of ships has a lot to offer, not least in contributing to the historical debate, but also for mainstream archaeology and the theoretical development of the field.

The Netherlands is a maritime nation *par excellence*. We have become what we are today through our rich maritime tradition, connected of course closely to water. We arrived here not only by defending ourselves against the sea but also by our extensive use of water transport. De Zeeuw (1978) states in his article, '*Peat and the Dutch Golden Age, the historical meaning of energy-attainability*', that without the use of ships combined with the optimal

use of wind power it would not have been possible to ship the immense amounts of turf that were necessary to fuel the booming Dutch economy (mainly in Holland).

Even today, in times of economic recession we see maritime industries flourishing. The Dutch do very well in the off-shore industry and in dredging and salvaging activities all over the world.

Not only was the transport over water of goods the main and often only means of transport in the past, fishing and transport of people by water were also of utmost importance. From the sixteenth century onwards big fleets of fishing vessels – so called *waterschepen* – crossed the former Zuiderzee trawling enormous nets behind them to provide the cheap and protein-rich food supply so needed by the rapidly growing urban population on the west coast of the Zuiderzee (fig. 1) (Ypma, 1962; Van Holk, 2005). PhD student Wouter Waldus studies the Zuiderzee as a transport landscape, as highway and cross-



Fig. 1. Excavation of waterschip at lot N 74 in Zuidelijk Flevoland (photo Van Holk).

road. A transport system in the Republic especially designed for the transport of people and parcel goods, a regular barge service (in Dutch: *beurtvaart*) was unique in the world in the seventeenth century. In the eighteenth century 800 beurtschepen departed for 121 different destinations in the Republic (fig.2) (De Vries and Van der Woude, 1995). In this way the larger regional centres were linked to each other. However, this is not the complete story because even small villages were linked to the regional centres by a system of *trekvaartverbindingen* (Reinders et al., 2013). Last but



Fig. 2. Excavation of beurtschip at lot B 71 in Oostelijk Flevoland (photo RCE).

not least, ships have often played an important role in the defence of the country. Even on an inland sea like the Zuiderzee battles and skirmishes took place over time (fig. 3). Van Westing, a PhD student at the University of Groningen, has started research on this topic, titled: “*Ter voorkominge van kaperijen, uytchuddingen, roverijen en andere schaden: de bewapening van koopvaarders en vissersschepen, ca. 1350-1800.*”



Fig. 3. Plan of an armed tjalk excavated at lot K 45 in Oostelijk Flevoland (drawing RCE).



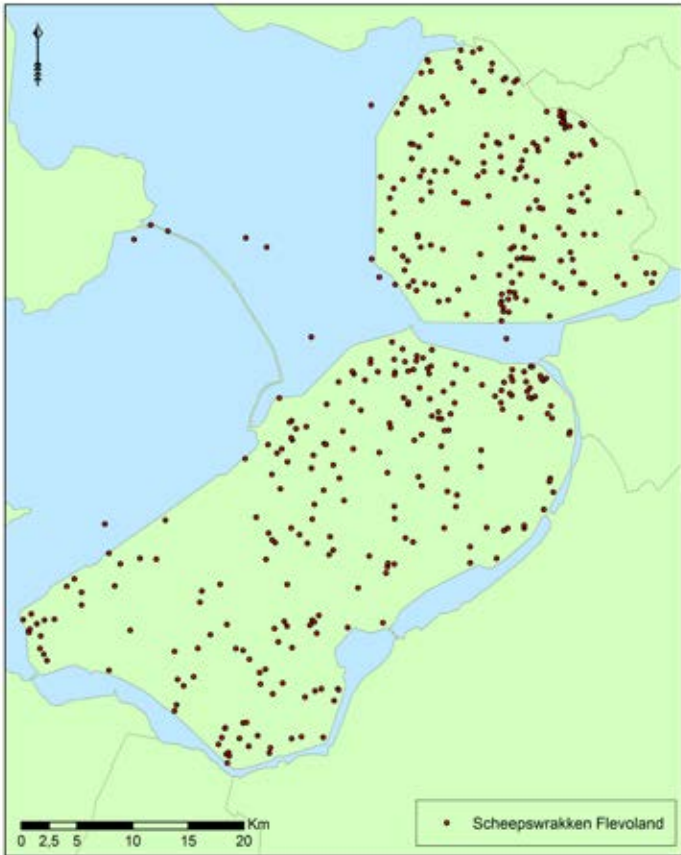


Fig. 4. Distribution of shipwreck-finds in the province of Flevoland (Van Popta, 2012).

This intensive use of water left a rich archive of shipwrecks on the bottom of the Zuiderzee (fig. 4). Due to regular flooding of the coastal area around the Zuiderzee, the Zuiderzeeproject was initiated; in 1932 the Zuiderzee was closed off by a dam, the Afsluitdijk, while in 1930 the Wieringermeer was drained, followed by the *Noordoostpolder* in 1942 and *Oostelijk Flevoland* and *Zuidelijk Flevoland* in 1957 and 1968 respectively (fig. 5). The



Fig. 5. Polders in the former Zuiderzee (Reinders, 1982).

first shipwrecks immediately appeared. The area turned out to be the largest ship-graveyard on land in the world, with a total of 422 shipwrecks dating from the thirteenth to the nineteenth century.

As soon as the Noordoostpolder was drained a service was installed to take care of the expected archaeological remains. The service initially operated under Van Giffen, then director of the

Biological Archaeological Institute (later Groningen Institute for Archaeology) in Groningen. Over the following years excavations that were carried out were of varying quality. Soon land reclamation became the most important issue and shipwrecks were in the way of development. Instead of archaeological research, ships were removed and seen as obstacles. The sheer quantity of shipwrecks and probably the post-medieval date given to a lot of the wrecks was due to this careless conduct. In the mid-1970s the tide changed. Fewer shipwrecks were excavated, the documentation improved enormously and excavation results were published in the series *Flevoberichten*. Unfortunately this 'Golden Age' of ship archaeology in Flevoland came to an end when the treaty of Malta was effectuated. From then on, archaeological excavations – also in the maritime sector – were conducted by archaeological firms. Besides that, sites that are not threatened by infrastructural developments but 'only' by natural processes are outside the range of Malta and are therefore excluded from investigation. The almost eighty wrecks still present in the soil of the province of Flevoland are therefore under a continuous threat of a combination of agricultural activities (of which ploughing is most detrimental) and natural degradation. What is described here for the wrecks of Flevoland is paralleled in the Waddenzee. In this area the maritime heritage under water is under a constant threat of degradation by natural processes and activities by treasure hunters.

You may ask yourself how could this situation arise? In the Netherlands, a maritime nation by nature? I am not going to try to answer this question. But what I would like to point out in this paper is the importance of maritime archaeology for our understanding and construction of the past. From a more theoretical stance maritime archaeology can also give new insights into the understanding of man's past, his economic behaviour and social interaction on the one hand and the (cosmological) views of space and time on the other.

The focus of this paper will be on the interconnectedness of research, education, public awareness and management of mari-

time archaeological sites. You cannot do the one without the other. This approach is shown by using the former Zuiderzee area as an example of a crossroad of transportation of people, goods and ideas, a space that was the scene of struggles over power and an area of utmost interest for the supply of food, mainly fish.

The research in the Zuiderzee area is used as an example because it comprises a very rich and underestimated maritime archaeological source and it is the main work area of the IFMAF (see below). We all know about the famous Dutch admirals and seafarers Cornelis Houtman, Michiel Adriaenszoon de Ruyter, Maarten Harpertszoon Tromp and Willem Barentz. We probably also know of the intensive shipping to the Baltic sea with the well-known ship type the flute. This trade was called *moedernegotie* in Dutch, ‘the mother of all trade’, in other words the trade that formed the basis of the prosperity of the Golden Age. But what about inland shipping? This is a completely overlooked branch of water transport. Why were the inland transport facilities of such crucial importance? Two economic historians De Vries and Van Woude (1995) point this out in the following quote:

“May it not be ironic that in a country where the economy is mainly determined by market integration rather than by (economic) politics, by ideology or force, the inland market together with the associated traffic and transport has hardly been the subject of systematic study”.

To counteract this neglect of our maritime cultural heritage – at least in the province of Flevoland -, the International Field School for Maritime Archaeology Flevoland (IFMAF) was established in 2008.

IFMAF

The IFMAF is a cooperation between several parties: the State Service for National Heritage, Heritage Centre Nieuw Land,

the University of Groningen, the province of Flevoland and the municipality of Lelystad. In the IFMAF the above-mentioned aspects of archaeology, research, education, awareness and management are combined. In this case ‘research’ should be understood in the sense of excavation-related research, rather than in the sense of broad research programmes. Every year an excavation in Flevoland is conducted by the IFMAF and an educational maritime archaeological programme is provided at the University of Groningen at Bachelor, Master and Research Master levels. In 2014 maritime archaeology will become an independent specialization at the Groningen Institute of Archaeology. In this section examples of the research by the IFMAF will be given.

Foreign ships on the Zuiderzee?

In 2007 a renewed reconnaissance excavation was conducted at lot B 36 in the Noordoostpolder as a pilot to find out if a partnership between the State Service for Archaeology, Nieuw Land and the University of Groningen was feasible, especially aimed at the organization of a field school for students of maritime archaeology (fig. 6)(Overmeer et al., 2008; Overmeer, 2009).

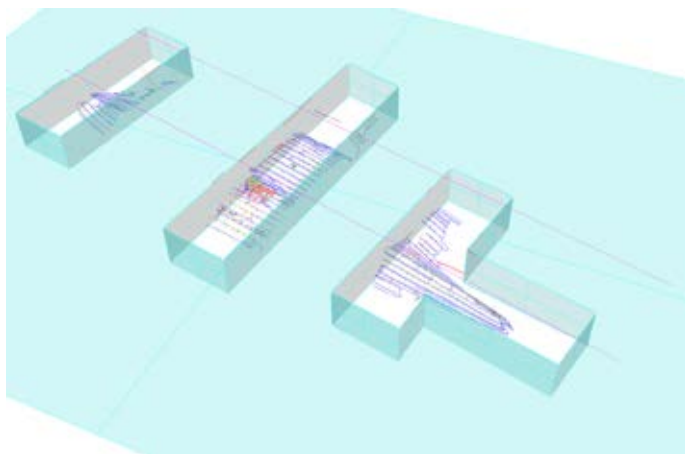


Fig. 6. Drawing with FARO-arm of trial-trenches at lot B 36 in the Noordoostpolder (Dallmeijer, RCE).

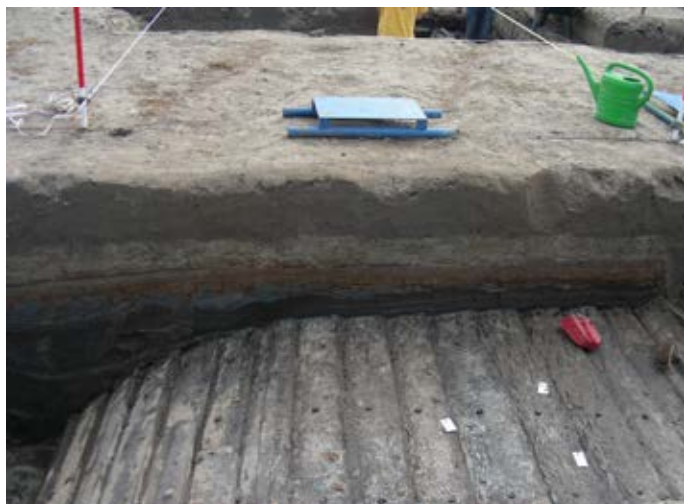


Fig. 7. Mid-ship section of shipwreck at lot NB 36, lying upside down (photo IFMAF).

The site was selected in the context of the PhD project titled “Dutch clinker-built ships in the 15th and 16th century” (Overmeer, 2006). Therefore the excavation is a good example of how the (at that time planned) installation of an endowed chair of maritime archaeology at the University of Groningen not only stimulates education in the field but also has the added value of the combination of research and education. Furthermore, two master students participated in the PhD project about clinker-built ships.

Initially only scarce information was at hand about the site, based on a reconnaissance excavation in 1985 which had to be ended because of sudden harsh weather. The only information available about the wreck was that the strakes were of lapstrake construction and the wreck was lying upside down at the bottom of the Zuiderzee (fig. 7). Based on the disturbance of the soil profile the excavators presumed the wreck had foundered before 1500.

The excavation in 2007 disclosed a seagoing vessel of 18 to 20m in length and 6m wide. Besides this, it showed that several construction elements of the vessel belonged to the Nordic tradition. The vessel is completely clinker-built from oak planks, with sixteen strakes still present at port side. The strakes are connected by rove and rivet at intervals of between 16-21 cm. At the overlap the seams between the strakes are caulked with strands of twisted sheep wool, the scarfs on the other hand are caulked with moss. The stern post is rebated into the keel, while the stem post, which was not present any more, was probably sculpted from one piece of wood. This could be deduced from the hood ends of the preserved planking. The frames are connected to the hull by trenails with a thick head. The tree-rings were studied by the Ring foundation (Ring, 2007). From the dendrochronological research it became clear that the felling date of the ship timber was AD 1476. The ship was probably built in that year or within a short time span. The area of origin of the trees is around the Baltic (Poland and Northern and Middle Scandinavia). This means that it is less likely that the provenance of the ship is to be found in the Baltic, despite the very clear Nordic construction elements of the vessel.

In Flevoland several shipwrecks with the same Nordic constructional elements have been found (Van Holk, 2003). The provenance of the trees used for building some of these ships is the Netherlands. The fascinating question which will be dealt with in the PhD research project is whether a Nordic shipbuilding tradition existed in the Low Countries in the fifteenth and sixteenth century, and if so, how did it come about?

Another question of the trial excavation at lot NB 36 concerned the conservation of the ship timber. So, besides research and education, another objective of the excavation concerned the heritage management of shipwreck sites in Flevoland. As stated above, most shipwrecks in Flevoland are threatened by serious decay because of drainage and agricultural activity such as ploughing. Visual inspection of the ship timber seemed to indicate that the

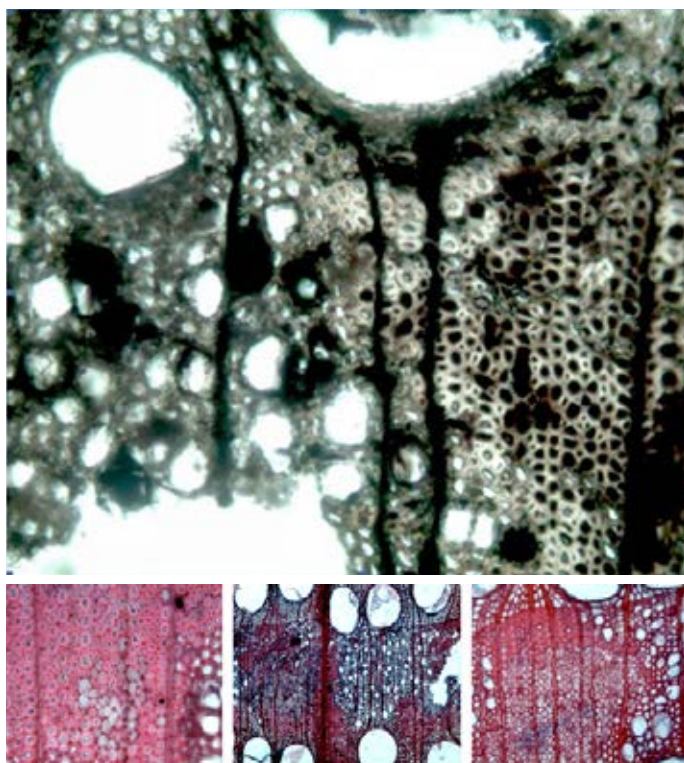


Fig. 8. Analysis of wood samples for decay of shipwreck at lot NB 36. Totally destroyed wood structure close to the surface (a); severe to moderate decay by erosive bacteria at deeper level (b) (SHR, 2007).

quality of the wood was quite good. Two samples were taken for degradation research, one higher up in the wreck and one at a lower level. Both samples were infected by bacterial decay. It turned out that the wood structure of the sample higher up in the wreck, at a position with a fluctuating ground water table, was completely destroyed. From the sample from deeper down, constantly under the ground water table, only the outer wood structure was destroyed, while the core was still intact (fig. 8a,b). Together with wood degradation elsewhere in Flevoland the

results of this research are highly significant. The research shows it is not a question of the length of time the ship timber stays at the bottom that influences the decay of wrecks, but under what circumstances. So the question is rather what protective measures can be taken? A method in use for several decades is the artificial raising of the ground water table around the site of a shipwreck. Eighteen wrecks in Flevoland are protected in this way. A tub is created around the wrecks, made of thick plastic sheeting. Rain-water can infiltrate from above and so locally an artificial higher ground water table is created.

Finally, some conclusions from the report by Overmeer (2009a) about the field school and the communicative aspects are interesting to mention:

- students have acquainted themselves with several skills needed to perform a reconnaissance excavation: the relocating of the wreck by the plotting of co-ordinates, the determination of the contours of the vessel, the excavation and cleaning of the ship's hull, the measurement and description of the ship construction (by traditional methods as well as with the help of advanced 3D drawing equipment (FARO-arm)), the study of the soil profile and taking samples for dendrochronological, wood-decay and caulking research.
- The wreck provided excellent opportunities to instruct a group of students, with a maximum of ten students and two to three professional archaeologists. For a thorough training of students a large or 'talked about' ship is not especially necessary; on the contrary, too much attention from the public and press is only distracting.

Regarding the maximum number of students, the IFMAF became so popular that more students had to be accommodated. This could only be done by longer campaigns. The ideas about press and publicity did change radically. At the moment, part of the students' training is how to give a tour and explain about the excavation to the public and press; an aspect that has become inseparable from and is essential to archaeology today.

Cog-like vessels

The IFMAF field school was active on two sites with remains of cog-like vessels. The first campaign was also the official start of the IFMAF, at a site already excavated by P.J.R. Modderman in 1944 (Modderman, 1945; Van Holk, 2006; Van Holk et al., 2008).

The excavation conducted by Modderman in 1944 was in many ways special and far ahead of its time. The techniques were new: for the first time a crane was used to dig up a site and even more advanced was the idea of reburying the vessel at a deeper level, under the ground water table. In order to do this the wreck was reinforced by planking and steel cables, still partially visible during (re)excavation in 2008 (fig 9). The Second World War was still going on, so there were no possibilities to conserve the wreck. Another remarkable aspect of the excavation was that Modderman recognized the vessel as a cog and acknowledged the importance of the wreck. It was the first time a shipwreck had



Fig. 9. Reconnaissance excavation of cog at lot M 107 in the Noord-oostpolder showing support structure (cables and wooden laths) (photo IFMAF).



Fig. 10. Models of cog NM 107, by W. Pul (a); half model by D. Huismans (b)(photo IFMAF).

been identified as a cog. Finally it was noteworthy that two scale models were built of the wreck (fig. 10a, b). Later on, reburying (the individual parts) of wrecks became a standard procedure to preserve (important) shipwrecks, as is the building of models to reconstruct the often deformed hull of an excavated wreck.

The aim of the re-excavation in 2008 was to solve some questions about the construction of the cog, to establish a firm date and

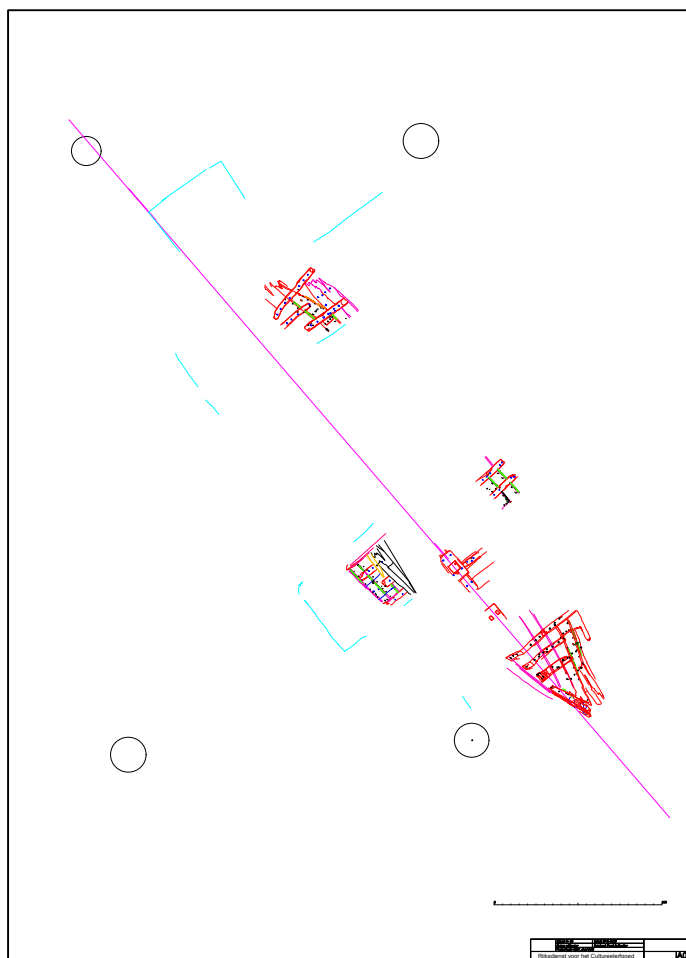


Fig. 11. FARO-arm drawing of plan of excavation at lot NM 107 (Dallmeijer, RCE).



Fig. 12. Stern-hook of NM 107 (photo IFMAF).



Fig. 13. Caulking of moss, sintels and moss-lath of cog NM 107 (photo Penders, RCE)

to check the overall condition of the ship timber (fig. 11). After the excavation in more recent times of several cog-like vessels it became clear that these vessels shared some common character-

istics (Reinders, 1985). In Modderman's publication two such characteristics seemed to be lacking. The first being a so-called stem- and sternhook; timbers in the form of a knee, which connect the keel to the stem and stern post (fig. 12). Another constructional detail we were looking for was the caulking method. In this case the use of moss, moss-lath and staples (Dutch: *sintels*) to fasten the laths (fig. 13). Both these elements were recorded during the re-excavation.

Samples for dendrochronological research were taken and the felling date of the timber was established at AD 1339 (Ring, 2008). The wood samples were dated by tree-ring calendars of the northern parts of the Netherlands. This is surprising because this is a scarcely forested region. It is clear that more research should be done to resolve the question of the wood provenance. As part of the educational programme in maritime archaeology at the University of Groningen, a student is writing his thesis on this find.

