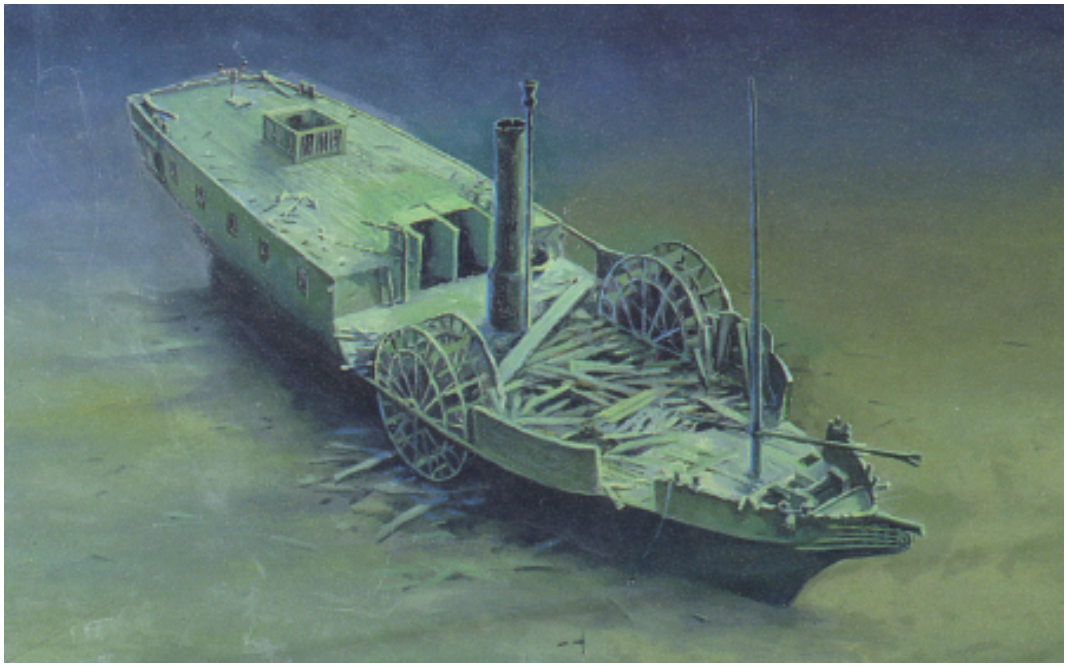
Management plan of shipwreck site Eric Nordevall



Södertörns högskola 2004

Education and Culture
Culture 2000

Index

0. Administrative details

0.1. Date

2004-04-16

0.2. Client

Does not apply here

0.3. Executed by (contractor)

Södertörns högskola (University college) in co-operation with Östergötland county administration and the MoSS Project

The plan is made by:
Carl Olof Cederlund, Fil. Dr., professor, Södertörns högskola

0.4. Approved authorities

Östergötland County Administration.

0.5. Central registration number

The Marine Archaeological Archives at the Swedish National Maritime Museum, number: 121:001.

0.6. Location research area

Vadstena municipality.
The ship since it foundered is positioned at 45 metres depth in open waters, 5 to 6 nautical miles out from the Nässja and Kampudden peninsula, west of the town of Vadstena, and about one nautical mile east of the island of Jungfrun in the same lake.

0.7. Coordinates

Ca 1 nautical mile east of the island of Jungfrun, Lake Vättern

0.8. Environmental context:

Coastal Geology

The site is at a depth of 45m on a flat bottom in open waters, 5 to 6 nautical miles out from the Nässja and Kampudden peninsula west of the town of Vadstena, and ca 1 nautical mile east of the island of Jungfrun in the same lake. This part of the lake has been denominated as the sediment area of Lake Vättern (Håkansson and Ahl 1976, p 12 f). The bottom is covered by sand, gravel and clay and is flat and even, with low sand banks with a diffuse horizontal configuration that has been sounded. The site is supposedly inside an area with postglacial to sub aquatic-slope deposits (sand to clay), as well as with silt sediments that have an organic content. For a description and discussion of the

character of the lake's bottom and the sedimentation process in Lake Vättern (see Norrman 1964, p 113 f and 195 f). For the recent sedimentary, deposits and sediment chemistry (see Håkansson and Ahl 1976). For a description of the topography and sediment distribution on the bottom (also see Norrman, J.O., and Königsson, L-K., 1972).

John, O. Norrman, 1964. Lake Vättern. Investigations on shore and bottom morphology. Medd. från Uppsala Universitets Geografiska Inst., Ser. A, Nr 194

John, O. Norrman, and Königsson, L-K. 1972. The sediment distribution in Lake Vättern and some analyses of cores from its southern basin. Publ. from the Dept of Quaternary Geology, Univ. of Uppsala No 66

Håkansson, L., & Ahl, T., 1976. Vättern – recenta sediment och sedimentkemi. Lake Vättern – Recent Sedimentary Deposits and Sediment Chemistry. Statens Naturvårdsverk 1976. SNV PM 740 NLU Rapport 88

Climate

Cold temperate climate on the border to warm temperate climate (acc. to the Köppel standards). Relatively little rain (less than 500 mm a year / arithmetic median value). Relatively mild autumns and winters and late springs – due to the influence of the temperature of the Vättern lake water.

Source: Meteorologist Hans Alexandersson, the Swedish State Institute of Meteorology and Hydrology (SMHI).

Flora and Fauna

Does not apply here as the site is in an open water area.

Human impact

The site seems acc. to the damage on the ship to have been subject to disturbance due to trawler fishing and skin diving.

During the latter part of the 1990s an extensive amount of diving by scuba divers took place on