In the wreck some large bricks (Dutch: *kloostermoppen*) were found. During the 1944 excavation the major part of the cargo, consisting of 5,000 bricks, was salvaged. A local farmer, visiting the 2008 excavation, told us that his father got most of the bricks from Modderman in 1944. The bricks were in use in his garden as an edging for his herbaceous border (fig. 14). The composition of the clay of which the bricks are made is currently being researched by XRF measurements to see if the production area of the bricks can be determined. In the fourteenth century bricks were produced largely by monasteries. Cistercian monasteries producing bricks in the northern Netherlands (provinces of Friesland and Groningen) at that time were: Klaarkamp (near Rinsumageest), Jeruzalem (near Gerkesklooster), Bloemkamp (near Bolsward) and Aduard.

The excavation was attended by nine students, seven from the University of Groningen and two from the University of Leiden. The exposed parts of the wreck in the three trial trenches were described and drawn by the students. Apart from the students,



Fig. 14. Bricks from the cargo of cog NM 107 used as edging for his herbaceous border (photo IFMAF).

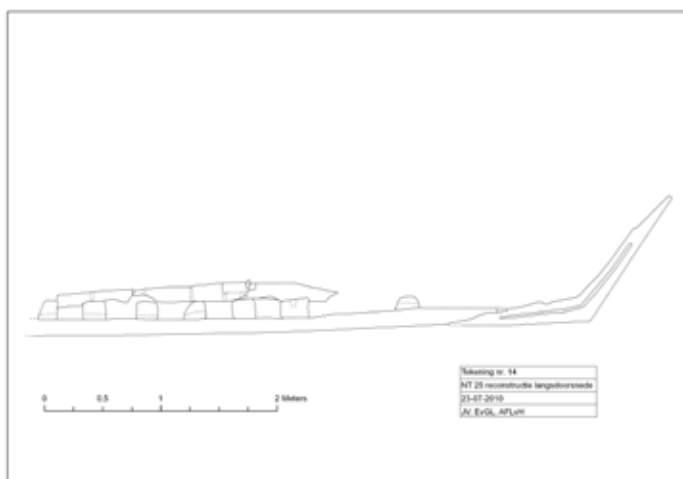


Fig. 15. Reconstruction drawing of longitudinal profile of shipwreck at lot T 25 in the Noordoostpolder (drawing IFMAF).

several amateur archaeologists, members of the Archeologische Werkgroep Nederland (AWN) joined the excavation team.

The next cog, excavated at lot NT 25 in 2010, was found during the construction of a recreational park with artificial dunes, rivers and lakes (Van Holk, 2010b; Van Holk, 2011a). Of the vessel, only the bottom was preserved with a length of 9.2m and a width of 2.8m. In 2007 elsewhere at lot NT 25 wood was traced during the construction of one of the ponds. One of the rescued ship parts was a so-called stemhook, a diagnostic constructional element of a cog. During the excavation in 2010 this piece could be placed back in its original position in the wreck together with a part of the stem itself. This was also the case with the keelson including the mast step. Thus the position of the mast could be ascertained (fig. 15).

It is currently impossible to establish the original length of the bottom, as the rear part is missing. The reconstructed width of the bottom is 2.48m. The reconstructed length of the vessel might have been 12 to 15m; the width 3.5m. The bottom consists of three planks at either side of the keel (fig. 16). The seams between the planks are caulked with moss. Moss-laths were not present. After carefully cleaning the ship's hull, the pointed ends of the *sintels*, which were stuck in the planks, appeared. The parts that kept the supposed moss-laths in place were missing. Probably the iron was corroded. The bottom is rather flat and flush built. Towards the ends the strakes become overlapping; a typical construction feature of cog-like vessels. The shape of the keel is very interesting. The ship has a beam keel, different from the plank keel, which is more usual for cog-like vessels. There is no explanation yet for the divergent keel; further research is needed.

The wreck was damaged in several phases. It seems the wreck foundered at another location, after the sides had broken off and disappeared. After the bottom settled at the find spot the starboard side was damaged mechanically as can be deduced from the straight line of the damage. The resultant disturbance of the bottom had been filled in, in a layered fashion, which means the



Fig. 16. Plan of cog NT 25 (drawing IFMAF).

damage took place at a time when the wreck was still under water. It is known that before the Noordoostpolder was drained canals were dredged under water. The wreck might have been damaged while such a canal was being dredged. This may also explain why the loose pieces of ship timber were found at a distance of 50 m from the location of the wreck (Arent Vos, written communication). Finally the wreck was hit by the laying of drainage pipes at the site. Since the site was not known from the archives of the RCE at the time the wreck was hit by the drainage pipes, it had not been reported that a shipwreck had been hit. The idea is that most wrecks are reported when disturbed. This wreck, together with the one excavated by the IFMAF at lot NR 4, shows that an unknown number of wrecks were never reported, which means that an extra unknown number of wrecks is still hidden in the soil of the province of Flevoland.

Seven wood samples were taken for dendrochronological analysis. Four samples could be dated and gave a felling date between AD 1307 and 1315. Reference chronologies from the northwestern part of the Netherlands gave the best match for the tree-ring series (RING, 2010a). Like the cog from lot NM 107, the wood from which the vessel is built appears to have been grown in the northern Netherlands. This area of origin is again remarkable, as stated above, since wood was scarce in these surroundings.

On the severely disturbed site of the wreck, three large bricks (Dutch: *kloostermoppen*) and two fragments were found, comparable to the ones from the cog at lot NM 107. These bricks are currently also being subjected to XRF measurements in order to determine the composition of the clay, and from that possibly the production area of the bricks. As stated above, monasteries in the northern part of the Netherlands played an important part in the production of bricks from the twelfth century AD. From around the thirteenth century these bricks were produced for export and trade. The intensive interference of the monastery in the battle against water by building dykes and creating polders, together with the creation of transport facilities by digging waterways, poses another interesting question: might the monasteries also have been responsible for, or might they at least have stimulated the building of cogs to transport their surplus production of bricks? This would explain why the wood used for both cogs from lots NT 25 and NM 107 has a provenance in the northern Netherlands.

Students from different universities in the Netherlands and, for the first time international students from Belgium and Germany, participated in the field school (fig. 17). Apart from the students, several amateur archaeologists, members of the Archeologische Werkgroep Nederland joined the excavation team.

The press covered the excavation extensively. Recordings were even made by the BBC programme Coast. The open day was a great success with almost 300 people visiting the site.



Fig. 17. Excavation of NT 25 (photo IFMAF).

Several years ago the project website ‘Vergane schepen’ was started. The aim of the project is to present the shipwrecks found in Flevoland on a map with a short description for the lay public and interested scholars. This project has been continued in cooperation with students from the University of Groningen. Sometimes interesting ‘new’ information turns up concerning not yet published material from shipwreck sites. One such case is the stern hook of a cog with the complete stern post (Van Holk, 2013). The stern hook and stern post were found at lot NM 133 in the Noordoostpolder (fig. 18). The find raised the question of whether it would be possible to say something about the vessel, for example to determine the dimensions of the complete cog, on the basis of the stern hook and stern post? This would imply that certain standard proportions existed in cog building. Research into specifications and conditions for seagoing vessels of the seventeenth century by Hoving (1994) showed that this was the case. The question is, whether these kinds of standard proportions were also used in late medieval times? In order to gain some idea about the complete vessel, several cogs were compared to determine if there is a relationship between the dimensions of

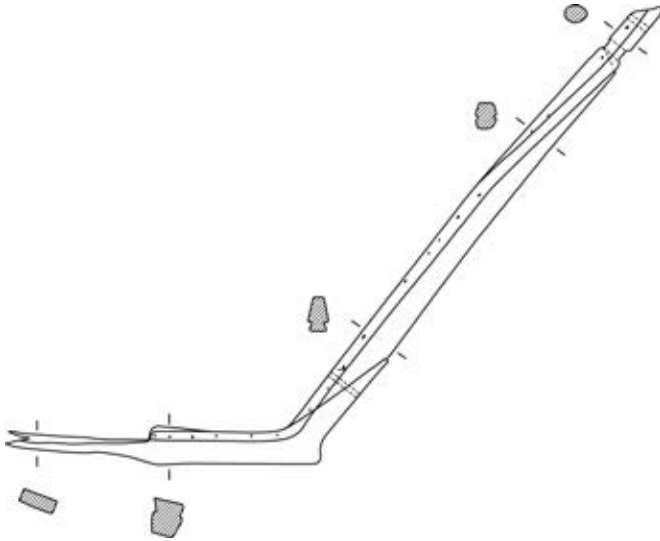


Fig. 18. Stern-hook and stern post of shipwreck at lot NM 133 (drawing Van der Zee, RCE and Boersma, GIA).

stern posts and ship size. Surprisingly a positive correlation was found between the dimensions of the stern post and ship size. The thickness of the stern post in particular shows a direct relationship to the length of the ship (fig. 19). On the basis of this, the dimensions of the cog to which the stern post and stern hook belonged could be estimated at 15 m x 4.5m. So the cog belongs to the 'small' variant within the cog family.

The (prelude to the) Golden Age

When I started my job at Nieuw Land Erfgoedcentrum in Lelystad, my first assignment in 2005 was to organize an exhibition about a shipwreck. There were several candidate wrecks, but the so-called *beurtschip* found in Lelystad (Flevoland) at lot OB 71 seemed to be the most suitable one (Van Holk, 2005; 2012a). Although there was some information at hand about the vessel, especially on its construction (Hocker, 1991a; 1991b), the cargo and ship inventory had been studied to some extent but certainly

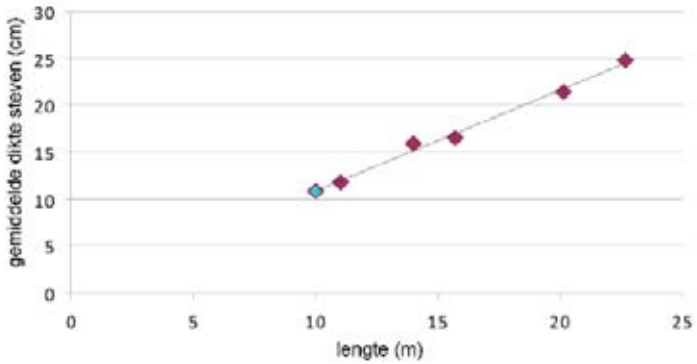


Fig. 19. Diagram showing linear relationship between average thickness of stern post and overall length of six cogs (van Holk, 2013).

not published, with the exception of a paper on the galley utensils and a preliminary working document (Sarrazin 1987; 1992).

Because of the composition of the artefacts, the wreck was called *beurtschip* or *beurtvaarder*. This refers to the function of the vessel as a cargo vessel used in regular service shipping. The importance of *beurtvaart* is reflected in the fact that these vessels are often depicted in paintings (fig. 20). The *beurtschip* at lot OB 71 was excavated in the years 1980 and 1981. The ship was built in 1587 and wrecked around 1620. It is probably of a type called *wijdschip*, a predecessor of a widely used vessel in later times, the so-called *tjalk*. The name *wijdschip* refers to the fact that this ship could not pass the sluice near



Fig. 20. Painting by Hendrik Cornelisz. Vroom, *view of the IJ (1566-1640)*. Detail showing *beurtschip* (RCE).



Fig. 21. Box filled with eggs from the hold of shipwreck excavated at lot B 71 in Oostelijk Flevoland (photo Penders, RCE)

Gouda, in contrast to its less wide variant the *smalschip*. The vessel sailed at fixed moments in time, between fixed places. This was a modern traffic system, not to be found in any other European country at the time, specially designed for the transport of mixed cargo (parcel goods) and passengers, connecting towns and villages all over the Republic and beyond (the city of Groningen for example had a regular service shipping connection to Bremen and Hamburg). The hold of the *beurtschip* was stuffed with an enormously varied cargo. Amongst other things a big chest filled with eggs was on board (fig. 21), with some of the eggs still intact!

The eggs were probably transported by a farmer or his wife to be sold at a market. The cargo in the hold indicates the vessel was on its way from either Hasselt or Zwolle to Amsterdam. A nearby hinterland of Zwolle is the region of Twente with the regional centre of Almelo. A place in the Netherlands where you would not expect any shipping to be going on. In geological terminology it is a deluvial area with brooks, hardly suitable for shipping. In his book "*Varen waar geen water is*" ("Sailing without water") Schutte (1985) showed that on the contrary the area could be characterized as what we would now call a maritime cultural landscape, strewn with Captain's Inns and small rivers made navigable and even a real harbour in Almelo. In addition, it is interesting to note that around Almelo farmers had specialized in egg production, already by the seventeenth century. So it is possible that the eggs on board the OB 71 originated from that area. Another most interesting group of artefacts found in the ship were the mowing tools of so-called *hannekemaaiers*. They were seasonal agricultural workers from Westphalia (Germany). From written sources we know that from 1600 onwards, 10,000 of these workers crossed the *Zuiderzee* each summer to work for the rich farmers in coastal zones of the Republic (Lucassen, 1982). Many *hannekemaaiers* departed from Zwolle and Hasselt by *beurtschip* to cross the *Zuiderzee* to Amsterdam. The farmers created new land by draining lakes that were made into polders. However there were not enough labourers to work the new land. Hence they had to bring in the *hannekemaaiers*, as their descendants did 350 years later with foreign labourers from Turkey to perform the dirty and poorly paid jobs in expanding industries. In the hold of the *beurtschip* several sets of tools for mowing grass were found. Apparently the *hannekemaaiers* had to bring their own tool-kits, which consisted of scythes in loose parts and devices, mainly for sharpening the blade of the scythe: chine, snaith, snaith crutch, peening hammer, peening anvil, grip and strickle (fig. 22). Besides these, leather kit bags were found, probably also belonging to the *hannekemaaiers*. So the main occupation of the *hannekemaaiers* was the mowing of grass, which was fed to cows in the form of hay. The cows were kept for milk production, which



Fig. 22. Hannekemaaiers on board OB 71. Scythe in loose parts and devices, mainly for sharpening the blade of the scythe: chine, snaith, snaith crutch, peening hammer, peening anvil, grip, strickle and kit-bag (photo Penders, RCE, composition Boersma, GIA).

was used in turn for cheese production. These *hannekemaaiers* therefore formed an essential link in the food production chain in the Republic. This was only possible by the intensive use of transport facilities over water. Regular service shipping was closely linked to the seasonal migration of labour. In the summer season, when the grass had to be mown, extra departures of *beurtschepen* were scheduled. The specialization of farmers, again at this early date, producing cash crops for a market was only possible by the extensive transport network across water. The *beurtschip* shows how the Zuiderzee functioned as a crossroad and highway. The hinterland of Zwolle was in fact the hinterland of Amsterdam. This very fast-growing metropolis was urgently in need of a vast and cheap supply of food. The network of the city of Amsterdam was not only international, but it also penetrated deeply into the smallest villages and towns in the Republic itself. Foreign visitors to the Republic in the seventeenth century praised the ease and speed with which they could travel throughout the country.

Another aspect of maritime archaeology in general is also made quite clear by the example of the *beurtschip*. Most sites of shipwrecks are the result of a disaster. To put it another way: shipwrecks founder in action. In turn this can result in reasonably



Fig. 23. Barrel filled with pewter objects from the hold of beurtschip OB 71 (photo RCE).

complete ships, artefactual inventories and cargo. Besides this, cargo on board ship is in transition, in the transportation mode, so it will never be found in a terrestrial setting. In the case of the *beurtschip*, for example, a big barrel was found in the hold filled with scrap pewter, intended to be re-melted in Amsterdam (fig. 23). Makers marks on the pewter could be attributed to *Berend van Goor*, tinsmith in Zwolle. Property marks WVI with three donkey heads belong to *Wolf van Ittersum*, alderman of Zwolle. In a way, the transport of the scrap pewter of the elite of Zwolle symbolizes the waning power of the east coast of the Zuiderzee in favour of the booming towns of Holland on the western coast. The last example of the unique character of material culture on board shipwrecks is the excavation of two zithers. In the whole of Europe only three zithers from the seventeenth century are preserved. The instruments of the *beurtschip* are the only ones with their original strings. The composition of the metal could therefore be studied and used to make 'original' strings for the replica that was built. Contemporary musicians play seventeenth-century music on the replicas, so research, exposition and performance can operate quite well side by side to create public awareness.

The IFMAF excavated two wrecks from the sixteenth century. The first one at lot R 4 in the Noordoostpolder in 2009 (Van Holk et al, 2012; Van Holk, 2012b) and the second excavated over two seasons in 2011 and 2012 (Van Holk 2011b; 2012c; 2012d).

The shipwreck at lot NR 4 was heavily damaged by deep ploughing (fig. 25). The felling date of the timber used to build the ship could be established through dendrochronological analysis (Ring, 2010b). The felling date is AD 1587. The provenance of the timber lies in two different areas: Norway and Northwest Germany. Other possible areas of origin are Twente and Lower Saxony. This seems to indicate that the timber was imported, and the ship was built in the Netherlands. The maximum estimated dimensions of the wreck are: length 15m, width 4m and depth of hold 1m. We have then a medium sized cargo vessel. However



Fig. 24. Replica of zither from beurtschip OB 71(photo Núñez).

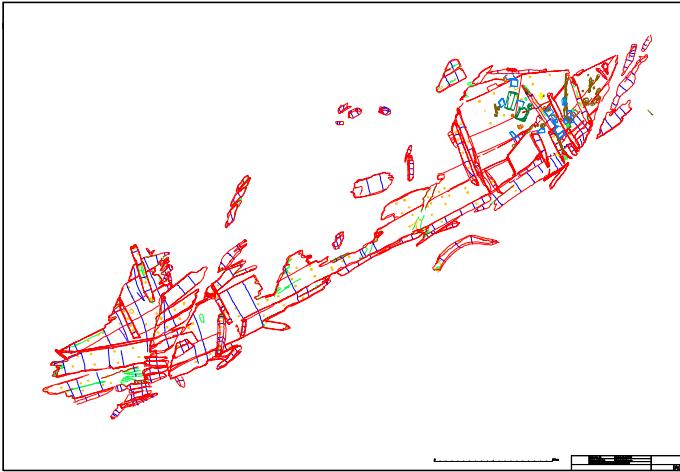


Fig. 25. FARO-arm drawing of plan of shipwreck excavated at lot R 4 in the Noordoostpolder (Dallmeijer, RCE).

the vessel itself is perhaps not the most interesting find. The site in itself is highly informative. First of all, around and under the vessel an accumulation of non-related material had assembled. The material dates from the eleventh to the eighteenth century. In the twelfth century, heavy storms and inundations changed the face of the coastline of the *Almere* dramatically, also in the area of the current *Noordoostpolder*. Parcels of land, consisting of a clay on peat deposit, were swallowed completely by the nascent *Zuiderzee*. Villages were swept away; amongst others, part of the village and fortifications of *Kuinre*, situated quite near to where the wreck foundered. The wreck site could not be compared to a site in the open sea. Probably the area was very shallow and the continuously eroded material could be deposited in stream gullies around the wreck.

Last but not least, the most imported message this wreck has to tell us is that if we sit back and do nothing and leave the wrecks in Flevoland as they are, they will be lost within the coming years. Serious threats are drainage, by which the ground water table is

lowered, causing the bottom to settle. Wrecks will be positioned ever closer to the surface level, above the ground water table, within reach of the plough and oxygen. Serious physical, chemical and biological degradation will be the result. This has unfortunately been confirmed by a visit to a wreck site at lot OR 49 in 2014 for monitoring purposes. In the field, metal and wooden objects, construction elements of the wreck were observed (written communication Waldus).

These threats are not restricted to wrecks on land in the province of Flevoland. Underwater maritime heritage in the Netherlands faces the same destiny if we do not act. If we fail to take protective measures, if we fail to make overall maritime cultural heritage management plans, in which research, conservation, public awareness and education play an equal part. The archaeological potential of the bottom of the former *Zuiderzee* which still lies under water in the *Markermeer* and *IJsselmeer* is hardly known. It is obvious that the *Swifterbant* sites do not vanish at the edge of the polder. Concerning shipwrecks, we face another problem. Their whereabouts are hardly predictable, since they foundered as result of a catastrophe, somewhere between the home port and port of destination. Moreover, even if a certain shipping-lane were to exist, a wreck would not necessarily sink within that sea-lane. It gets into difficulties and drifts away for a distance that could be miles away from the accident site. Unfortunately, large infrastructural interventions in the subsoil lay ahead of us. One such large-scale project is the development of the *Marker Wadden*, which covers 10,000 hectares. The plan comprises the building of artificial islands. For the creation of the islands deep trenches will be dredged in the subsoil. Sand extraction was already a threat to cultural heritage in the past, but now it will strike on an unprecedented scale (also elsewhere in the *Markermeer* and *IJsselmeer*). Other threatening developments are the construction of windmill parks outside the dikes, in the water.

In the *Waddenzee* the threats are of a different nature. Here the highly dynamic geomorphology of the area itself is the problem.

The course of gullies changes all the time, exposing wrecks, but also covering wrecks up. This in combination with a strong current is disastrous for the maritime remains. Since these natural processes of degradation are not caused by project development but by nature itself, a 'causer' cannot be appointed in the sense of the treaty of Valletta. But non-natural dangers are also lurking: drilling for oil and gas, the laying of cables and pipes and, last but not least, the treasure-hunting activities of amateur divers.

In 1975 the find of wood from a ship was reported at lot OE 34. In 1985 a reconnaissance excavation was conducted. In 2003 a second reconnaissance excavation took place because, on the basis of the first one, the site could not be assessed in a proper way (fig. 26)(De Boer and Van Holk, 2005). The three trial trenches that were dug revealed the presence of a fairly complete vessel, the sides of which were in a bad state of preservation because of the shallow depth under ground level. A remarkable find was a complete rapier. Dendrochronological analysis of some samples gave a felling date of AD 1553 for the trees used for building the vessel. On the basis of the second field survey it was concluded that the wreck was potentially rich in information. It was also concluded that preservation in situ was not a possibility due to several circumstances. First of all, the soil structure was not suited for conservation measures and, secondly, the wood near the surface was already heavily degraded. Moreover the site was situated in the middle of a plot of land in agricultural use. The raising of an artificial mound to protect the wreck physically would not create goodwill for archaeology. So in 2011 it was decided to turn to site OE 34 with the field school to conduct a complete excavation of the wreck (fig. 27). The site proved to be of great interest and due



Fig. 26. Trial trench of the reconnaissance excavation in 2003 at lot E 34 in Oostelijk Flevoland (photo Nieuw Land).



Fig. 27. Overview of the shipwreck at lot OE 34 (photo IFMAF).

to the bad preservation of the sides of the vessel, which impeded quick documentation, the excavation was continued in 2012.

Soon after the start of the excavation it became clear that although the state of preservation of the sides was bad, the wreck was almost complete. Because the sides lay in a horizontal position they were preserved probably to the uppermost strake. The wreck rested with her keel on the Pleistocene sands of the subsoil, at a local shallow of the Zuiderzee, known as the 'Knar'. For this reason the wreck could not sink further into the subsoil. At the site the Zuiderzee was no deeper than two metres, so the wreck was possibly visible above the water table for a certain period of time. As there was very little left of the cargo and a big dredging hook was found in the hold of the vessel (see below), possibly salvage attempts had been undertaken.

Before the excavation started, the wreck site was surveyed with the help of geophysical techniques. In 2008 a pilot scheme to detect buried shipwrecks in Flevoland with a so-called groundtracer proved to be successful (fig. 28)(Van Holk, 2009b). The tracer technique makes use of two different kinds of measurements:

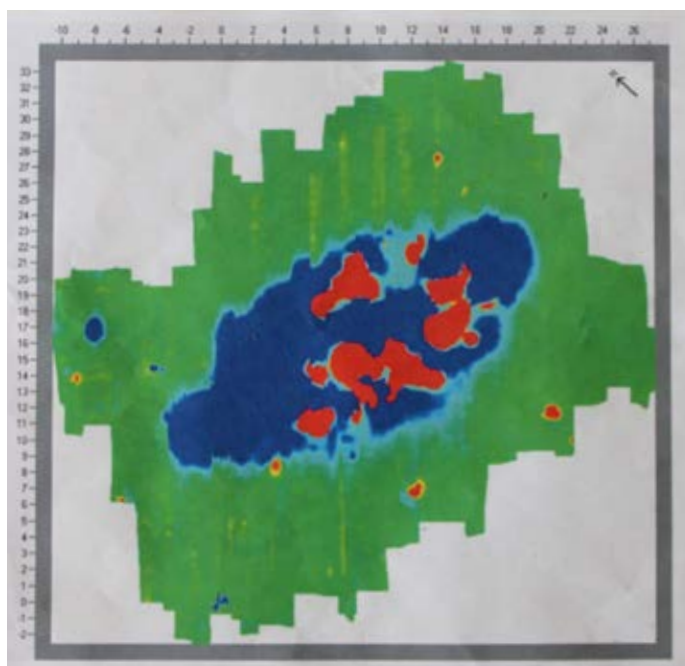


Fig. 28. Groundtracer measurements at lot OE34 showing the contour of the wreck (De Boer et al., 2012).

radar and tracer. The Ground Penetrating Radar transmits electromagnetic waves that are reflected and received by sensors. The tracer measures differences in the electromagnetic field at the surface, caused by the structure of the subsoil. A pilot in 2008 conducted in Flevoland at lot P 37 in Zuidelijk Flevoland showed that the combined data gave a far clearer picture of anomalies in the subsoil compared to the use of both techniques separately (figs 29a and b). In the case of OE 34, also the contours of the wreck were visible. At some locations in the wreck there was an intense reflection. In one instance this could be explained quite easily by the presence of a hearth consisting of tiles. Artefacts of stone give a strong signal and so turn up as a strong anomaly in the subsoil. At some other wreck sites the Ground Penetrating

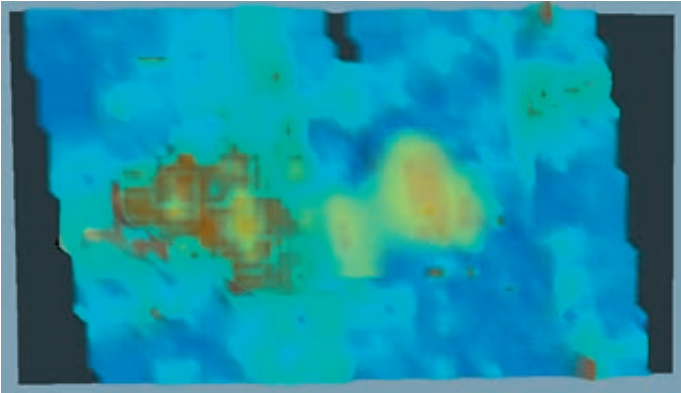


Fig. 29. Groundtracer measurements at lot P 37 in Zuidelijk Flevoland. Excavation plan (RCE)(a), Groundtracer image (GT Front-line)(b).

Radar was tested with variable results, due to other (non-archaeological) anomalies in the surroundings of the wreck sites (Boer et al., 2012).

The estimated dimensions of OE 34 are a length of 20-23m, a width of 5m and a depth of 2.5m. One mast provided the propulsion. Fore and aft the vessel was probably decked, while the hold might have been open, provided with a hatch coaming that could be closed by hatch covers. The shipwreck at OE 34 is carvel built, with flush, non-edge joined planking, in contrast to the Nordic (clinker) shipbuilding tradition. The carvel concept was at the time (mid-sixteenth century) starting to be the generally accepted way to build a ship hull. The medieval or even Roman way to

construct a hull, by combining flush planking for the bottom and overlapping strakes of the sides, continued to be used alongside the carvel construction technique. For a well-known fishing vessel of the Zuiderzee, the *waterschip*, the transition from overlapping to flush planking can be dated quite sharply to between AD 1530 and 1550. The introduction of carvel shipbuilding might be earlier elsewhere (for big seagoing vessels), but in the Zuiderzee area the *waterschip* may give a good indication of the period of transition. One of the probably last big clinker built ships, excavated in Flevoland, is OU 34. The felling date of the timber used is circa AD 1530 (Overmeer, 2006). This wreck supports the transition date of 1530. In other words, the wreck excavated at lot OE 34 may be one of the early medium-sized vessels constructed in flush fashion.

For several reasons the construction of the vessel at lot OE 34 was of great interest. First of all, the hull showed a transition between a medieval hull form, where both bow and stern are lean and a post- AD 1600 hull form, with bluff bows, where both ends start to be full and rounded. In the case of OE 34 the bow is bluff, but the stern still shows the medieval leanness (fig. 30).



Fig. 30. Lean stern under the waterline of OE 34 (photo IFMAF).

Lee-boards had not yet been introduced in Dutch shipbuilding at this time, so ships could not be built with bluff ends because they would then have suffered from too much leeway. The steep, probably almost vertical sides and the other characteristics of the hull form suggest that the wreck is of a ship type called *wijdschip* or a precursor of this type. Two variants existed: the *smalschip* and the *wijdschip*. The *smalschip* could pass through the sluice near Gouda, while the *wijdschip* could not.

Secondly, another striking feature of the construction that could be deduced was the building sequence of the vessel. The sequence of construction in wooden shipbuilding can be divided into three basic principles: shell and skeleton construction and bottom-based shipbuilding. In shell-first construction the hull is built first and the frames are put in afterwards. In frame-first it is the other way around, with the frames coming first. This sequence is the modern method of shipbuilding, which requires a complete plan in advance, based on mathematical calculations (integral calculus) of the vessel to be built. Nautical architecture was introduced in shipbuilding in the eighteenth century, but not in all countries of Europe. In the Netherlands for example, shipbuilding, even of larger seagoing vessels, was a craft and not a science. For smaller and medium-sized vessels (up to say 25m) built in small local shipyards the building process was done by eye even in the nineteenth century. Bottom-based shipbuilding is a combination of both shell-first and frame-first. The bottom is built shell-first and the frames of the sides are put in next. Bottom-based design, more correctly, means that the bottom of a vessel is the main element which designates the form of the sides (Hocker, 2004). This detour about different concepts in shipbuilding is necessary to understand the building sequence of the vessel found at lot OE 34. The bottom of OE 34 is clearly built in shell construction. Archaeological evidence for this are the numerous spike-plugs (fig. 31) (Dutch: *spijkerpennen*) found throughout the bottom. Spike-plugs are small wedge-shaped wooden plugs, used to fill former nail holes that belong to temporary cleats used to keep the carvel planks of the bottom together. The planks of the hull



Fig. 31. Spike-plugs (spijkerpennen) in one of the bottom planks of OE 34 (photo IFMAF).

needed to have some temporary support, as no frames were used. Small poles were often used at the outside of the hull to give the planks some extra support. Another archaeological indicator for a complete shell-built hull would be the absence of joints between the floor timbers (inner timbers of the bottom) and the futtocks (inner timbers of the sides). Detailed analyses of the construction of OE 34 showed no such joints, except at two frame stations near the mast-step. This is the position of the main frame, the most important frame to control the form of the sides. Two floors of two frames were connected there to the futtocks by two horizontal trenails and a rebate in the floors (fig. 32). At all other stations such connections were lacking. The two frames are interpreted as main frames, which means they were erected before the sides were built. This is the first time a shipwreck excavated in the Zuiderzee area shows this kind of fastening between inner timbers. For the first time it can be demonstrated how the shape of the sides was controlled by two principal frames.

In the bow of the vessel another characteristic construction was found. Two half-round timbers were mounted at both sides of



Fig. 32. Connection of floors timber to futtock by two horizontal treenails and a rebate in the floor (photo IFMAF).

the keel plank (fig. 33). Again a construction unknown from shipwrecks from the Netherlands. One of the wrecks excavated in Copenhagen at the B&W site (B&W 4) shows a remarkable resemblance to the wreck in Flevoland, even in detail (Lemée, 2006). It has the same two half-round timbers beside the keel plank. Two timbers with an unknown function. The resemblance in detail suggests both ships were built at the same shipyard. Yet in



Fig. 33. Overview from bow to stern showing the half-round timbers beside the keel-plank of OE 34 (photo IFMAF).

date they lie almost half a century apart. B&W 4 was built some time after AD 1587. The study of the framing system of B&W 4 made clear that frames were not interconnected. From a simplistic evolutionary point of view one would expect the shell concept to be gradually replaced by the more modern frame concept of ship-building that is characterized by a hull form determined by the shape of pre-erected frames (at least in the sides). Comparison of the wrecks from Flevoland and Copenhagen shows the opposite. It seems the older vessel was built according to more modern principles than the younger one. But there may perhaps be another explanation. As pointed out before, the wreck in Flevoland might be one of the early carvel-built vessels in the area. The form was different from the prevailing medieval hull form with lean ends. To ensure the correct form was accomplished two main frames were pre-erected. Later on, when the shape became familiar to ship-builders and moulds probably had been used to check the correct form, the pre-erected frames were no longer necessary.

The hull form and construction sequence of this vessel may be interesting, but the composition of the cargo and the artefac-



Fig. 34. Rapier in the hold of OE 34 (photo IFMAF).

tual inventory are fascinating as well. During the reconnaissance excavation in 2003 the first rapier turned up. During the succeeding complete excavation by the IFMAF in 2011 and 2012 more weapons came to light: two more (fragments) of rapiers, a lance head and a weapon which looks like a halberd (fig. 34). These weapons were not the standard weapons for the crew of a cargo vessel. The crew members would more likely have had a dagger, used as personal knife, weapon and tool in one. So what could be the significance of these weapons? Another shipwreck, dated in the same period, a *waterschip* excavated at lot OW 10 in Flevoland, was able to shed light on this question (Reinders et al., 1986). *Waterschepen* were in use as fishing vessels on the former Zuiderzee (Van Holk, 1994). On board this *waterschip* a halberd and a rapier were found, weapons that were not used by fishermen. It is more likely that the weapons belonged to soldiers. The question is, what does the presence of soldiers on board a fishing vessel signify? Most of the *waterschepen* had their home ports in Holland, especially in Amsterdam. In 1568 the Revolt of the Dutch against Spain started: the beginning of the Eighty Years' War. The rebels under the leadership of William of Orange called themselves sea beggars (Dutch: *watergeuzen*). As their name

indicates, they operated mainly on the water, not only against the Spanish but also as privateers. They were active on the Zuiderzee and turned this inland sea into an unsafe place. For some time Amsterdam supported the King of Spain, Philip II, and initially did not take part in the Revolt. From the point of view of the *watergeuzen*, ships from the port of Amsterdam were hostile ships, the enemy, and so were subjected to attack. The weapons on board the *waterschip* and the *wijdschip* might indicate the presence of an armed escort aboard vessels whose home port was Amsterdam. The *watergeuzen* did indeed block the entrance of Amsterdam to the Zuiderzee. In 1573 the Battle of the Zuiderzee took place. The *watergeuzen* defeated the Spanish fleet under the count of Bossu. After this, Amsterdam joined the Revolt against Spain. Thus both wrecks, the *waterschip* and the *wijdschip* must be seen in this context.

The artefactual inventory of course comprised much more interesting material culture: ranging from tools for maintenance of the ship to galley utensils. On the last day of the excavation, as is almost always the case, an unexpected find turned up while a trench was being dug to study the soil profile outside the ship: two rolls of coins stuck together. Around one of the rolls fragments of the textile packing were still present (Koehler, 2013). The find consists of 48 coins, from small specimens with a low silver content to bigger ones with a high silver content (fig. 35). The coins represent a wide range in date, the oldest ones are half reals from the reign of Ferdinand II of Aragon and Isabella I of Castile (1474-1504) and the youngest ones, two 1/10 coins of Philip II (Dutch: Filipsdaalders). The coins give an unprecedentedly exact date for the foundering of the ship. In 1572 and 1573 a mark was put on the Filipsdaalders in the provinces of Holland and Zeeland which had to be paid, to raise money for the battle against Spain. Only coins with a mark were accepted for payment. None of the coins aboard the vessel has such a mark. Since the youngest coin dates from 1571, and the coins must have been taken out of circulation before 1573 or 1574, the foundering must have taken place in 1572 or 1573. This could be another reason for the presence of



Fig. 35. Coins from the shipwreck at lot OE 34 (photo RCE).

weapons on board, because the battle on the Zuiderzee took place in 1573 (fig. 36). In theory the ship could have been involved in this battle. The presence of the cargo, on the other hand, suggests otherwise. Moreover the amount of armoury seems too small for a ship engaged in battle. Another interesting inference could be made on the basis of the coins. Among the silver coins were fourteen so-called *flabben*, silver coins minted in the town of Groningen. According to numismatic scholar Pelsdonk (oral



Fig. 36. Battle at the Zuiderzee in 1573 AD. Painting by Abraham de Verwer (1585-1650).



Fig. 37. Fourteen flabben, silver coins minted in Groningen (photo RCE).

communication), this means the ship must have visited the town of Groningen. Probably a transaction took place there for which a payment in flabben minted in Groningen was made.

The cargo was preserved only partially. The wreck foundered in relatively shallow water. As a result, it was possible to salvage the greater part of the cargo. Two barrels containing a white substance, probably chalk, and a couple of iron bars were all that was left in the hold (fig. 38). One barrel was found outside the vessel. The chalk may have been used as an ingredient of mortar. The iron bars resemble the cargo of the shipwreck *'Aanloop Molengat'* that foundered on the North Sea at the entrance to the Waddenzee near the island of Texel (Maarleveld et al., 2012). This led to the idea the *wijdschip* functioned as lighter to transport cargo to and from sea-going vessels that lay at anchor in the Texel Roads. The size of the wreck seemed to indicate the vessel was fit for the Zuiderzee but not exactly a sea-going vessel. This idea had to be abandoned because of the Copenhagen find at the B&W site,



Fig. 38. Cargo from the hold of OE 34: two barrels containing chalk and an iron bar (photo IFMAF).

which resembles the Flevoland wreck to such an extent that both wrecks could be called sister ships.

So the wreck informed us about trade with medium-sized vessels to the Baltic. It shows how the Zuiderzee was part of the political scene, sometimes a hostile place, where skippers had to protect themselves against pirates, in this case the *watergeuzen* who revolted against the Spanish rule. The *watergeuzen* took advantage of the fact that the sea was a space that was difficult to control. Even an inland sea like the Zuiderzee, but also the Waddenzee, offered excellent opportunities to fight a guerrilla and follow the tactics of hit and run. Navigation was difficult, especially with big ships and a crew that was not familiar with these shallow waters, with tides and narrow gullies. The *watergeuzen* indeed succeeded in defeating the Spanish fleet in the Zuiderzee in 1572. For the Spanish the Zuiderzee must have been the kind of hostile environment described by Van de Noort (2011) in his book *'North Sea Archaeologies'*. The *watergeuzen*, however, did engage in a totally different manner with this environment: they took advantage of it.

The construction of the wreck has its own narrative to tell. If it is true that the vessel is one of the early carvel built vessels in the area, this would explain the use of main frames and the abandonment of the master frame in comparable *wijdschepen* fifty years or so later, when the job could be done on the basis of routine and with the help of moulds. Although the Dutch economy was the first to be organized along modern capitalist lines (De Vries and Van der Woude, 1995), shipbuilding remained conservative and the traditional ‘old-fashioned’ concept of constructing a hull bottom-based, survived, probably because the advantages, flexibility in hull design and wood convergence, were greater than the disadvantages.

The public days of both campaigns were attended by many visitors. The media, journals, television and radio focused a lot of attention on the excavation. From an educational point of view the excavation was also a huge success. In the two campaigns a total of 33 students from different universities in the Netherlands and students from abroad (U.S, Belgium, Portugal and Finland) joined the excavation. At the moment different students are working on a range of subjects concerning this wreck, in the context of



Fig. 39. Provisional cardboard model of the bottom of OE 34 built by IFMAF students (photo IFMAF).



Fig. 40. Botanical and zoological remains found near the hearth of OE 34 (photo IFMAF).

their study. The post-excavation research, drawing ship timbers, description of the construction, building of a provisional model (fig. 39), description of the artefactual inventory and analyses of botanical material (fig. 40), is dealt with by students, while members of the AWN assist in the conservation of the artefacts. The excavation is a good example therefore of the integration in the IFMAF field school of the elements research, education, public awareness and management.

The excavation by the IFMAF in 2013 was conducted at lot OL 79. For the first time in the history of maritime archaeology in the Netherlands aerial photographs had been taken with a drone (fig. 41). The wreck was found in 1959 when a first superficial observation was made. In 1985 a more elaborate reconnaissance excavation took place and it was determined that the wreck was in a very bad condition. Not only was the wood in a bad state of preservation, but the wreck was also incomplete (fig. 42).



Fig. 41. Aerial photograph with a drone (photo IFMAF).

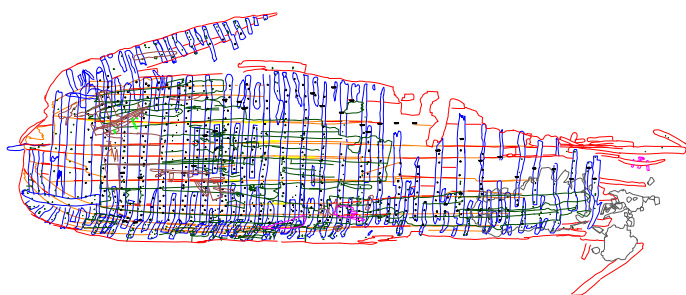


Fig. 42. FARO-arm drawing of plan of shipwreck excavated at lot L 79 in the Oostelijk Flevoland (Dallmeijer, RCE).

Despite the poor condition of the wreck, some exciting artefacts were recovered. A silver watch with a chain, made in London, 483 coins and tokens and some fine industrially produced earthenware (fig. 43a, b, c). On the basis of the artefactual inventory it was determined that the ship had foundered at the end of the eighteenth century. The size of the remains were 16.5 by 4.5m, while the deepest point under the surface lay at a depth of 1.2m. The ship was carrying a cargo of slate.





Fig. 43. Artefacts from the reconnaissance excavation of OL 79 in 1985, watch and chain (a), coins (b) and ceramics (c) (photo Penders, RCE).

It was decided to choose this wreck for the field school for two reasons. First of all, the bad state of the wooden remains of the wreck would deteriorate further in future. Secondly, the artefactual inventory appeared to be interesting for extensive research concerning for example the composition of the crew. From earlier research it became clear that family life on board ships started in the Netherlands at an early date, around AD 1700 (Van Holk, 1997). The field school in 2013 yielded a lot of new information



Fig. 44. Glasses from shipwreck OL 79 (photo Penders, RCE).

about the wreck. Especially the artefactual inventory proved to be quite substantial, as was to be expected from an eighteenth-century shipwreck. In the bow, the best preserved part of the wreck, most objects were found. Of the stern, only part of the bottom remained. Despite this, some artefacts were also found in the stern. Among these artefacts were personal belongings, such as glasses (fig. 44). This implies that this space was also used as a living area, probably for the skipper (and his family?), as the glasses, most of the coins and a pencil were found in the stern. Glasses and writing materials imply the skipper was literate. From comparison with other ship-wrecks excavated in Flevoland it appears that books, in most cases bibles, appear on board from 1600, while from 1700 onwards, writing materials may be present. Although inland skippers in the Netherlands gradually became a subculture despised by the sedentary population on the shore, they were certainly not illiterate (fig. 45) (Van Holk, 2013). Among the coins were several tokens that served as receipts for the yearly payment for the maintenance of lighthouses, beacons and landmarks. On the basis of the tokens with dates on them, the vessel foundered in AD 1796, or shortly thereafter.

No less than three copper tobacco boxes were excavated. So it would appear that the crew consisted of at least three adult men: the skipper and two mates? An interesting question is whether there are any clues for a family on board? Among the most



Fig. 45. Artefacts from different shipwrecks excavated in Flevoland indicating literacy (photo Penders, RCE).

extraordinary finds was an industrially produced, creamware tea-set. Some of the cups and saucers are decorated with the Dutch Virgin resting with one arm on the bible and holding a spear in her other hand with the hat of freedom on top. She is flanked by a climbing Dutch lion and the text “*Voor Vrijheid en Vaderland*” (for freedom and homeland) (fig. 46). The image and text represent the ideas of the Patriots, a movement against the governing elite and the stadtholder Prince William V. The Patriots were inspired by the battle for freedom in America and the French revolution. Propaganda existed not only on ceramics, also political cartoons were very popular in this period (Grijzenhout et al., 2013). Apart from patriotic propaganda, the Orangists, the party in favour of Prince William, had their own imagery. The traditional idea that the basis of this conflict was between the rich and poor has to be corrected. Roedema and Bitter (2013; Bitter, written communication) argue that at least in the city of Alkmaar, but probably also elsewhere, the conflict between Patriots and Orangists



Fig. 46. Creamware with patriot propaganda in situ in the wreck OL 79 (photo IFMAF).

cannot only be traced back to the contrast between the populace and the governing elite regents. More important was the discontented middle class, excluded from government. Besides that, also within the elite classes there were contradictions based on

religious grounds and problems of nepotism and arbitrariness. But what about skippers, are they tipped Patriots or Orangists? Were they at all interested in politics? One of the problems is that the socio-economic position of inland skippers at the end of the eighteenth century is difficult to assess. They were small entrepreneurs with most of their capital invested in their ships, as most skippers were skipper-owners of their vessels. They certainly did not belong to the elite circles of society, but neither to the lowest ranks. A quick scan of the internet gives some interesting results on the political persuasion of this profession. For the skippers from Meppel it is stated that many of them were Orangists (<http://www.encyclopediedrenthe.nl/Meppel>). At the same time a patriotic skipper is involved in the skirmishes around Lemmer when the English tried to conquer this city in 1799 (<http://www.tresoar.nl/vanderaa/index.php?sub=Lemsterland>). Another source, finally, concerns the genealogical study of the family Hatendoer, most of them skippers. Of a certain Adriaan Denissen it is known that he was a skipper in the patriotic exercise society of 's *Gravenmoer* (http://www.heemkunde-sgravenmoer.nl/attachments/File/gevonden_op_zolder.pdf). So historical sources seem to indicate that both political orientations were to be found among skippers. The ceramics on board OL 79 clearly mean the skipper from OL 79 had patriotic sympathies. According to the preliminary valuation of the artefactual inventory the skipper was reasonably well to do. Apart from the coins a silver watch with chain and silver shoe buckles have been found. Moreover the glasses and writing materials indicate that this skipper was a literate man. That would be in accordance with the fact that the patriots were to be found, although not exclusively, among the middle class of society.

Another question is how common were the ceramics with propaganda? In Amsterdam only two finds are known, so there this was rare (Gawronski and Jayasena, 2010). According to Bitter (written communication), this pottery must have been quite common. If we look at the date of production of creamware with patriot slogans and propaganda, Lunsingh Scheurleer (1986) comes to the



Fig. 47. More than 700 visitors came to the open day during the excavation of OL 79 (photo IFMAF).



Fig. 48. Students and members of the AWN participating in the excavation of OL 79 (photo IFMAF).

conclusion that this earthenware was produced within a rather short period of time, between 1784 and 1787. This short period of production might mean it was not widely available.

With some caution the conclusion could be drawn, based on the coherent tea-set, that the wife of the skipper also stayed on board. There are some other vague clues for this, the find of an oval split-wood box, often used to store ceremonial clothing, and a decorated button. Family life aboard inland ships could, archaeologically at least, be documented on board shipwrecks of the Zuiderzee from 1700 onwards (Van Holk, 1997a; 1997b).

The excavation at lot OL 79 was very well covered by the media. Even a complete episode of a children's programme (*het Klokhuis*) was dedicated to the excavation. More than 700 people visited the open day at the site (fig. 47). Again, students and members of the AWN participated (fig. 48). Students also participate in the post-excavation research at the RCE's workshop in Lelystad. So again the combination of research, education, stimulating public awareness and management works quite well.

FROM THE WATER MARGINS TO THE CENTRE GROUND?

The title of this paragraph is borrowed from Jon Adams (2006). He used it as the title for the first editorial of the *Journal of Maritime Archaeology*. Regarding the situation in Great Britain, I would say the question mark can be skipped. For the Netherlands however we have to conclude that the situation looks less favourable.

The development of maritime archaeology in Great Britain (and elsewhere) in recent decades shows the great potential of maritime archaeology. This potential is in part due to the often favourable site formation caused by a catastrophe. Stated otherwise, ships go down (in most cases) when in action. Of course formation processes intervene and determine the final appearance of

a site together with its finds distribution and composition. But compared to a terrestrial situation most shipwrecks comprise a (relatively) closed context in space and time, fine-grained and high in resolution.

For several reasons ships fulfil a central role in society. First of all, the building process is a complex one and (at least for big ships) associated with a complex social organization. Secondly, ships are in many cases important because they are central to communication, social interaction and exchange. The exchange of material and immaterial culture is a basic condition of human existence (Van Holk, 2010b). Social structure can even be defined in terms of the repeated contacts between people (Renfrew et al., 2008). Ships therefore are central to the social organization of society, as a means to connect people. Especially exchange over large distances is in many societies connected to supernatural beliefs, to gods and/or ancestors. The performance of long journeys brings social prestige. So the boats themselves, as instruments of such journeys, get a supernatural connotation as well. The role of distance in society is described in great detail by Helms (1988) for pre-industrial societies.

The natural preoccupation of maritime archaeologists with the crossing of space, can revitalize the concept of migration. Not so much in the old-fashioned sense of the culture-historical paradigm, but as a mechanism of study. How does cultural change take place? How do innovation and diffusion actually take place? What is the role of networks connecting origin and destination of people on the move and how do networks facilitate information exchange? Hakenbeck (2008) suggests the use of the more neutral term mobility as an encompassing and open concept instead of migration. Maritime archaeology can contribute a great deal to the renaissance of the study of migration! This venue of research is also important to overcome purely site-oriented research, ignoring the connectedness of people with the outside world.

Initially, maritime archaeology suffered from an inward vision.

Attention was paid for the most part to the construction of ships and the reconstruction of shipwrecks, in fact a sub-discipline of maritime archaeology, called nautical archaeology. This is not surprising, because ships belong to the most complicated machines man was able to produce for a long time. Combined with the fact that most hulls of shipwrecks are fairly complete, as a result of site formation, this means the reconstruction of the (often disintegrated) hull of a shipwreck swallowed up most of the maritime archaeologist's attention.

Some initiatives to move to a broader vision, away from pure nautical archaeology, came from Muckelroy (1978) in his comprehensive and still influential book "Maritime Archaeology", where he pays attention to wreck formation and for the first time develops a theory of maritime archaeology. Another important, still influential, contribution came from Westerdahl, who introduced the concept of the maritime cultural landscape in 1980 and developed this further in subsequent years (1987). His approach puts shipwrecks in a much broader, holistic (landscape) perspective. Besides that, Westerdahl introduced the ritual landscape as a field of study, where the opposition between land and sea is not only a physical one, but both are also divided by a cognitive liminal zone, a threshold, only to be crossed by liminal agents. The threshold also implies diverse taboos, like the strictly forbidden presence of women and clergymen on board (fishing) vessels as bringers of bad luck (Westerdahl, 2005). The interesting point of these observations is that some of the superstitions still exist. On board modern Dutch fishing vessels you would still not encounter any females. Interesting in this connection is the situation on board Dutch inland vessels from 1700 onwards. Skippers mostly lived with their families on board ship. So the taboo of taking a female on board was overcome (except in the fishing industry). The reason for this could be that the former closed guild organization of transport, organized by an urban elite, was replaced by a more open system (stimulated by a need for more transport capacity), where the access to the shipping industry was not restricted any more. The acquisition of a ship

however was a great investment, made possible for less fortunate sailors by abandoning a house on the shore. De Vries and Van der Woude (1995) describe Dutch society as the first modern capitalist society in Europa. Might this predominant form of maritime social organization be a proof of this early capitalist mentality? The social bond of man and woman was in this case not merely a bond of love, a sentimental bond, but at the same time a business partnership. The man was skipper but his wife was called in Dutch *schipperse* (feminine form of skipper). At the same time the former terrestrial bonds of skippers were cut off when they started living on board without a domicile on land. A subculture developed separate from terrestrial society. Skippers became water nomads looked down upon by people living ashore (Verrips, 1991). In this case the sea was experienced as an acceptable place perhaps to work, but certainly not to live with your wife and children, without a fixed residence, out of control.

In the Netherlands, Reinders applied the concept of the maritime landscape in several studies (Reinders, 2009; 2013). Van Holk (1990) sketched an interdisciplinary approach by using the concept of maritime culture from an anthropological, social and historical perspective. The ideas about family life on board inland vessels were further developed as a gender study in 1997 (Van Holk 1997a and b). Two important contributions to the field are from Adams (2003; completely revised edition 2013) and Van de Noort (2011). Adams develops new theoretical pathways to understand technological innovation. He explains technological development in the context of social change. Van de Noort on the other hand unfolds a new theory of the sea. The concepts of hybrid geographies and (other-than-human) agency are applied to the seascape and lead to new insights, not only from a maritime point of view but also in a terrestrial sense. Interesting venues are the sea as a deviant space that has to be socialized and not so much enculturated.

CONCLUSION

From a theoretical point of view, developments within maritime archaeology tend unfortunately to take place abroad, outside the Netherlands. As Adams (2013, after Ucko 1995) points out “available funding mechanisms have a profound effect upon the overall complexion of archaeology practised and this has certainly been visible in the work done along coasts and under water.” The funding of actual fieldwork may not be the biggest problem in maritime archaeology in the Netherlands, because of the existing heritage legislation in spatial planning. However, because responsibility is delegated to the low administrative level of municipalities, in the case of large-scale spatial interventions this can be problematic. A second point brought up by Adams (2013) is the ‘modest but significant presence in universities [of maritime archaeology in Great Britain]’. In the Dutch situation the embedding of maritime archaeology at universities is rather weak, apart from a couple of good initiatives. The funding is based on ad hoc decisions. The funding of the (part-time!) chair by special appointment in Groningen for example is on a yearly basis. So this does not help to enable broader research programmes, so urgently needed to lift the field to a higher level, essential for the development and to the coming of age of this young branch of archaeology. In short, more funding to employ more people is needed to establish maritime archaeology firmly in academia. We need to combine and not isolate research, education, awareness and heritage management. They cannot operate on their own, there has to be a mutual cross-breeding. Funding of course is one thing, but there also has to be the feeling of urgency to establish this, the right mind-set. Of course this is a matter of choice, of policy, of a consistent policy. In my opinion we need to re-evaluate the predominant terrestrial orientation of archaeology. Hopefully the example of the IFMAF and the broadening scope of maritime archaeology in general, of which archaeology as a whole can take advantage, will contribute to the awakening of the Dutch archaeological world.

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J.H.G. GAWRONSKI

SHIPS AND CITIES IN MARITIME
ARCHAEOLOGY.

THE VOC SHIP *AMSTERDAM* AND
A BIOGRAPHICAL ARCHAEOLOGY OF
EIGHTEENTH-CENTURY AMSTERDAM

It is only some fifty years ago that shipwrecks were included for the first time in the archaeological record for scientific study. In current archaeology their material remains are now recognized as vital sources for our understanding of the past (Gibbins and Adams 2001). It can be stated that water transport is crucial for the developmental process of societies, regardless of their historical or even pre-historical period or cultural affiliation, as long as their geographical situation allowed contact with water. As the surface of the globe consists of more than 70% of water, this scenario is almost inevitable. Ships enabled long distance and efficient transport and therefore contributed to the spread of knowledge, human interaction, material and cultural exchange, to systems of warfare and trade and the development of advanced technology. These contextual qualities were for the first time defined and elaborated with the development of maritime archaeology. As this specialized archaeological discipline is of relatively recent date, only now do ships or watercraft in general start to determine the archaeological research agenda and become more accepted in the general heritage management systems.

DIVING TECHNOLOGY

From the 1960s into the 1980s mainstream archaeology went



Fig.1. Pioneering Italian underwater archaeologists on the site of the roman Spargi wreck in 1957-1958 (Corsica/Sardinia, 100 BC).

through a period of intensive theoretical debate on its scope and goals, on the paradigms and methods of the profession. New directions in analysis and interpretation were examined, like New Archaeology, (post) processual archaeology and contextual archaeology. New fields of study emerged, such as medieval,

post-medieval archaeology or historical archaeology. In that time maritime archaeology was a nascent discipline which primarily aimed at conquering a new physical environment for scientific fieldwork underwater. The direct cause for the extension of archaeological activities into the wet world of seas, lakes and rivers, where archaeological sites were located, were not academic scientific ambitions but post-war innovations in diving technology (Gawronski 1992). Man's performance and working capacities underwater were definitively enhanced through the invention of scuba diving equipment in the 1940s and from the 1950s this diving equipment became standardized and available to the general public. As the technological perfection of the new gear continued, not only did sport diving and leisure activities increase, but also the applications in science, industry, mining, salvage and the military sector multiplied.

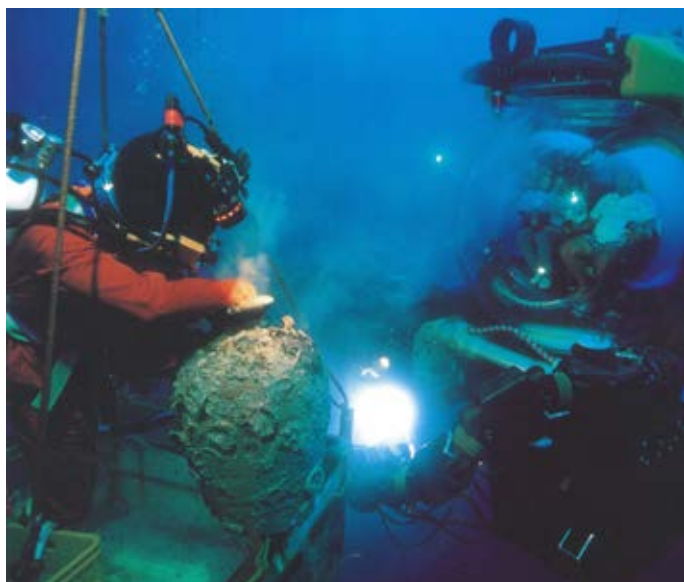


Fig. 2. Deep water site of the Brunei Junk off Brunei in 1998: for the fieldwork by divers (breathing Heliox mixture) also submersibles and ROV's were deployed (DRASSM, Marseille)



Fig. 3. Archaeological research on the site of the VOC-ship Mauritius (1609) in 1986, Gabon, West Africa (DRASSM, Marseille).

UNDERWATER ARCHAEOLOGY

The large-scale exploration of that still unknown underwater world resulted in the discovery of numerous archaeological sites underwater, in a variety of marine, riverine and lacustrine environments. And this number is only increasing, as the present day advancement of diving technology allows access to deep water environments, with robots and submarines, applying sophisticated remote sensing and digital visualization. The archaeological discipline which emerged in those early days was tagged underwater archaeology. Its scientific focus in the 1960s and 1970s was on methodological issues related to archaeological research underwater, aimed at the development of new techniques and adaptations to exercise fieldwork according to standards of terrestrial excavations. Subsequently, the scientific scope of this new field of archaeology was to understand (the meaning of) the new types of sites. Underwater archaeology became, and still is, an extremely

heterogeneous field of study, encompassing any imaginable relict, not only shipwrecks, which are sites related to water transport and could be expected in a water environment, but also sunken remains from land-based activities, such as settlements, harbours, burials, sacrificial sites and any type of building or random finds from any culture or time period. In view of this diversity it became necessary to develop differentiated research strategies for each specific category of material remains. A historical shipwreck obviously demands different research criteria than a Neolithic settlement. Therefore, from the 1970s onwards independent fields of study were distinguished within underwater archaeology, with their own specific analytical tools and strategies. In other words, not the environment but the subject itself determined the archaeology of an underwater site.

MARITIME ARCHAEOLOGY

For the study of shipwrecks maritime archaeology was defined, a new discipline which dominated the field of underwater archaeology, as most of the sites discovered underwater consisted of sunken ships. Keith Muckelroy's definition, in his 1978 handbook, still marks clearly the scope of this emerging scientific ambition: 'the scientific study, through the surviving material evidence, of all aspects of seafaring: ships, boats, and their equipment; cargoes, catches, or passengers carried on them, and the economic systems within which they were operating; their officers and crew, especially utensils and other possessions reflecting their specialized lifestyle' (Muckelroy 1978, 6). This was the starting point for an essentially multidisciplinary approach and theoretical framework which allowed interpretation of the material culture of shipwrecks in a context which reaches beyond the narrow limits of the underwater world or the mere physical technological properties of a shipwreck site. The study of ships was not new, but had an already existing tradition in maritime history outside the archaeological field. Here issues were addressed which were related to the technology of ship construction and on

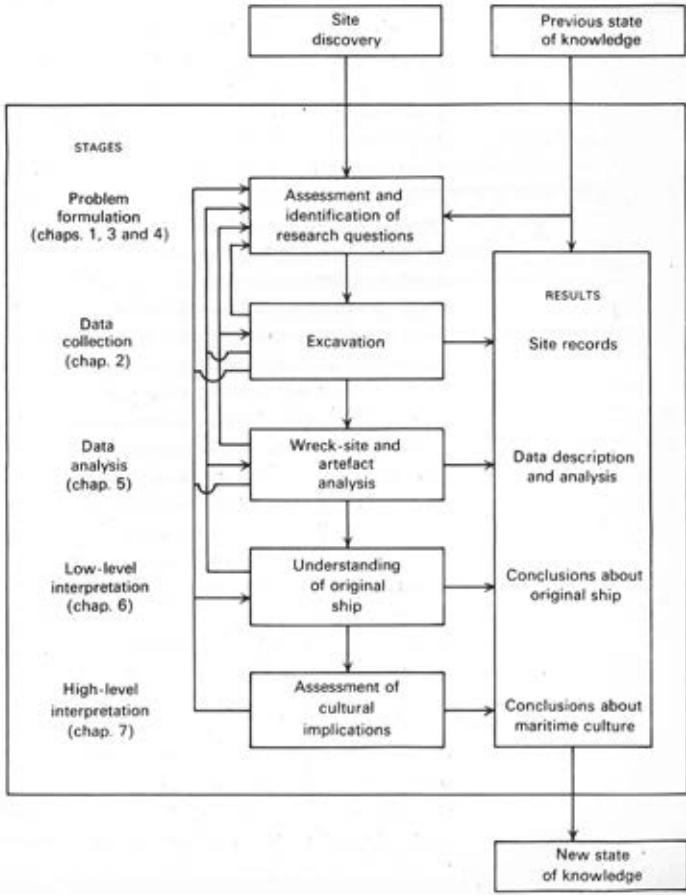


Fig. 4. System model of the maritime archaeological research process (Muckelroy 1978, p. 249).

nautical qualities, on life on board and the science of navigation through historical sources, such as archival, iconographical and also material records like three-dimensional ship models. Shipwreck archaeology provided an extension of the available sources with the material entities of ships.

MARITIME CULTURAL LANDSCAPE

The ongoing fieldwork on shipwreck sites resulted in a vast and varied set of maritime data based on the real life ship remains. After three decades of technological and methodological progression, the 1990s marked a next phase of maturity, in which maritime archaeology developed a broader perspective and the intricate information value of ships was more fully explored. New approaches were formulated to understand and apply maritime data, by connecting to theoretical developments in symbolic or contextual archaeology (Flatman 2003. Gibbins and Adams 2001). The notion of the maritime cultural landscape, derived from landscape archaeology, allowed a more coherent contextual approach, in which the boundaries between underwater and land-based sites were less distinct (Westerdahl 1992). Within this wider spatial context shipwrecks are not to be considered as isolated material entities but as exponents of complex patterns of production, communication within and between communities and societies, on a local, regional or global level simultaneously.

Ships

In discussing the current state of maritime archaeology, one of the focus points is the meaning of ships for our understanding of the functioning of human societies. The theoretical debate which already started in the early days of maritime archaeology was progressively aimed at defining the metaphysical qualities of the archaeological data from shipwrecks rather than discussing the research's physical requirements. In general terms, sailing ships, especially for long distance, can be considered as the most complicated artefacts people manufactured until the era of industrialization and the invention of steam and subsequently combustion engines in the nineteenth century. One of the first contextual observations of the qualities of ships and shipwrecks was Muckelroy's early definition in 1978 stating that: 'in any pre-industrial society, from the upper Palaeolithic to the nineteenth century AD, a boat or (later) a ship was the largest and most complex machine produced' (Muckelroy 1978: 3). Being machines

for long distance travel, sailing ships can be compared with space shuttles, reflecting an equal notion of advanced technology. Even now in the current space age, ships are still by far the largest travelling machines.

Complex meaning

Ships are multifunctional tools, which could be used for transport, warfare, communication, discoveries, operations, trade or a combination of these (or more) functions. This complexity is

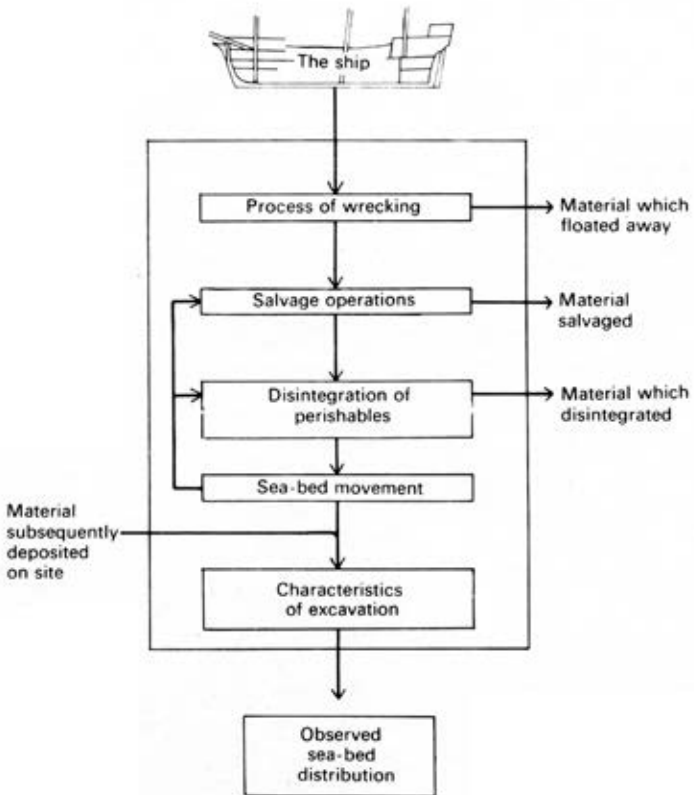


Fig. 5. Flow diagram representing the formation process of a shipwreck (Muckelroy 1978, p. 158).

reflected in the material appearance, in the sunken remains which archaeologists study on the seabed. As ships were mobile material complexes which were designed to function autonomously in the open space of water (oceans, lakes, rivers), they represent dense and varied material entities. Functional organization models have been developed in maritime archaeology to record the meaning of each separate component within the (spatial) context of the ship (Adams 2001, Gawronski 1992). Ships reflect in a micro-cosmic way the societies or systems from which they originated or in which they functioned. The process of designing, building and using ships was a complex social activity and therefore ships are closely connected to the economic, social, political and cultural mechanisms of a given human society. Compared with the average archaeological land-based sites ships represent a separate category of archaeological datasets with clear contextual properties. The material entity of a ship embraces the whole spectrum of metaphysical features of past societies which are not present in the record of land sites or other sources. It is exactly this wider context which makes ships so relevant for research questions and topics, the impact of which reaches beyond the maritime world, touching upon the cities, economies, exchange systems, political events, technological inventions, social developments, cultural processes, in given societies in given countries, areas or periods.

Closed find

Also, a shipwreck is often referred to as a closed find, or time capsule, as the cause of site formation is usually a shock event in terms of shipwrecking, by which the functioning of a vessel comes to a sudden standstill, because of sinking or wrecking. The definition distinguishes ships fundamentally from classic land sites, which generally reflect periods of functioning over long stretches of time and contain data on diachronic processes. However, the synchronic aspect of a shipwreck site is only partially valid, and related to the moment of wrecking itself (Adams 2001, 296-297, Gawronski 1992, 22). The ship itself, or each object in the material assemblage of artefacts on board has a history of long-term use, which can be related to previous voyages or to alterations in

the composition or purpose of the vessel or the shipboard assemblage. The present research agenda within maritime archaeology shifts gradually from individual vessels and the composition of the material assemblage to the wider social contexts in which ship's remains can be interpreted.

Maritime data

In these respects the question arises to what extent finds from maritime contexts can be considered representative for mainstream processes within (land-based) societies. Archaeological objects from a wreck site context belong to a certain degree to specialized maritime material culture, as they reflect the choices which were made to create a material assemblage needed for shipboard life and work and oversea travelling. On the other hand shipwreck finds are also directly connected with general items and aspects of everyday life of a past society. For example, the diversified finds from the material entities of historic shipwrecks which belonged to the European shipping companies to the East or the West Indies are a precise reflection of the complex material culture which is representative of the societies in the post-medieval period. Recently several theoretical directions have come under discussion which were inspired by the rich and varied body of maritime archaeological data. There are new issues which focus on the nature of shipboard societies and their relation to mainstream society, relating ships to the context of social interaction (Flatman 2003). Another theme provided by maritime archaeology is that of shipbuilding technology as an expression of the complex patterns of behaviour in a past society and the extent to which the study of change and innovation of the construction of late-medieval and post-medieval ships enables to monitor social and political changes in society (Adams 2003).

Multilevel and biographical context

Another direction in the contextual and post-processual archaeology of shipwrecks which needs further exploration is the multilevel contextual analysis of material culture from historic ships. This approach is based on the principle that a given ship can

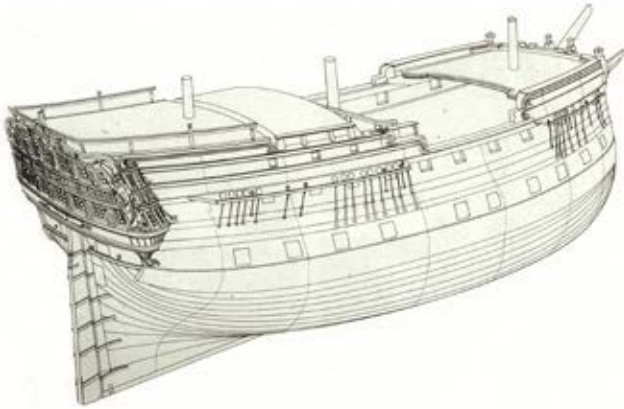


Fig. 6. Perspective drawing of the hull a VOC-ship of the 150 feet class from the 1740s, based on the contemporary design (drawing R. van Silfhout, Stichting VOC schip Amsterdam).

belong to different social or economic contexts simultaneously. This means that a ship represents different levels of organizational complexity, for example the given institution to which the ship belonged (e.g. admiralty, East India company) or the topographical or geographical context (e.g. city, country) from which it originated (Gawronski 1992, 20-21). Further development of this approach was triggered by the availability of a vast body of historical sources linking the material entity of the ship to these contexts. Systematic use of historical data in connection with the material record provided options to refine the functional context reference for the interpretation of the archaeological finds. More importantly, this approach provided the development of a biographical quality of shipwreck research. From archival sources the identity of historical persons who participated in the production process of the ship could be retrieved and added to the inboard contexts of the archaeological finds. The finely structured functional context of a ship enables us to identify close links between material remains and historical individuals within their spatial context of place of production. This biographical level of context

allows that the archaeological shipwreck finds provide meaning to the wider economic and social processes of the city or region where the ship was produced.

INTEGRATED HISTORICAL ARCHAEOLOGICAL RESEARCH OF VOC SHIPS

The research on wrecks of ships of the Dutch East India Company (VOC) in the 1980s and 1990s provided case studies to test the potential of this approach. These shipwrecks drew international attention because of their close link with East India trade and Dutch maritime history. They also represented all the allure of exotic tales involving shipwreck and disaster, possible hidden treasure and its financial rewards, the museum potential of material remains and rich sources of archaeological information. In nearly forty years some fifty sites have been discovered, triggering numerous commercial salvage enterprises and scientific projects (Gawronski 1992, 14. Gawronski 1996, 14). VOC ships are material and historical sources which combine a special material assemblage under water with a specific Company's archive.

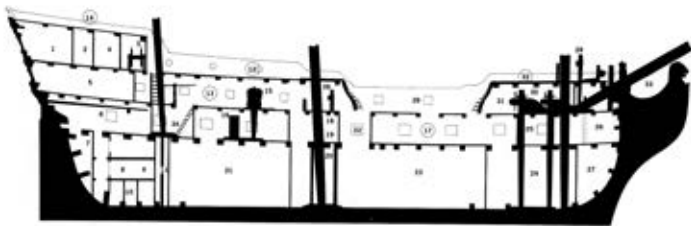


Fig. 7. Site of the Amsterdam (1749) at Hastings, during low tide, in 2006 (Stichting VOC schip Amsterdam).

Historical-archaeological research provided the key to integrate the rich variety of data. This approach facilitates the development of meaningful discussion regarding the interpretation of the individual sites within a more broad and social context and thus providing the outline of a more in depth research field. This analytical process led to functional modelling of VOC ships as 'pars pro toto' components of the Company, each individual ship theoretically comprising a microcosm of the different features of the whole enterprise in Europe and Asia. A number of VOC ship projects, especially the *Hollandia* (1743) and the *Amsterdam* (1749), contributed to the development of such historical archaeology theory of VOC ships (Gawronski et al.1992. Gawronski 1996). This also created greater consciousness regarding the meaning of the shipyard as a similar source of the VOC policy and its material implications. In particular, the study of one particular site, of the *Amsterdam*, a VOC ship from 1749, illustrates to what extent this integrated historical-archaeological research contributes to the understanding of the functioning of the VOC and the wider socio-economical context of the city of Amsterdam where this VOC ship was produced.

VOC ship Amsterdam (1749)

The *Amsterdam* was built and equipped in the Amsterdam yard of the VOC on the eastern harbour island Oostenburg, in 1748. The vessel beached in 1749 on its maiden voyage on the south coast of England, near Hastings, and the complete hull sank over 7 m deep in the sand. This site is still one of the best preserved of the known sites of sunken Dutch East Indiamen. Because of its quality and integrity, the wreck site of the *Amsterdam* clearly exemplifies the material complexity of this class of vessels and also played a key role in the awareness process on the potential of maritime archaeology in museum, university and heritage management circles in the Netherlands. In 1969 a first dry land survey was done by the British archaeologist Peter Marsden during low spring tides when the site is exposed. In 1973 the *Amsterdam* was designated as the first protected historic wreck site in the UK and by 1975 a foundation (Stichting VOC-schip Amsterdam)



1 captain's cabin (schipperskamer)	18 captain (kapitein)	29 waist (kalfdek)
2 captain's bedroom (schippersslaapkamer)	19 ventilator (ventilator)	30 fore-cabin (quarters for crew) (bak)
3 cabins for officers (kajuiten voor officieren)	20 gundeck (quarters for crew) (overloopdek)	31 anchor-hole (ankerboring)
4 surgeon's cabin	21 galley (quarters for cook and assistants) (keuken)	32 fore-cabin deck (bakdek)
5 (flat near uppermast) (schijngat)	22 steward's room	33 back (heads for crew) (galjein)
6 cabin (kajuit)	23 (quarters for steward and assistants) (kalfdeur)	34 saltpan (zalkoven)
7 constable's room (constabelkamer)	24 masthead (masttop) (masttop)	35 passageway to constable's room
8 cable tiers (kabelgat)	25 water and victuals hold (water en spijsegat)	36 (passageway near constabelkamer)
9 carriage lockers (wagengang)	26 main hatch (grate bak)	37 area for consumption of food and drink
10 bread & saltstons (broodkamers en zalkstons)	27 hold (ruim)	38 (plateau voor consumptie van voedsel en drank)
11 powder room (spijkamer)	28 waterhold (watergat)	39 backhatch (achterbak)
12 powder room (spijkamer)	29 rope-work store (bergplaats voor lijd touwwerk)	40 cook's hatch (keukenbak)
13 quarterdeck (kalfdek)	30 cable tiers (kabelgat)	41 forehatch (voorbak)
14 upper deck (verdek)	31 manger (voerbak)	42 wasson gallery (officers' heads) (galjein)
15 powder room (spijkamer)	32 bits (dikkevoets)	

Fig. 8. Interior arrangement of the East Indiaman of 150 feet, 1750 (drawing G. Hoekstra).

was set up in the Netherlands under the auspices of the Dutch ministry of Culture (CRM) and the city of Amsterdam to initiate plans for the research and salvage of this relict of the Dutch global shipping period. Three underwater excavations of the stern area were organized by the foundation under the supervision of the University of Amsterdam in 1984-1986 and executed by an Anglo Dutch underwater archaeological team of professional archaeologist and amateur divers (Gawronski 1990, 1992, 1996). By providing educational facilities the Amsterdam project had a vital function as a field school. Simultaneously the scientific programme of the Amsterdam project enabled further elaboration of the theoretical principles of historic shipwreck research.

Material microcosm

In a simplified way, the material assemblage of a ship like the Amsterdam is a three-dimensional wooden shell, which is coherently subdivided into separate spaces and is filled with thousands, even ten thousands of components, artefacts, semi-manufactured

products and raw materials. Apart from cultural materials, such as a ship also contains ecofacts - parasites, animals, plants, seeds - related to the environment or food on board. The composition of all these material elements is defined by the multi functionality of the vessel, developed by the VOC. An East Indiaman was the VOC's means of transport between Europe and Asia, as their Dutch contemporary name *retourschepen* indicates, and was the most important instrument to carry out the Company's trade policy during the seventeenth and eighteenth centuries. As these ships were designed, built and equipped by the VOC, they can be regarded as a direct product of the Company's organization, both materially and conceptually. The entity of a ship is a material microcosm which reflects where the vessel came from and what its destination was. Each individual object on board was a carrier of several meanings, related to its place of origin, its use for a specific craft of application, its own precise location and function within the closed capsule of the ship.

Functional model

According to a basic system analysis six functionalities can be defined which determine and influence in interaction the physical assemblage of a VOC ship and its varied contents:

- 1 Sailing machine, for the transatlantic journey of 15,000 sea miles between the homeland and VOC overseas settlements. The nautical properties are critical for the general character and structure as a machine.
- 2 Part of the economic trading network, as these ships provided for the import and export of merchandise, as well as the supply of the overseas settlements.
- 3 Military platform, with inboard armament for the protection of the ship itself. It also played a practical part in the Company's power politics, as the ships were employed for the defence of the overseas settlements and spheres of influence against competitors or enemy powers. Besides this, they carried military supplies including soldiers and equipment.
- 4 Company's floating office and bank transporting correspondence and currencies.



Fig. 9. The shipyard of the VOC (Dutch East India Company) on Oostenburg in Amsterdam; on the background the large East Indian Sea Warehouse and slipways on the foreground (print J. Mulder, 1694, altered version from Wagenaar 1765).

- 5 Working community. A multifunctional crew was needed for nautical tasks to navigate and maintain the vessel and to provide for themselves, with facilities for storage and preparation of food and health care
- 6 Social element, composed of a community of over 300 persons, coming from all parts of Europe (and the world), which was tightly organized and had its own rules of life and conventions. The social order on board was based on a strongly hierarchical system. The crew consisted of officers, seamen, craftsmen, soldiers and some passengers.

SHIPYARD OOSTENBURG

In addition to this functionalistic analysis, the material assemblage

of the Amsterdam has other contextual levels of meaning providing information which reaches further than the construction and content of the ship itself. They are linked to the activities of the technical staff and the workmen of the Amsterdam shipyard. The Amsterdam reflects both conceptually and materially the industrial processes of the office and yard of the VOC. The shipyard on the eastern harbour island of Oostenburg was a centre stage for intensive ship production and distribution activity (Gawronski 1996, 2002). In some 200 years approximately 720 VOC ships were built in Amsterdam, of which the greater part (about 500) was on Oostenburg. The process of building and equipping was large-scale and standardized, with an annual production of three ships, and around 1750 even five. With at least fifteen vessels leaving Amsterdam annually, the yard was the starting point (or end point, depending on the direction of the journey) of the intercontinental bridge of ships, which supported the company's overseas administrative and communication system and transport and trade lines. Upon arrival from Asia, the imported goods were stored and processed on the harbour island of Oostenburg: spices, stimulants, porcelain, textiles, monopoly goods and exotics, bulk articles and rare products. The yard physically consisted of several units, divided into three separate islands which housed separate sections of the production process. The main infrastructural unit was the warehouse of 215 x 25 m, which served as the centre of the storage and distribution system, where all incoming goods and all the materials needed to equip a ship were stocked.

Labour organization

The labour organization of the shipyard and the logistics of its working floor were equally large-scale and intricately woven. In 1750, 1,200 employees manned this section of the VOC: some 80 supervisors and 1,100 workmen. The organization consisted of six main sections: administrative staff, artisanal departments, storage, transport, vessels and barges, and a security system. The structure of the organization was pyramidal with a small staff of three bookkeepers at the top, while the broad base consisted of a finely crystallized network of subdivisions and separate working



Fig. 10. Plan of the city of Amsterdam, with the semicircular city wall of 26 bastions, the canal zone and the harbour island on either side of the harbour IJ, end seventeenth century (Plan Gerrit de Broen 1732).

units. Some fifteen main artisanal labour units can be distinguished next to an administrative staff of 65 specialized functions. In fact, the yard consisted of a series of independent and specialized sections as can be seen by the division and allocation of tasks. This horizontally organized labour contrasts with the general image of the VOC organization, symbolized by the hierarchical structure of the board of 'Seventeen' (Directors). While the oligarchic bureaucracy of seventeen regents seems archaic, a functional analysis of the daily work indicates that the organization of the yard was almost modern, in view of the standardized and efficient assemblage of mass products in wood. The nineteenth-century industrial technology of steam and steel would have integrated well with the eighteenth-century production system of the VOC yard, instead of the traditional energy sources of wind, man and animal power. The functioning of the VOC is typical of pre-

modern Dutch ship production. This phase started at the end of the sixteenth century with the birth of the maritime expansion period and ends at the threshold of the industrial revolution at the end of the eighteenth century.

Supply network in Amsterdam

Simultaneously the shipyard was not an isolated production centre, but was the focus point of hundreds of supply lines of manufacturers and suppliers in the city of Amsterdam which the VOC engaged to execute the construction and the equipment of its sailing vessels. As a self-generating machine, the production complex had to be fed by its surroundings: the city of Amsterdam. This international trading metropolis was a gathering point for thousands of products, not only from regions throughout Europe, but from the entire world. This was the VOC's source for building and equipping ships. Trading houses, shops, arti-

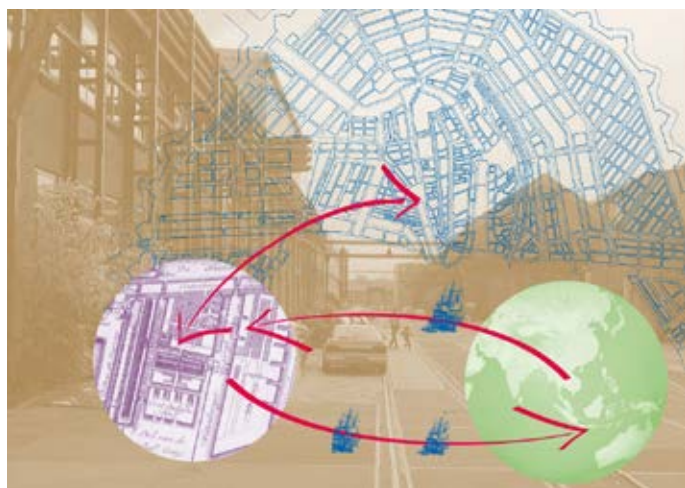


Fig. II. The archaeology of the material assemblage of a VOC-ship such as the Amsterdam is related to three contextual levels: the ship itself, the yard where the vessel was produced and the city of Amsterdam as source of the material supplies for the construction and equipment of the ship.

sans, workshops and factories, in short, several hundred people were engaged in supplying the Oostenburg yard. In the mid-eighteenth century, more than 600 suppliers were contributing annually to the yard's production system. Oostenburg as receiver and transmitter is a basic yet essential metaphor, mirroring the VOC itself. Here, within the confines of the yard, was the core of the Dutch branch of the global enterprise, operating within a distinctive European context. As the focus of the Amsterdam trading system, the yard attracted products from all neighbouring European regions. A brief list of supplies clearly illustrates its international scope (excluding the local and regional Dutch products): timber from Scandinavia, Poland and Germany, tar from Russia, hemp from Riga, iron nails and fittings from Liège, glass from Bohemia, quicksilver from Austria, copperware from Nuremberg, wine and liquor from France, Germany, Spain and Portugal, iron guns from Sweden, trumpets from Leipzig, pewter spoons from London, cantharidum ("Spanish fly") from Spain, octants from England, oxen from Denmark, butter from Ireland, grain from Prussia and Poland, prunes from France, fish from Norway. All this material was transformed on Oostenburg into loaded ships, which sustained the overseas branch of the VOC.

THREE CONTEXTUAL LEVELS: SHIP, COMPANY, CITY

Therefore, the material components of a VOC ship like the *Amsterdam* represent three information levels: the ship and its crew, the VOC yard and its personnel and Amsterdam city and its system of shops, workshops and markets. Following this information model the *Amsterdam* offered a case study of integrating archaeological finds and historical information on the production and equipment of the vessel. Historic shipwrecks like the *Amsterdam* offer challenging options to extend the interpretation of each archaeological find of a shipwreck beyond the level of the individual ship because of the availability of archival sources on material purchases for the yard, like in this case VOC bookkeeping documents, or on the identity and professions of suppliers



Fig. 12. A stoneware jar on the orlop deck of the Amsterdam, 1984 (Stichting VOC schip Amsterdam).



Fig. 13. Tamarind fruit inside the jar (Stichting VOC schip Amsterdam)

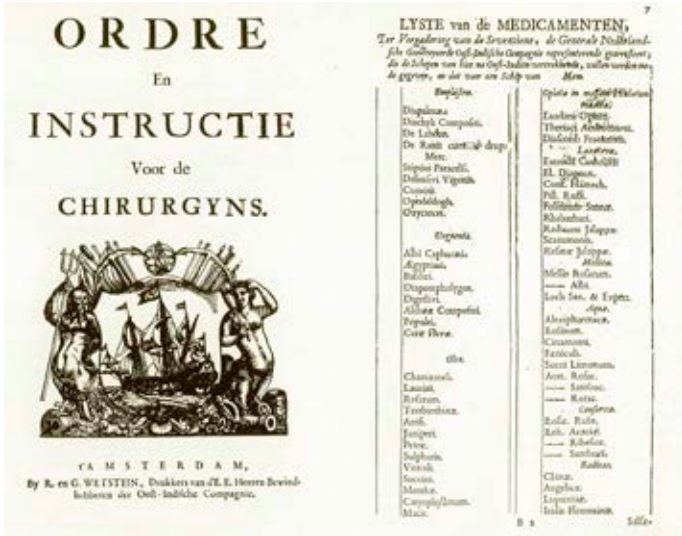


Fig. 14. Title page of the instructions of the ship's surgeon of the VOC: tamarind appears under the herbal medicines.

for the Amsterdam yard, like residential tax registers. This three-levelled analysis based on historical and archaeological data can be applied to each individual find, creating a link between the ship and the urban socio-economic context of Amsterdam. In interaction with historical data the archaeological relics from the *Amsterdam* can be taken from anonymity and can be linked to the historical persons in Amsterdam with whom the VOC did business in those days. Such an integrated approach has yielded some interesting case studies on the direct material relation between the maritime business and the socio-economy of Amsterdam and on the involvement of individual entrepreneurs from all levels of the Amsterdam economy in the materialization of this VOC ship.

Tamarind

A case study of such biographical archaeology from the *Amsterdam* research is the find of a stoneware jar, located on the orlop deck, which contained a vegetal mass, identified as tamarind

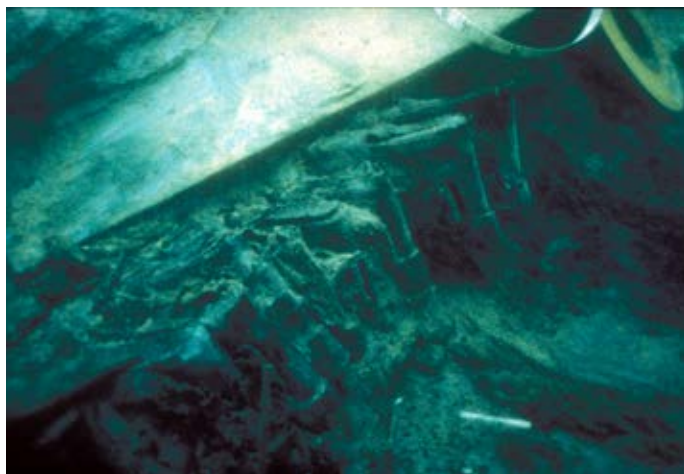


Fig. 15. A pack of twelve new cartridge cases, excavated in the Amsterdam, 1984 (Stichting VOC schip Amsterdam).



Fig. 16. One cartridge case after conservation, with the belt tied round, consisting of a copper case and a leather covering (Stichting VOC schip Amsterdam).



Fig. 17. An account in the VOC bookkeepers journal of October 1743 under the heading 'Geschat en Amunitie van Oorloogh' (Military Armament and Ammunition), with the delivery of 218 cartridge cases by the shop of widow Jan Deldijm.

(Gawronski 1996, 213). The presence of bugs of the (*Sitophilus linearis*) species indicated that the fruit was not refined, as these insects only live in the tropical place of origin. Tamarind was one of the tropical products which the VOC imported from Asia. After its arrival in Amsterdam and storage in the warehouse on the yard, the plants changed from a trading commodity into a part of the ship's equipment. Tamarind was taken on board an outgoing vessel because of its medical properties and appears on the ship's medicine list as a laxative or fever remedy under the Latin apothecary term *fructus Tamarindorum*. The archaeological reality proved that behind this eighteenth-century medical terminology a raw material was hidden, fruit with insects, with which the ship's doctor had to prepare his own medicine. As the VOC imported this raw material itself, tamarind does not appear on the specified purchase list of medical herbs which in the 1740s were standard, supplied to the company by three or four shops in the city, like pharmacist Roeland Willem van Homrigh and drugstores Joost Krudop and Pieter Ploos van Amstel.



Fig. 18. The distribution of suppliers to the VOC shipyard (red) in Amsterdam:

◆ Four shops where the VOC shipyard ordered its cartridge cases in 1743:

1. Wed. J. Deldijn, buttonshop, Warmoesstraat
2. Herm. Elshoff, buttonshop, Halsteeg,
3. D. Hanius, broker, OZ Achterburgwal
4. Joost v. Wijk, shoulder belt manufacturer, Warmoesstraat

✚ Three shops which supplied medical herbs in 1743

- I Js. v. Homring, pharmacist, Leidsestraat
- II Joost Krudop, drugstore, Het Water,
- III P. Ploos v. Amstel, drugstore, Nieuwendijk

Cartridge cases

Another example offers a series of twelve cartridge cases in the constable room of the *Amsterdam*, brand new, unused, the leather belt diagonally wound around (Gawronski 1996, 190-191). These items belonged to the standard equipment of the company's musketeers; among the 333 people on board were 128 soldiers, in transit to Batavia. The cartridge cases for the *Amsterdam* were supplied

by Dirck Hanius, a broker on the Oudezijds Achterburgwal, for 32 stivers apiece, who was paid in November 1748 for the delivery of 1700 items. According to the VOC bookkeeping the purchase of these soldiers' equipment was reorganized in the 1740s, because five years earlier – in 1742 – cartridge cases were still made by four separate firms in the old commercial district of Amsterdam, among which two female entrepreneurs: the widows Jan Deldijm and Arent ten Elshof, who each had a button shop – one in the Warmoesstraat and the other in the Halsteeg. The other two suppliers were Joost van Wijck, a shoulder belt manufacturer in the Warmoesstraat, and a man named Jan Haijningh without specified profession. These shopkeepers supplied limited quantities several times per year, altogether the number as in the one delivery by Hanius, but for 40 stivers apiece. The archaeological discovery of the cartridge case is like a snapshot in time of the efforts of the staff of the VOC shipyard to achieve more efficiency in its operational management, by restructuring the purchase through small businesses into a delivery by only one agent. Simultaneously, the finds allow us a glimpse behind the counter and a view of the product assortment of ordinary artisan shops in eighteenth-century Amsterdam. They also shed light on the actual labour of the five suppliers. A cartridge case consisted basically of an oblong copper case with copper tubes inside for the cartridges, soldered together, and a leather covering with a belt. The copper case itself was undoubtedly not produced by the suppliers themselves as they had workshops or stores in clothing accessories (buttons) or leather manufacturing. Their work consisted merely of assembling the different parts, while the copper cases were produced somewhere else and were made available by the VOC to the suppliers for the final assembly. According to the information in the bookkeeping journal, one would assume the five shopkeepers had these cartridge cases in their regular assortment, but linked with the archaeological information on the real material composition these suppliers participated in a multistep production line, for which final stage they were selected by the VOC. This explains the presence of the broker in the accounts, who was probably hired to coordinate the logistics of this assembly process.

EPILOGUE

These finds belong to the hundreds of stories on the intricate relations between a ship and the broad context of urban economy and production which a shipwreck like the *Amsterdam* can offer. They illustrate the fundamental fact that a ship is a complex carrier of information, not only literally saved in its material remnants, but also metaphorically present, turning a ship into an accumulation of messages, on material reality and on historical persons. Each individual ship is a junction of information as an element of a wider (regional, global) communication system. In analogy with present digital cyber systems, a ship can be represented as a floating flash drive, loaded with data: a container of hundreds of stories, locked in the material remains and documents. The *Amsterdam* offers an intricate case study on the relations between the physical elements of a ship, produced by archaeological research of the wreck site, and the historical context of the production of the vessel in the city of Amsterdam. Through the availability of archival records from the VOC's business administration and the city of Amsterdam's demographic registers, the personal identity of the historical actors involved in the physical realization of the *Amsterdam*, can be linked to the archaeological dataset on the contextual and physical features of the artefacts from the ship and the ship itself. Although archaeology is a science which studies the past of societies and people, the data which generally are deduced from archaeological sites are often anonymous. Archaeological research basically results in abstractions of spatial or historical reality, like soil features, foundations, refuse dumps, structures, burials, fragmented artefacts or ecological and human remains. These data enable reconstructions of landscapes, buildings, the material culture of a society or, with current DNA and physical anthropological techniques, also the faces of individuals from the past. On the basis of these reconstructions and datasets of the tangible reality, archaeologists aim at concepts about the contextual qualities of the past society, on the social, cultural, economic and administrative systems of people. The case of the *Amsterdam* illustrates the capacity of maritime archaeology to go

beyond the common level of anonymous archaeological data and to reach a level of biographical reality through the research of historic shipwrecks.

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SHIPS, AGENCY AND POWER: NEW DIRECTIONS IN MARITIME ARCHAEOLOGY

For a long time maritime archaeology referred to itself as a ‘nascent discipline’ but this is no longer quite true. If we consider the first occasion when maritime archaeological research was carried out that would still comply with today’s professional codes of conduct, then we are talking about a form of archaeological research that is now more than half a century old. Over that time maritime archaeology has become one of the most dynamic and fastest developing fields of archaeology, increasingly embedded in the institutions of heritage protection and management, industry and education. This paper reviews current research on medieval and early modern shipwrecks in the Baltic to demonstrate some of the central concerns of maritime archaeology and the ways it is integrating theory and practise to achieve its research goals. In particular it will focus on the reflexive relationship between research questions rooted in the humanities but which are investigated and interpreted using a range of scientific and computational techniques. New tools are prompting new questions and in this case the answers are providing new insights into the power structures and agency of medieval Europe and how, through maritime enterprise and shipping, that medieval world became modern.

THE GREEN SEA

Below a certain depth in the coastal archipelagos of the Baltic Sea it is icy cold and dark. Chlorophyll in the suspended phyto-



Fig. 1. The wreck of the English brig Severn (1834) lying in 9m of water near Nynäshamn, Sweden. (Photo., Kester Keighley)

plankton gives the water near the surface its characteristic limpid green, colour (Fig. 1). As you swim down the cold steadily bleeds through your suit and the top light is progressively filtered out until at around 30m everything has turned pitch black. But this is deceptive: turn on a torch and the water can be crystal clear. The seabed is revealed in surprising clarity, and if you are on the site of one of the Baltic's thousands of lost ships, the timbers, rocks and sediment are shown in dramatic chiaroscuro. It was just such a place in the Stockholm archipelago where one of these wrecks was discovered in 1990. To say it caused something of a stir would be an understatement for it was identified as *Lybska Swan* (*Swan of Lubeck*) the flagship of Gustav Eriksson Vasa. He was the man who had defeated his enemy king Christian of Denmark in 1523 and established an independent Swedish monarchy. If that were not all, Swan was the ship on which the Danish Admiral had signed the surrender. No wonder then that this wreck was wishfully hailed in the press as better preserved than the *Vasa* of 1628 and older than the *Mary Rose* of 1545 (neither of which was true). Certainly the wreck proved to be highly important but not

entirely for the reasons its finders believed. But before providing closure for this particular story I want to step back and consider its place in the context of maritime archaeology, together with discoveries of other wrecks that have been made since.

SHIPS AND MARITIME ARCHAEOLOGY

In 1978 Keith Muckelroy defined maritime archaeology as *the scientific study of the material remains of man and his activities on the sea* (Muckelroy 1978: 4). Gawronski (this volume) has outlined some of the key developments in a field that has matured significantly since then, and this is partly because the scope of the subject has been explicitly widened. McGrail for example, while an important mentor of Muckelroy's, nevertheless regarded his definition as too restricted and this has been borne out by subsequent research. Much of what Gawronski discusses for example would have been excluded from Muckelroy's definition as it addresses coastal communities and related objects on the shore. Muckelroy saw a relatively discrete separation between maritime and non-maritime 'sub-cultures' but today we see maritime affairs as more interconnected and in many ways inseparable from the wider community. Indeed one might ask where the 'maritime' stops and the non-maritime begins. When returning home to Ithaca, Odysseus, is told by the ghost of the seer Tiresias, that he is destined to take revenge on his wife's suitors. For atonement he is instructed to pick up an oar and travel inland until he reaches a place where no-one recognises what it is. Here he must plant the oar in the ground and make sacrifice to Poseidon to secure a comfortable old age and a peaceful death far from the sea (Jones & Rieu 2003: *The Odyssey*, Book XI). Barring deserts and mountain ranges, such places are surprisingly hard to find. Even there, riverine and lacustrine waterways extend waterborne transport networks far inland (Westerdahl 1992). If therefore, maritime affairs affected those living far from the coast and vice versa, then maritime archaeology may include the investigation of past peoples who may never have seen the sea. In the light of this greater

scope we might advance a broader definition in which maritime archaeology is *the study of the remains of past human activities on the seas, interconnected waterways and adjacent locales* (Adams 2013:2). The omission of the word 'scientific' is because I assume that science is intrinsically embedded in the discipline, while omission of the word 'material' acknowledges that while material remains are our primary source, archaeology also addresses non-material remains, such as place names or symbolic meanings. In rationalising what he called his 'ladder of inference' Christopher Hawkes suggested that ideological and religious aspects of past societies were the hardest to access through archaeological remains, though it didn't stop him proposing ways in which this might be done. Indeed, particularly since the 1980s, many archaeologists assume this to be part of their brief and I include this paper's concern with agency – the ability to discern human motive and action in the past.

It is therefore rather ironic that as maritime archaeology matured, the study of shipwrecks, so prominent in the development of the subject and so central to Muckelroy's and McGrail's thinking, sometimes attracted criticism. Maritime archaeologists whose research focused on watercraft of any sort were collectively labelled as ship fetishists and, to a degree, some criticism was warranted due to the restricted theoretical scope of some of the shipwreck investigations of the past. Today this is far less the case for two reasons: firstly, because of the increasing pace of investigations of other types of site and secondly, because ship-based research is carried out in ways that more effectively exploit its extraordinary archaeological potential.

CHANGING THE THINKING

An example of the ways in which approaches to ship archaeology have changed concerns motivation. In the past it could be said that shipwrecks were often excavated for the same reason that George Mallory said that he climbed mountains – 'because they're

there'. Mallory's subsequent comments in which he enlarged on the motives that ultimately drove him and others to their deaths are less well remembered than this off-the-cuff remark given at a fund-raising event in the United States in 1923. It does however, encapsulate the spirit of what drove him and probably every mountaineer since has deployed the same answer. Similarly, the reasons shipwrecks were excavated from the 1950s onwards were many and varied. However, it would be fair to say that many cases it was 'because they were there'. Typically, excavators were driven by curiosity and a sense of exploration and their investigations often lacked any sort of formal research design, let alone any aim of contributing to a wider research framework (Lenihan 1983; Murphy 1983). In fact, many projects had more sophisticated research aims than it appeared at the time (Adams 2013:9) but where they were lacking, I believe the reason concerns the intrinsic qualities of shipwrecks as archaeological sites. A shipwreck is an event (sometimes taking only minutes, sometimes hours or days) in which aspects of human action are arrested together with their associated material culture (Fig. 2). The contemporaneity of the assemblage – the ship and its contents – is the reason that wreck sites are often called 'time-capsules' or more soberly, 'closed finds'. Although these terms need to be qualified, shipwrecks are a form of catastrophe site and so have qualities that distinguish them from the majority of land sites. As Gibbins put it shipwreck assemblages lack 'purposeful selection' (Gibbins 1990:377) in the sense of a funerary assemblage in a tomb for example. With the often high level of organic preservation, it is easy to see how a ready-made research design presents itself. Well-preserved finds present apparently self-evident knowledge about the past and prompt inductive research avenues, i.e. prompted by the hap-
penstance of what is found.

However, the real archaeological benefits of a wreck are not just the high-resolution view we get of the past through structures and objects but something much more valuable than either: the contextual relationships between them. While we might establish the function, date and other aspects of an object such as its



*Fig. 2. A shipwreck depicted by Siewwert van der Meulen in *Navigiorum aedificio*, a series of prints depicting the life of a ship (early 1700s). It is easy to see how it might be assumed that what remained on the seabed would be randomly scattered (de Groot & Voorstman 1980:151)*

manufacturing technology, if it can be viewed in spatial relationship to other elements of an assemblage and to adjacent structure, far more can be inferred. Shipboard contextual relationships can reveal such things as the mode of use, professional specialisation, social grouping, hierarchy and organisation on board, the organisation and use of space, attitudes to death, health and treatment of illness or wounds, etc. All of these relate in turn to the ways in which the norms, tenets and ideology of wider society are transposed to the shipboard situation. To establish these relationships we move outwards from the particulars of the wreck and the events with which it is associated to engage with the social context of its role and use.

IMPEDIMENTS TO PROGRESS

It is easy to critique past work however, and there were of course several notable exceptions some of which are referred to below. We also have to take account of another factor that militated against wreck excavations entraining broader perspectives, namely the socio-economic circumstances within which they were carried out. Looking back fifty years, legislative frameworks, if they existed, were rudimentary and neither wrecks nor the wider field of maritime archaeology figured in national heritage management strategies. This is partly why few of the funding sources on which land archaeology drew were available to underwater maritime projects. With underwater material in particular it was a case of 'out of sight – out of mind'. Another aspect of early wreck 'exploration' that was related to this institutional vacuum was that each site tended to be investigated as an individual phenomenon. If one takes account of the ways in which such projects were conceived and organised this is not surprising. Many were driven by entrepreneurial characters whose knowledge of archaeology was as varied as their backgrounds. I have noted elsewhere (Adams 2013:6) that of 24 contributing authors to the 1972 UNESCO volume 'Archaeology Underwater – a nascent discipline', only six had formal training in archaeology of any kind. Although many achieved extraordinary results, funding was often inadequate to complete the project and so it is not surprising that post-excavation analysis was often rudimentary and the data insufficiently integrated with comparative material or otherwise contextualised.

THE NATURE OF SHIPWRECK SITES

Another factor that undermined the value of what was recovered from the seabed was the absence of a sophisticated understanding of formation processes. In particular, it was commonly assumed that shipwreck sites were chaotic or random scatters of material resulting from the wrecking event itself and subsequent environmental forces. Believing this provided excavators with the

perfect excuse to sidestep the otherwise ever-present obligation of archaeological fieldwork, i.e. recording. Why record an object if its position on the seabed is meaningless? In fact several of the early shipwreck excavations were demonstrating this to be far from true. Examples include George Bass' work in the Mediterranean (Bass 1967), Colin Martin's work in the waters off Scotland and Ireland (e.g. Martin & Parker 1988), Ole Crumlin-Pedersen and Olaf Olsen's work in Denmark (Crumlin-Pedersen & Olsen 2002), the recovery of *Vasa* (1628) in Sweden (Cederlund & Hocker 2006), (Fig. 3), Jeremy Green's work in Australia (Green 1975) and Margaret Rule's work on the warship *Mary Rose* (1545) (Rule 1982) (Fig. 4) and linking England and the Netherlands, the VOC Ship *Amsterdam*. (Gawronski 1990) Of course all these examples were sites where there was more or less extensive preservation of structure and contents. But the work that thoroughly torpedoed the notion of the 'chaotic wreck site' was Keith Muckelroy's excavation of the Dutch East Indiaman *Kennemerland*, that was wrecked in 1664 on the Outskerries off the Shetland Isles (Fig. 5). Compared to *Vasa* the hull of which survives almost in its



Fig. 3. The warship *Vasa* lost in 1628. (Photo., the author)

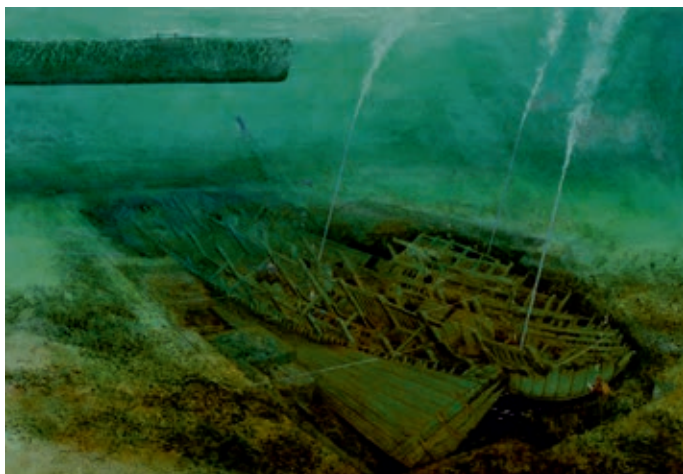


Fig. 4. Artist's impression of Mary Rose (1545), done prior to the raising and showing the site as it would have looked (if such visibility existed) towards the end of the excavation phase in 1981. (The author)

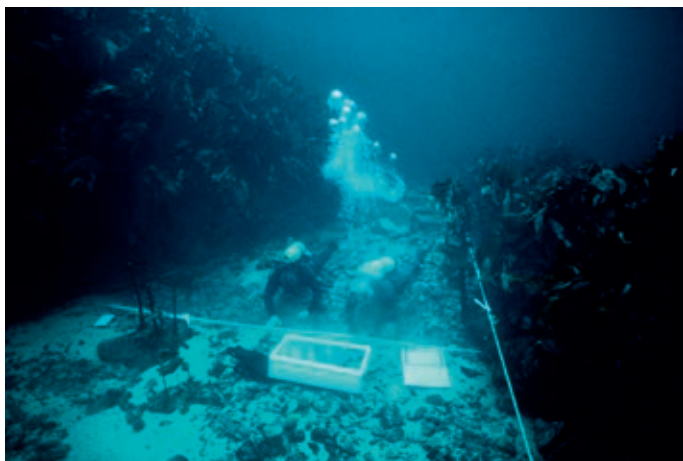


Fig. 5. The site of the VOC ship Kennemerland (1664) during excavation in 1987. Nothing of the hull remains but much of the ship's contents are represented in the seabed distribution of material. (Photo., Christopher Dobbs)

entirety, Nothing of *Kennemerland's* structure survived at all. The ship had struck rocks in a storm and been violently swept into the voe, breaking up as it went. Yet after mapping every object no matter how small, Muckelroy was able to demonstrate that the seabed distribution of every class of material, from ballast and guns to glass and ceramic sherds, was meaningfully patterned. Far from being randomly scattered across the seabed, he showed that the seabed positions of objects were directly related to their original locations of use or storage in the ship. He was also able to reconstruct the process of wrecking, revealing the order in which materials had been deposited as the storm drove the ships into the voe and out again on the subsequent tide (Muckelroy 1978:167). David Tomalin's work over a twenty year period on an even more dynamic site, the Needles off the Isle of Wight in England, effectively demonstrated the same thing in the case of the wrecked English frigate *Pomone* (1811) (Tomalin et al 2000).

LANDSCAPES, SEASCAPES AND SHIPSCAPES

With an increasing understanding of the nature of wreck sites and their archaeological potential, came realisation of the ways in which their study could contribute to understanding past maritime affairs rather than or as well as technology and typology. Another significant development saw the approach to wreck sites adopt an increasingly area-orientated approach where, just as land archaeology had done, the maritime archaeology of ships began to be seen as an archaeology of time and space and of wider society rather than as a series of single-event phenomena. In this sense it is the archaeology of East Indiamen and particularly Dutch East Indiamen where these ideas were developed and implemented not just in the way that archival research was carried out to complement fieldwork but as an integrated theoretical approach that affected the strategy of excavation itself. As Gawronski has put it, what was excavated off the coast of Sussex in the 1980s was not simply the wreck of the VOC ship *Amsterdam* but a window into the VOC itself - its people, its strategies, its networks - and

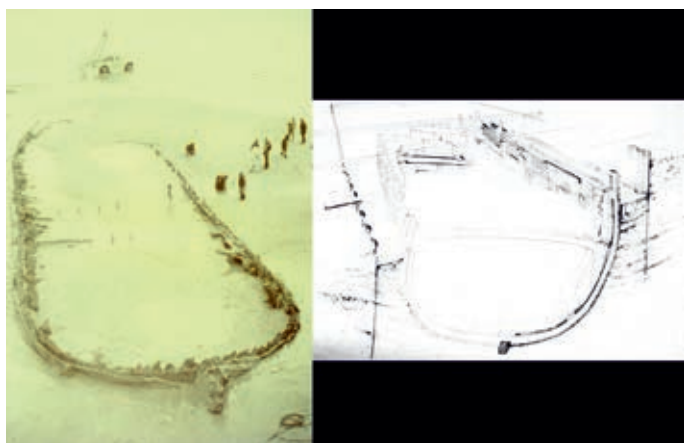


Fig. 6. The wreck of the VOC ship Amsterdam that was run ashore near Hastings in 1749. The hull is deeply buried to a depth of over 7m in the beach sediment. (Photo., BBC; Cutaway drawing the author)

in turn early modern Europe society (Gawronski 1992 and this volume) (Fig. 6). The ship as a type, as an element in a military or economic system (a la Muckelroy 1978:216), as a society, as an element in a fleet, of a collective, long-term enterprise, as the product of a craft tradition (often enduring for thousands of years), and always as a carrier of symbolic meaning, all of these aspects mean that the investigation of a single example or its parts on the bed of a river, lake or sea requires these contextual factors to be addressed. Otherwise we end up with data rather than knowledge, measurements rather than meanings, descriptions rather than understanding.

Another example of this approach to the maritime archaeology of ships is the work of Carl Olof Cederlund in the Baltic. Although he was one of the team who excavated the warship *Vasa*, he subsequently carried out a series of excavations of merchant ships, partly to counterbalance what he saw as the undue focus on warships at the time (Cederlund 1994). Merchant vessels he argued were far more numerous and varied and were therefore important

elements of the maritime system that needed to be included in any comprehensive research of past societies.

NEW DISCOVERIES – NEW TOOLS

Much of this work was carried out on wrecks discovered in the decade after the rapid development of diving in Sweden in the late 1950s - 1960s. As in the Mediterranean, after a few years the rate of discovery of historic wrecks in the Baltic slowed until this century when various new technologies became available for civilian use. As a result the incidence of discovery has increased. The digital revolution in seismic reflection systems and the availability of global positioning systems has made finding wrecks much easier. Once discovered, mixed gas diving technology allowed diving on them to far greater depths than with conventional self-contained equipment. And, whether by diving or operating with remote vehicles, the ways in which we can record and visualise these sites has become faster and more accurate. Of course hyper-accuracy is only cost effective if it assists in answering questions, but in the recording of ancient hulls accuracy certainly improves subsequent reconstruction and thus interpretation. It also assists in the creation of accessible visualisation for publication and general exhibition, all the more important now that research is measured in terms of its social impact as well as its academic rigour. What follows shows that we are now in a new era of Baltic ship archaeology in which these new sites together with new technologies are allowing us to frame questions that would have difficult or impossible to answer hitherto.

The Baltic was already recognised as the world's best repository of historic (and perhaps prehistoric) vessels. Its low salinity has so far excluded the *Limnoridae*, and the isopod mollusc *Teredo navalis* which are the principal agents in the ultimate destruction of submerged wood in warmer, more saline seas. But these new finds startled even those accustomed to Baltic wreck. The new sites were being discovered in deeper, anoxic water where pres-

ervation was simply extraordinary. Just as the warship *Vasa* had caught the imagination of the world in 1961, the discovery in 2003 of an almost intact Dutch *fluit*, also from the 17th century, did the same (Fig. 7). The wreck was discovered by the offshore survey company Marin Mätteknik (MMT) who are now part of an innovative collaborative research network based in Södertörn University, Sweden (Holmlund & Rönnby in press). The ‘ghost ship’ as it was called proved to be no exception – MMT have since discovered two other *fluits* of similar age and condition.

But what of the implications for research? What can we glean from these wrecks that is not so visible or recoverable from shallower wrecks? In 1978 Muckelroy observed that up to that time there had been relatively little research done on the nature of shipboard societies (Muckelroy 1978:221). Since then there has been a certain amount done but less than in the domains of ship technology and seafaring or mercantile and naval aspects. Now the quantity of evidence we see on ships as well preserved as the ‘ghost ship’ offer the opportunity to test assumptions of shipboard societies and how life on board was lived. In his, albeit brief discussion of the nature of shipboard societies Muckelroy presented a default position of a strict hierarchy with one ‘man’ in command and ‘with very few exceptions’ an all-male crew. This may have been (largely) true for relatively recent, western naval crew structures and similar systems certainly held sway elsewhere but these were not universals. Even in the navies of nation states in the 19th century there were far more women aboard in various capacities than is commonly realised. On the ghost ship, Eriksson (2013) sees evidence that raises questions about the degree of hierarchy and social division in the crew and challenges assumptions about the ways in which status dictated the use of space, regulated social activities aboard and otherwise affected the running of the ship (Eriksson & Rönnby 2012; Eriksson 2013). Research into these and other wrecks is now focusing on understanding these ships as agents within their respective networks of communication, trade and exchange. In particular, the ways that their contents can reveal political and cultural agendas explicitly aimed to change

society (Alvik 2013; Rönby 2013).



Fig. 7. The 'ghost ship', a mid 17th-century Dutch fluit discovered by the survey company Marin Mätteknik (MMT) in 130m depth in the Baltic.

THE ARCHAEOLOGY OF POWER

From this perspective Cederlund's critique of maritime archaeological emphasis is being addressed so we can turn back to ships of war with a clear conscience! Here too, recent discoveries have transformed the nature of our enquiry, for although many wrecks had been located, relatively few have been the subject of intensive archaeological investigation. Prior to 1990 the most significant finds included *Elefanten* sunk in 1564; *Riksvasa* which caught fire and sunk in 1623; the *Vasa* of 1628 lost on its maiden voyage in Stockholm harbour and *Riksnyckeln* of around 800 tons, lost in a storm near Järflotta on the Swedish coast. A generation later Sweden suffered the catastrophic loss of several ships during the Scanian war (1675-79) the most significant being the flagship *Kronan* lost in the battle of Öland in 1676. *Riksäppet* was lost four days later and *Grona Jägaren* later the same year.

Substantial structure survives on many of these wrecks but many were heavily salvaged soon after their loss. Even worse was the damage caused by black oak hunters salvaging wood for furniture and curios prior to the extension of Sweden's cultural heritage protection to include wrecks in 1967 (Cederlund 1983). Only *Vasa*, *Kronan* and to an extent *Elefanten* were substantially undisturbed prior to discovery or at least prior to archaeological intervention (Ekman 1942; Einarsson 1990; Cederlund & Hocker 2006).

His Majesty's best kravel

Now to return to that wreck discovered in the Nämndöfjärd of the Stockholm Archipelago in 1990. Its initial identification as *Lybska Swan* was made on the basis of a map compiled by Anders Franzén (1967) which marked it at this very spot. A company was formed, shares were issued and fame and fortune were anticipated. Subsequent survey however, showed that although it was of the right period, it could not be the *Swan*. It was simply too small (Adams et al 1991). It was however, one the ships in Gustav Vasa's first fleet and therein lies its importance (Fig. 8). Not

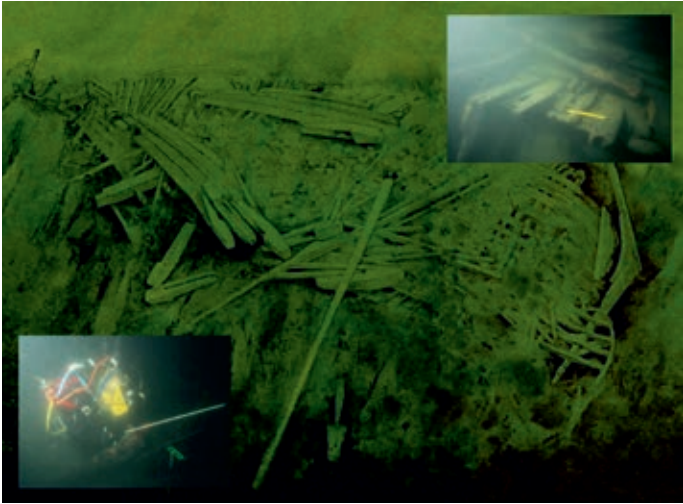


Fig. 8. The 'kravel', a heavily armed carvel vessel of Gustav Eriksson Vasa's first fleet probably acquired in 1522 and lost in 1525. Artist's impression the author, inset photos Christopher Dobbs and Kester

simply because of its association with the 'Landsfather' king, or even its intrinsic qualities as a historic ship, but because of why it came to lie here and what it represents. As a ship it is relatively unimpressive. It wasn't large even by the standards of the time, nor would it have looked particularly regal in terms of the quality of its build. It was nevertheless referred to as 'His Majesty's 'beste krafwell' for its carvel construction – a recently adopted and prestigious technology, and its large cargo of heavy guns - place this vessel at the centre of Baltic power politics and the formation of the modern Swedish state (Adams & Rönby 2013). In 1525 this ship was lost transporting guns and other equipment back to Stockholm. As well as its own guns it was carrying a large number of even bigger guns from the *Swan*, abandoned on Öland the year before which may explain the confusion. These losses were serious because at this time Gustav Vasa's grip on power was still far from secure. He held on to it by various means that marked him out as a particularly skilful (and ruthless) exponent of Machiavelli's

teachings in his dealings with his rivals. But undoubtedly one of the keys to his success was his recognition of the importance of sea power. In the struggle against Denmark his final victory in taking Stockholm was only made possible by the acquisition of a fleet from his supporters in Lübeck. Thereafter, Sweden's political and military fortunes were inextricably bound up with the sea.

TOOLS OF STATE BUILDING

Work on the site has continued up to the present and in some ways was reinvigorated by the discovery of two more iconic Swedish warships. In 2011 the company Ocean Discovery found the wreck of a large wooden ship in 70 metres of water. (Fig. 9) They had been looking for the warship *Mars*, lost in 1564 and indeed *Mars* it proved to be. By then MMT had also discovered the wreck of another big warship, *Sword*, lost in 1676 (Fig. 10). Both were among the largest vessels of their day. Both had been lost in major naval engagements against competing powers and both had been commanded by admirals as iconic as their ships. In addition to them, the wreck of *Resande Manen* (1660), a small



Fig. 9. The warship Mars, lost in action against a combined Danish/Lübeck fleet in 1564 (Photo: Tomasz Stachura).



*Fig. 10. A gun still at its station in the fore part of the warship *Sword*, lost in the battle of Öland in 1676. (Photo., Jonas Dahm/MMT)*

warship that had long eluded the likes of Anders Franzén among others was at last located in 2013. And just to add spice to the mix, a wreck that had been known for many years was confirmed as the Danish warship *Gripshunden*, built in 1480 and lost in 1495 (Eriksson et al. in prep).

In a just few years these discoveries have transformed the landscape of enquiry and provided timeline that is much more substantial, especially when considering their dates of construction as well as loss. Beginning with *Gripshunden* as one of the earliest carvel ships yet discovered, built in 1480 this is potentially one of the most significant historic wreck finds anywhere. We then have the Nämndöfjärd kravel (built c. 1515-20) – *Elefanten* (built 1559) – *Mars* (built 1563) – *Vasa* (built 1628) – *Svärdet* (built 1642) and *Kronan* (built 1668-72).

Ships of state

The common denominator of these ships was their carvel technology, a term referring to a method of hull construction deriving

from the Mediterranean and progressively adopted in northern Europe from the around mid-1400s. Carvel construction steadily eclipsed the formerly ubiquitous clinker construction at least for some purposes. Clinker building is sometimes described as 'shell-first' in the sense that the construction sequence is plank-led. By the late medieval period, this technology was under pressures in several ways. Firstly, it was not suited to construction of vessels much over 35m in length. Some certainly exceeded this size but they required extraordinary measures to strengthen the basic structure. The all-important planks in clinker building were radially split from straight-grained timbers, preferably oak, but this was becoming scarcer and more expensive especially for larger vessels (Crumlin-Pedersen 1986, 1989; Goodburn 1992). This promoted a shift to clinker hulls that had far heavier framing suitable for carriage of goods across the North Sea, down the Channel and the Atlantic coast. Several examples of such ships have been found in Guernsey, two at least being around 30m in length (Fig. 11). In some ways they anticipated what was to come and it may have been ships such as these that contributed to subsequent developments.



Fig. 11. The wreck of a large medieval clinker merchant ship in St Peter Port harbour, Guernsey. (Photo., Kester Keighley)

What happened seems to have been the result of a remarkable north/south exchange of technologies. Italian shipwrights began producing ships that combined their methods of hull construction with features of the northern ships that were then entering the Mediterranean, principally the square sail and the stern rudder (Friel 1994, 1995; Adams 2013). The Italian ships retained their lateen sail on the stern 'mesan' mast with the square sail on the main. Soon a third mast was added and the classic ship rig was born. These ships proved well suited for trade up and down the Atlantic coast, the waters around the British Isles and the Baltic. In England the larger ones hailing from the Mediterranean were called 'carracks' but their manner of construction was called 'carvel', derived from the smaller Portuguese 'caravelas'. This would make sense as this maritime traffic went via the Atlantic coast of the Iberian peninsula and as Friel has suggested it is probably these that fell into northern ownership and first copied rather than the 1000-ton Genoese carracks. The term 'carvel' became the generic term for all ships constructed in their manner, being frame-led rather than plank-orientated as in the older clinker construction (Figs 12, 13). The sea-keeping qualities of the new carvels were a spur for rapid adoption. It was also easier to build very large ships using sawn timbers that would not have

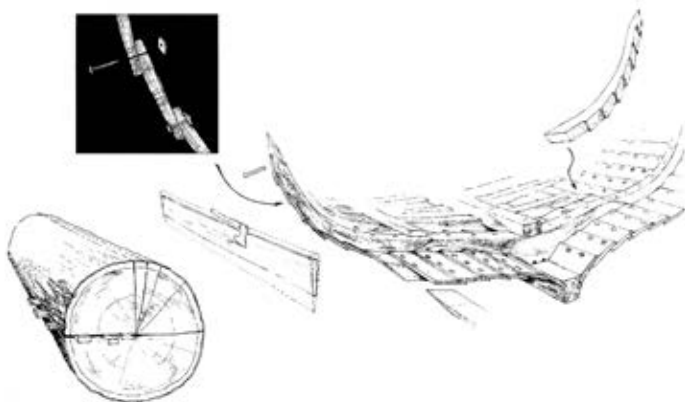


Fig. 12. Drawing showing generalised late medieval clinker construction (The author)

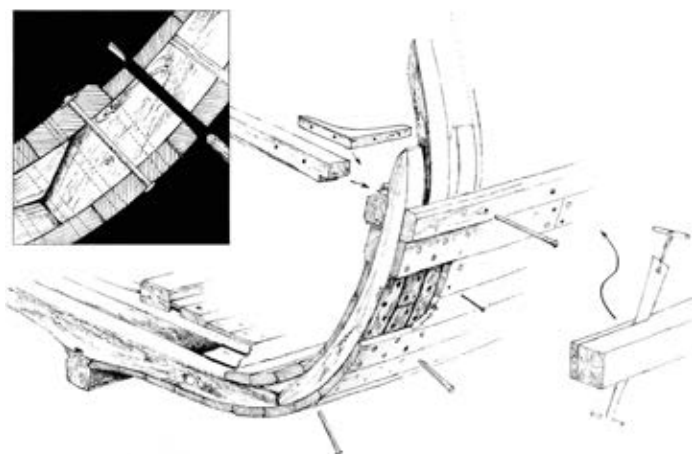


Fig. 13. Drawing showing generalised carvel construction. (The author)

been suitable for clinker vessels. They could also be built with a higher proportion of unskilled labour. For the power hungry (and the paranoid), the resulting vessels also had another very important quality: they were more suitable for carrying heavy armament. This is the reason why in Sweden the word 'kravel' quickly became synonymous with 'örlogskepp' (warship) (Figs 14 & 15).

AGENCY AND POWER POLITICS

The nature of the change from clinker to carvel in northern Europe was for a long time presented as a revolution clouded in mystery that defied solution (Greenhill 1976, 1995; Sarsfield 1991). But it was a problem of our own making, insoluble only because explanation was sought in the timbers of the vessels themselves rather than where the motives for change originated. This created the impression of a conceptual gulf between the two methods that doesn't seem to have existed at least not to the degree of impeding the relatively rapid integration of carvel ships into northern navies. In essence then this was no 'evolution' from

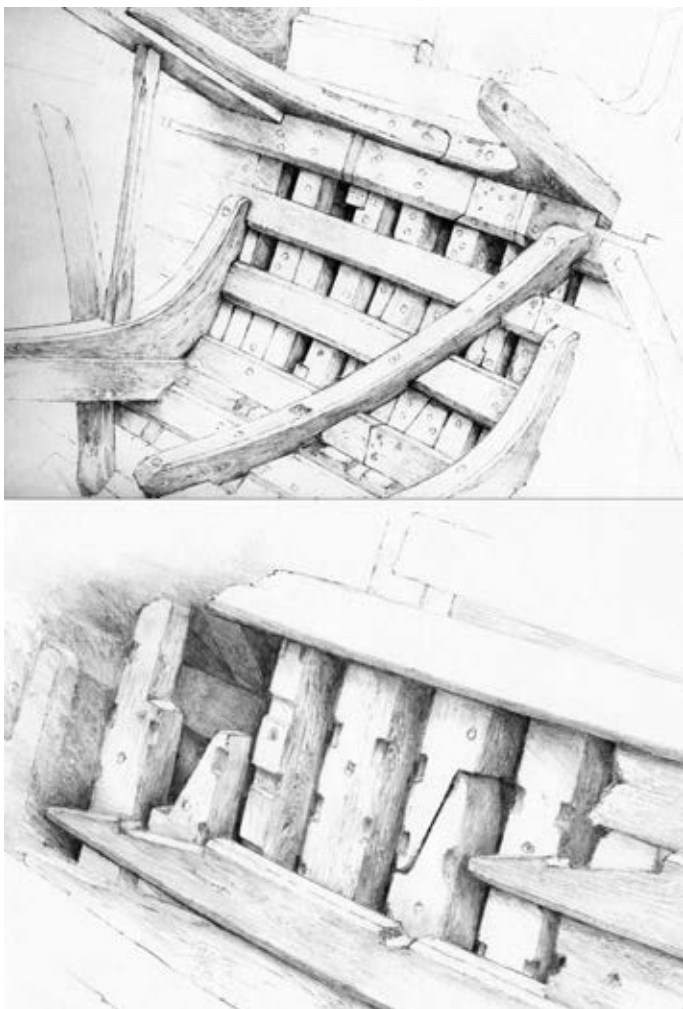


Fig. 14. The hull timbers of the Mary Rose of 1545 below the main gun deck (upper) and in an approximately similar location on the warship Mars of 1564 (upper). In both ships the timbers were converted from relatively high quality timber and assembled to produce a robust construction (Drawing, the author)

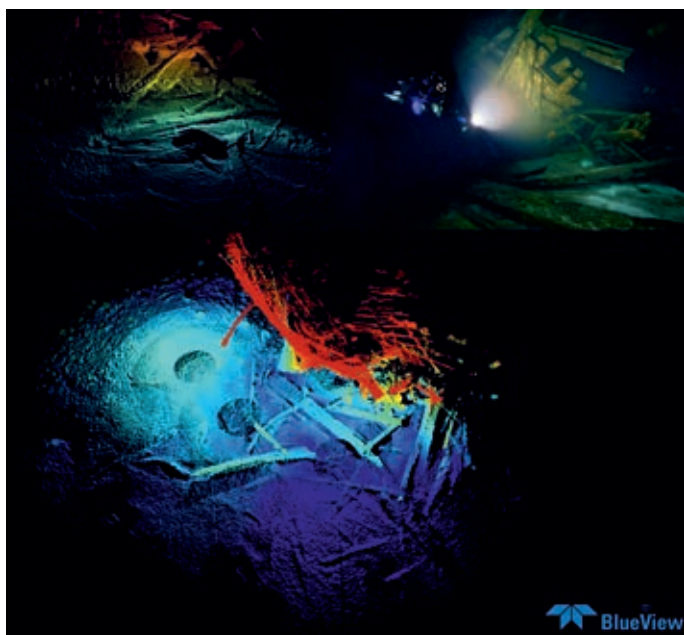


Fig. 15. Acoustic scans of the stern of Mars using a BlueView 3D scanning sonar. Top left is a single scan of the stern (Holmlund/Adams). Top right is a photograph taken from a similar angle (Tomasz Stachura). The lower image is four scans of the upper surface of the hull and adjacent seabed stitched together. (Holmlund). (MARIS/MMT)

one condition to another or a progressive development of one form into another. It was change that was driven by intention – visible in various forms of agency.

As one of the more problematic concepts used throughout the social sciences and humanities, the word agency can seem to have as many definitions as people who use it. Here it is used in two related ways: firstly, in the direct sense as defined by Ian Hodder: motivated human action in the past (Hodder 1986:157). Secondly, in the indirect sense of human relations facilitated by material culture, based on the notion that once something exists,

a ship, a sword or a mobile phone, it acts back on society, influencing both subsequent action and social relations. This notion of 'active material culture' is consistent with the idea in Actor Network Theory (ANT) that nonhuman entities can act as agents. A ship is a good example of an entity that has a powerful capacity to affect people's lives. However, this is related to how we understand intentionality, the consequences of action and the agent as intermediary.

At one end of the spectrum the agency of individuals can be seen as a series of social preconditions that facilitate human action (Dobres & Robb 2000). In this sense agency works through individuals rather than emanating from them, as though the agent is an actor in a play rather than the playwright. This is partly to do with the notion of individuality which as Hodder & Hutson (2003:99) state is a Western, post-medieval construction. Ruling out individuality makes it difficult to define agency as the actions of individuals with free will. However, this is difficult to apply to what we see here, especially as we are dealing with agents that are Western and which straddle the medieval and post-medieval worlds. Instead, notions of agency as 'action and consequence' are nearer the mark and is closely related to the nature of power. Even here, some perspectives focus on the impact of agency rather than the intention behind it (Barrett 1994:1). But the agency of 'motivated action' by definition links intention to outcome, even though the outcome may not have been as the agent would have wished. The ship on the bottom of the Nämndöfjärd was certainly not the result Gustav Eriksson Vasa intended but in lying there now it allows us to view the conditions that he created for himself in order to achieve his aims, and it does so with greater immediacy than text. Similarly, in all these ships there is a clear link to the agency of power, enacted to realise a series of political, economic, military and dynastic goals. As a result these ships manifest the process by which Sweden moved from a being medieval society, subordinate to Denmark, to an independent dynastic monarchy and thence to a fully formed nation state that for a time became one of the most powerful in Europe.

CONCLUSIONS

In summing up, the explanation for the changes we see in northern European ship technology are to be found in the social changes associated with a series of variously traumatic, transformative processes that pushed medieval Europe into modernity. In other words changes in ship technology manifest changes in society at large. The change from clinker to carvel ship building is just one of many episodes of technological change where we see this strength of correlation (Adams 2013). All material culture embeds human intentionality in some form or another but often very cryptically. But in the complexity of the ship as artefact, as technology, as society, as symbolic carrier of meaning and as agent, the maritime needs and human strategies that lie behind the existence of the ship are often much more visible. It follows then that as well as being able to locate the causes of change in ship technology within society, the ships themselves provide a portal through which we can view those societies in new light.

In this case the increasing use of ships in connection with state formation is connected with the increase in scale of European polities. In 1350 nation states in the sense we mean now did not exist and the political map of Europe had the appearance of a patchwork quilt. Relations between competing powers were highly volatile and borders were correspondingly fluid. The changing configuration of English territory in France is a good example. But steadily the process of dynastic politics, by promoting alliance or conflict, over time tended to increase aggregation of territory. Polities became larger and ultimately more stable. The larger the polity the more likely it was to have a coastline. For example a unified Spain, a France now free of English occupation, England itself and of course Sweden, Denmark, Holland (and later the Netherlands). Competition between states of necessity now looked outwards instead of inwards and so was by definition maritime. This of course required ships: vessels of trade, of industry, of exploration and of war. Of these the warship, constructed in the new prestigious carvel technology, became a primary tool

of state building, capable of exerting coercive power with its guns but just as importantly, of embodying state power as a symbol, and as floating embassy.

We cannot therefore fully understand the impacts of the Black Death, the wholesale changes in society that we conveniently label 'renaissance' and 'reformation', or indeed the related drift from a service-based feudalism to a capitalist monetary economy, without taking account of the maritime elements of social action. We might even go further and suggest that capitalism found its precedent in the entrepreneurial maritime enterprise in the port towns of the high medieval period and that as well as being the tools of state-building, ships were instruments of modernity.

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H. DESSENS

AN INVESTIGATION INTO
THE POSITION OF MARITIME
ARCHAEOLOGY IN THE
NETHERLANDS

WHO WILL TAKE THE HELM?

The motivation for this contribution to the 2014 edition of the Kroon-Voordracht lecture series was a request from the board of the Stichting NMAP asking me to present a lecture reflecting on maritime archaeology in the Netherlands, and specifically about ‘the lack of interest, particularly political interest, faced by maritime archaeology in the Netherlands.’ I am often invited to give lectures and usually I decide immediately whether or not to accept the invitation. But in this case I asked for a week in which to consider the invitation.

You see, I am not a maritime archaeologist, or even any kind of archaeologist, and in terms of scientific achievement I am rather out of place compared to the other three speakers we are hearing today. I have been working in museums since 1982, starting with the Maritiem Museum ‘Prins Hendrik’ (which is now called the Rotterdam Maritime Museum). Since 1991 I have worked at what was formerly the Nederlands Scheepvaartmuseum Amsterdam and is now called Het Scheepvaartmuseum (The National Maritime Museum). The educational aspect of a career as a historian has always attracted me more than the scientific aspect. Although I have published a number of books and articles on maritime topics over the past thirty-two years, I cannot say that I have been an active scientist *pur sang*. Related to this is the fact



East Wing: display of yachting models from the 17th – 21th century.

that Het Scheepvaartmuseum, where I am the director of collections, is not active in maritime archaeology, primarily because in the Netherlands, this very specialized discipline is traditionally the domain of institutes which have been specially founded for this purpose. At present the leading institute in this field is the Maritime Archaeology department of the Cultural Heritage Agency of the Netherlands in Lelystad. Despite my less-scientific background, after a week of considering the matter, I decided to accept the invitation. The request became a personal quest for me, in which I hoped to gain more clarity on the current position and significance of Dutch maritime archaeology in relation to the many organizations and people focusing on collecting, maintaining, interpreting, and communicating about the Netherlands' maritime heritage. If maritime archaeology really has reached a low ebb, I also wanted to find out the causes of this. My position as an outsider puts me at a bit of a disadvantage, but I believe there are advantages to it as well, because I do not have any personal stake in this discussion.

I wish first to take a look at the cultural context of which maritime archaeology is a part and at the specific role that maritime

archaeology fulfils or can fulfil within that context. I will then explain why wide social attention to our maritime heritage is not automatic. In addition, I would like to tell you about the renovation of Het Scheepvaartmuseum, because a central part of the renovation entailed making cultural heritage relevant to today's society. The museum's experiences in this regard may be useful to maritime archaeology. Then I will present the results of my research into the current state of maritime archaeology in the Netherlands, in which I interviewed experts and carried out some literature research. I will conclude my lecture with my opinions of the state of maritime archaeology, whether changes are desirable, and where there is room for improvement.

MARITIME HERITAGE IN THE NETHERLANDS

Maritime archaeology does not operate in a vacuum. The Netherlands is a country that is quite rich in maritime heritage. There are more than fifty museums in this country with maritime collections. A significant number of these museums are specialized maritime museums, usually focused on a particular region, place, or collection. Examples include the Fries Scheepvaartmuseum in Sneek, in the north of the Netherlands, the Maritiem Museum Zierikzee, in the south-west of the Netherlands, and the Nationaal Baggermuseum in Sliedrecht, near Rotterdam. Many other historical and art museums house important maritime collections, such as the Rijksmuseum in Amsterdam, the Museum Boymans-Van Beuningen in Rotterdam, the Zuiderzee Museum in the north-west, and the Netherlands Open Air Museum in the east of the country. I estimate that together, these organizations house at least 1.2 million items with a maritime background in their collections. They include works of fine and industrial art, tools, library collections, and a number of other types of items. Archives also house many items of maritime heritage. The most famous example is the archive of the Dutch East India Company, which is housed in the National Archives of the Netherlands and consists of 1.4 kilometres' worth of documents! There are also



The building of the maritime museum 's Lands Zeemagazijn was built in 1656. It was the storehouse of the shipyard of the Admiralty of Amsterdam.

lesser-known archives such as the notarial archives, the archives of the Shipping Commissioner, the Shipping Inspection, the Ship Gauging Service, Rijkswaterstaat, the nautical colleges, and shipping companies, including the archives of the shipping company Koninklijke Nedlloyd. In addition, the Netherlands has the world's largest fleet of registered floating monuments. The Stichting Federatie Oud-Nederlandse Vaartuigen FONV, a federation of organizations which preserve traditional Dutch vessels, keeps a registry of historic vessels which have value as monuments. This registry lists more than 3,000 commercial vessels and pleasure boats above fifty years old. Most of these vessels belong to private owners. And of course our cities and towns are connected to each other and to the Dutch landscape by water and shipping and the history of shipping. None of these collections or archives speaks on its own, but they must all be interpreted in order to acquire meaning. That requires maritime historians. Until very recently, there was only one professor of maritime history in the Netherlands, at Leiden University, whose chair was financed in part by private funds received through the association of maritime funds. Scientific research is crucial for museums, because we cannot tell

new stories to our visitors unless our collections are interpreted through scientific research. For this reason, Het Scheepvaartmuseum has collaborated with VU University Amsterdam to establish a special chair in 2013 with the goal of teaching young academics how to use collections of historical objects as historical sources in addition to researching the written and printed sources which have a prominent role in history degree programmes.

Het Scheepvaartmuseum in Amsterdam is one of the institutes that maintains a collection. In fact, based on the size, breadth, and importance of its collection, the qualifications of its curators (two with doctorates and two currently working on their doctorates), and the potential of its buildings and locations, it is one of the most important maritime museums in the world. A museum is of course more than just its collection. Its impact on society is just as important. And in the late 1990s, the museum board began having concerns about Het Scheepvaartmuseum's impact on society.

SOCIAL RELEVANCE

Even if we believe that our museum houses one of the five best maritime collections in the world, if society in general does not also recognize the collection's importance, the museum and its collection will be marginalized. And that is exactly what was in danger of happening to Het Scheepvaartmuseum in the 1990s. Since the 1960s, shipping, shipbuilding, and related trades gradually decreased in prominence as a result of a number of factors. We realized that in the minds of our visitors, the Netherlands was no longer a maritime country. It also became apparent that fewer and fewer visitors had a coherent picture of the Netherlands' maritime history, and as a result they were unable to grasp the context of the exhibitions' contents. In 1991 Het Scheepvaartmuseum took over the full-scale replica of the East Indiaman Amsterdam. The number of visitors drastically increased that year, totalling more than 100,000, and subsequent years consistently saw around



Reconstruction of the East-Indiaman Amsterdam, which was built originally on the Company of the Dutch East India Company in Amsterdam, 1749.

200,000 visitors per year. In 2002 the museum's jubilee exhibit on 400 years of history of the Dutch East India Company attracted approximately 230,000 visitors. This proved without a doubt that people are very interested in maritime history when it is presented attractively.

The museum chose to undergo what we call a 'renewal' rather than a renovation in the strict sense of the word. We changed our organization, our stakeholders, our earning model, our target audience policy, and our presentation concept, thereby transforming the museum into a cultural entrepreneur that is focused on society. The museum made choices, which necessitated getting rid of some things. We said goodbye to our ambition to present a more or less complete picture of Dutch maritime history (in an exhibition that was much too large and rigid anyway) and instead we selected twelve themes which focus on the target audience. The museum wanted to tell stories rather than merely display objects. Het Scheepvaartmuseum even wrote a corporate story and now tells its visitors 'The Netherlands' Seaward Story'. This is not the story of clogs, tulips, and windmills, or people hiding behind protective dykes, but rather about daring people who take to the seas looking for adventure. This story gives context to the identity of the Netherlands as an internationally oriented trading nation. The museum also formulated five themed collections. These themes serve to guide the museum's programmes for the public as well as the scientific research carried out by its curators, research fellows, and work placement students.

Het Scheepvaartmuseum was seriously concerned about its future in the 1990s, because it had lost track of its social relevance. The museum managed to turn the tide thanks to a well-considered and well-prepared renovation. Its clear goals and concrete approach enabled it to generate a great deal of support for the renovation. This support came from the Dutch Ministry of Education, Culture and Science; the business community; various funds; the museum's own sponsorship programme 'De Vriendenvloot;' and many private donations. The number of visitors increased dramatically after the reopening. Although the museum's reopening occurred too recently to be able to reliably predict an average number of annual visitors, we believe that a minimum of 350,000 visitors per year is a reasonable figure.

MARITIME ARCHAEOLOGY

To what extent is the situation faced by the field of maritime archaeology similar to that faced by Het Scheepvaartmuseum, a public institution which maintains a collection? In order to obtain a clear overview of maritime archaeology in the Netherlands, I have held long conversations with experts active in the field of archaeology, particularly maritime archaeology; and in addition I have carried out literature research. The conversations painted a fairly consistent picture: Despite hopeful attempts to develop maritime archaeology into a fully-fledged branch of science in the Netherlands, starting in the 1990s the situation began to deteriorate, a trend that is continuing to the present day. When I asked the experts how they would characterize the future of maritime archaeology, their answers mostly came down to 'hopeless'. I found that disconcerting.

The general mood was one of despair for the state of maritime archaeology in the Netherlands, and my literature research confirmed this. The website of the Cultural Heritage Agency of the Netherlands was the only source I found with information that did not have this negative tone; I will discuss this website in more detail later.

I came across the following themes in the interviews and literature.

The implementation of the Malta Convention:

The interviewees were unanimous their view that the way in which the Government of the Netherlands has implemented the Malta Convention has been detrimental to maritime archaeology. The European Convention on the Protection of the Archaeological Heritage, also called the Malta Convention, states that anyone making a chance discovery of artefacts in the ground is required to allow archaeological research to be carried out. Whether you are building a shed in your back garden or an international rail route, if the area on which you wish to build is officially registered as potentially archaeologically valuable, the relevant government

body will not issue you a building permit until you have had archaeological research carried out by an officially accredited excavation company, which in turn is required to write up a report according to certain standards. The Dutch government explicitly chose to give the authority to carry out this required archaeological research to private businesses rather than government bodies, for both wet and dry archaeology. It would seem, therefore, that progress in archaeological science in the Netherlands is primarily determined by developments in spatial planning, and key research questions which relate to social or scientific needs have almost no influence. There is an official National Archaeological Research Agenda in the Netherlands, but my readings of it have led me to the conclusion that the research questions upon which the excavation companies base their work, as well as their interpretations of their finds, are primarily developed from prior research, giving rise to a kind of 'research chain'. This is not conducive to the excellence of a scientific discipline. Of course the excavation publications and any artefacts that are found, conserved, and registered result in a growing archive of accessible sources and may inspire future research that actually is question-driven. The Dutch implementation of the Malta Convention also assumes that in situ preservation is the best solution for preserving heritage. I am not qualified to judge whether this is beneficial in the case of land-based archaeology, but it is definitely an inappropriate solution for maritime archaeology. If in situ preservation were the best solution for long-term preservation of maritime artefacts, then centuries-old ships would be excavated from the mud looking as pristine as they did when they were launched, and that is clearly not the case. These ships are disintegrating, and the disintegration process does not stop until all the material has been eaten or rusted away.

According to my interviewees, when the Government of the Netherlands implemented the Malta Convention, it made a crucial error of judgement in relation to maritime archaeology, with disastrous and irreversible effects. This standpoint is supported by a number of publications. Valuable wrecked ships and other

primary sources from periods of time or about topics which are not addressed by any existing written sources can easily be lost as a result of natural processes such as erosion or shifting sand banks, as well as by disturbances to the seabed as a result of bottom trawling by fishing boats. This last factor is a particular problem in coastal waters with strong tides, like the Wadden Sea and the waters of Zeeland. There have been extensive publications addressing this specific threat to this unique and irreplaceable heritage, including, surprisingly enough, a relatively recent publication by the Cultural Heritage Agency of the Netherlands itself. As the Cultural Heritage Agency speaks on behalf of the Minister of Education, Culture and Science, I assume this shows that the Minister is concerned about preserving the Netherlands' maritime Heritage.

Financial and emotional value:

During my interviews, I also encountered frustration about years of budget cuts and a lack of the financial means to systematically look for, map, protect, research, and interpret maritime archaeological artefacts in addition to the occasional research carried out on accidental finds on the basis of the Malta Covenant. This lack of finances means that it is not possible to repair the systemic errors in the way in which the Malta Covenant is implemented in the Netherlands. The Dutch government has mostly delegated the care of our monuments to the municipalities, but they are short of funds and therefore also short of the people or means necessary to have the beds of their waters systematically investigated or protected. This is alarming, because in the IJsselmeer alone there are major projects planned which will cause massive disturbance to the lakebed, such as large-scale measures to make the water of the IJsselmeer clearer and the construction of the Marker Wadden (mudflats) next to the dyke connecting Enkhuiszen and Lelystad.

And this problem goes further than just ships and ships' inventories being lost without policies of preservation. The remains of buildings, old dykes, and other artefacts which were once on dry

land can also be found underwater as a result of flooding in the past. The bottom of the IJsselmeer and other major coastal waters also contains the wrecks of World War II bombers and fighter planes, sometimes with the remains of the crew still on board, thereby making the issue an ethical question as well. Recovering these vessels and planes, thereby making a real burial possible, is almost always deeply meaningful to the families of those who died.

Sporting divers:

The third theme is related to the second one. After World War II, the invention of scuba gear meant that large groups of people were able to take up diving as a sport. And for a variety of reasons, groups of sporting divers are more than willing to fill the gap left by the government. They are well organized; often seriously interested in maritime history; have access to materials, financial means, and free time; and they do not have to fulfil health and safety requirements, which have become extremely stringent for professional divers. Officially, sporting divers are allowed to dive above a wreck as long as they do not disturb anything or take anything with them. But in all honesty, if a diver who is seriously interested in maritime history is diving over a wreck and sees that some of the cargo and inventory is in good condition but exposed, what can we reasonably expect the diver to do, knowing that the next autumn storm will probably destroy these artefacts? Particularly because it is not likely that either the national government or the municipal government will make any efforts to preserve these items; and given the extent of the budget cuts over the past year, the chances of the water police catching the diver are as good as zero. And any sport diver who is seriously interested in history is also aware that archaeologists are prepared to make the best of the situation and work with divers in order to prevent even greater losses of artefacts. Two years ago, I was asked to contribute to a book about an eighteenth-century Frisian tjalk which had been carrying a cargo of bricks and other coarse ceramics when it suddenly sank near the mouth of the Hoorn harbour. During the introductory meeting for the authors, at which archaeological researchers were also present, one of the attendees placed several

beautiful artefacts recovered from this wrecked tjalk on the meeting table. To my astonishment, this attendee was not one of the archaeologists, but a sporting diver who was a member of the local divers' association. And really, can you blame him?

No systematic research programme

In my interviews, I explicitly asked whether there is a Dutch or international research programme for maritime archaeology in charge of directing research in the Netherlands. The answers I received were in the negative. If any maritime archaeological research even takes place as a result of the Malta Convention, it is always because a wreck or other materials happen to be found and because the municipality demands research in connection with the issuance of an integrated environmental permit or some other permit. Actually, a museologist would call this 'documentation' and not really 'research'. 'Documentation' means building up an accessible archive of finds which can later be interpreted and given a context by historians.

The Netherlands' largest complex of maritime archaeological finds is formed by the reclaimed polders of the IJsselmeer. This complex contains hundreds of wrecks, some of which still contain their inventory and some of which contain human remains, dating back to anywhere from the late Middle Ages to the 20th century. I am astonished that there is no research agenda for this clear, integrated collection of artefacts, and that the entire excavation staff has been eliminated as a result of budget cuts.

It seems to me that we don't know what a treasure we have. Over the past fifty years, the field of land archaeology has worked hard to produce good maps of what can be found where and what its archaeological value is. Apparently this has not yet been done in maritime archaeology. This means that there are no adequate maps showing archaeological objects on the ocean floor, lakebeds, or riverbeds; and of course, this makes it impossible to create policies or manage and maintain artefacts. If there's no adequate information, it's extremely hard to make good choices.

Education:

A fifth complaint was the fact that there is no integrated academic degree programme for maritime archaeology at any Dutch university. André van Holk is the only professor of maritime archaeology in the Netherlands. Thanks to the Province of Flevoland, he has a professorship at the University of Groningen, although he only has a fixed-term, part-time contract. In 2012, four Dutch universities and the Cultural Heritage Agency of the Netherlands offered students a Bachelor's-level course in maritime archaeology, in honour of the major International Symposium on Boat and Ship Archaeology in Amsterdam.

It would seem that a student wishing to become a professional maritime archaeologist needs to go abroad to obtain a degree. For instance, at the University of Southern Denmark, in Esbjerg, students can study under Professor Thijs Maarleveld.

Summary:

Experts are of the opinion that the way in which the Malta Covenant is implemented in the Netherlands threatens Dutch maritime heritage. Natural processes are also gradually destroying our heritage. What is more, there is no reliable national overview of potentially valuable archaeological locations in the Netherlands. Sporting divers have almost no restrictions and can freely take archaeological objects from dive sites. Regardless of the fact that they often do this out of a genuine interest in history, it is a strange state of affairs. There is no directed research programme, by either universities or the Cultural Heritage Agency, and research is limited to occasional excavation reports. And finally, there is no integrated academic degree programme for maritime archaeology in the Netherlands.

THE ROLE OF THE CULTURAL HERITAGE AGENCY OF THE NETHERLANDS

The Cultural Heritage Agency is part of the Dutch Ministry of Education, Culture and Science and came about as a result of various reorganizations and mergers. The Agency absorbed various departments which had fallen under the auspices of the former Ministry of Transport, Public Works and Water Management (within the former IJsselmeerpolders Development Authority) and the Underwater Archaeology department of the former Ministry of Welfare, Public Health and Culture (which later became the Ministry of Education, Culture and the Environment),

In 1995, Aad Nuis, at that time the Dutch state secretary of culture, art and media, instituted NISA, the Netherlands Institute for Ship and Underwater Archaeology. NISA started out in Ketelhaven but soon moved to Lelystad, which had the basins, equipment, and employees needed to preserve wood. NISA developed plans for the preservation of maritime archaeological sites but received insufficient funding for implementing those plans. In 1996 NISA set up its own diving team consisting of eight people, but it was dissolved in 2006 as a result of budget cuts and the implementation of the Malta Covenant. NISA's field team for land archaeology had been dissolved well before this because of budget cuts. After 2006, NISA itself was dissolved and absorbed into the National Service for Archaeological Heritage and later into the Cultural Heritage Agency.

The first sentence of the Cultural Heritage Agency's mission statement is, 'The Cultural Heritage Agency of the Netherlands helps other parties to get the best out of our heritage.' The Cultural Heritage Agency has a Maritime Archaeology department, and according to its website, it wishes to take an important role in shaping Dutch policy regarding the maritime archaeological heritage. One of this department's responsibilities is administering the National Depot for Ship Archaeology in Lelystad. It also has an exhibition about ship archaeology which is open to the public,

and it employs a few researchers.

The Maritime Archaeology department has a section on the Dutch-language website of the Cultural Heritage Agency. In the course of my research, I read these web pages thoroughly. The section of the website covering maritime archaeology begins with an introduction which, to put it bluntly, needs some editorial attention. Nor does it seem as if much thought was put into the texts on the other pages. Under the heading 'Research' one reads that the Agency is not a research institute, but it does participate in research because it wishes to be taken seriously as a conversational partner. The next pages contain a list of current research projects, a text about building model ships in order to facilitate research, information about educational programmes, information about their facilities for preserving ship wood and other objects, information about the depot of approximately 33,000 artefacts, and information about visiting the department.

The website places a great deal of focus on the 'Maritime Programme,' which formulates eight goals. In addition to its typographical errors and poor writing style, the text does not explain this programme particularly clearly. The choices are not clear and there is no statement of the problem. The international ambitions are not particularly clear, either, and I do wonder how realistic they are. It doesn't seem likely that countries like Sweden or Finland would be eager to have Dutch archaeologists come there in order to dive down to sunken fluyts. The Cultural Heritage Agency's Maritime Archaeology web pages do not give a clear picture of the role which the Agency, and thereby also the Minister of Education, Culture and Science, fulfils or wishes to fulfil for maritime archaeology in the Netherlands. Nor is it clear how the Agency wishes to address the issues that came up in my interviews with experts and my literature research, nor what concrete results the Agency wishes to achieve.

But the cooperation and support of the Government of the Netherlands, as represented by the Cultural Heritage Agency,

is essential if we are to develop a serious basic programme for locating, protecting, excavating, and conserving the Netherlands' maritime archaeological heritage. Such a programme is necessary in order to repair the systemic errors in the implementation of the Malta Covenant, save our threatened heritage, and enable inspiring scientific research.

CONCLUSION

On the basis of my research, it is clear that maritime archaeology in the Netherlands lacks management. There is no clear, commonly-supported goal of convincing society why a national programme for underwater archaeology can be valuable and inspiring. This goal is lacking among both the government and the experts in this field, who are connected with a variety of different organizations. Dutch maritime archaeology has no 'corporate story,' to use a marketing term. The Government of the Netherlands is certainly implicated in this situation. It has taken advantage of a divided and rather isolated sector by opportunistically implementing budget cuts as a reaction to the fact that the sector is incapable of clearly formulating why it has a right to exist. It is essential to make choices if you wish to excel and generate support. Maritime archaeologists could begin by formulating one or at most two knowledge domains which are so important for raising awareness of Dutch maritime history and archaeology that they should influence the choice of research topics.

Giving meaning within society to excavated sources requires careful scientific information, guided by a central question which society recognizes as an inspiring invitation to engage in discourse. Up to now, it seems that a great deal of research has focused on defining types of ships or has addressed some other technical, ship-related topic. That can be useful, and is sometimes necessary; however, Het Scheepvaartmuseum has clearly seen that the average Dutch person is not interested in technical surveys, but is primarily interested in appealing, recognizable stories about

people. It would be vastly easier to get politicians and policymakers to focus on maritime archaeology if archaeologists can succeed in presenting the issues in a way that inspires society.

Regardless of the Malta Convention, the commitment of the Dutch government is essential in order to establish and maintain a well-functioning maritime archaeology in the Netherlands. In this regard, there are three areas which the Dutch government must address and safeguard:

- Policy-making and enforcement.
- Detection, excavation, and documentation on the basis of a national programme.
- Scientific research.

It should be self-evident that the Cultural Heritage Agency of the Netherlands would have the main role in the first two areas, in close collaboration with a university with a fully-fledged programme of research and education in maritime archaeology in order to enable optimum interaction between the finding and documenting of sources and question-driven research.

In such a system, the Cultural Heritage Agency should not carry out independent scientific research. That would be much better done by a university, which has implemented the national and international guidelines and rules for scientific research. In this regard as well, the support of the Dutch government is essential, although it would still be appropriate to require that the parties involved take care of supplemental funding. The Cultural Heritage Agency should not have museum-style exhibitions. That function can be better fulfilled by museums.

In this discussion of maritime archaeology in the Netherlands, I have only given a rough sketch of the issues. This means that of necessity, certain nuances and influential figures have not been

addressed. In addition, because of time limitations, I have only outlined my recommendations for the future.

I would like to express my sincere thanks to those who were so willing to discuss these issues with me. As they have requested anonymity, I cannot thank them by name.

I have faith that maritime archaeology in the Netherlands will be given new energy, thereby continuing 'The Netherlands' Seaward Story'.

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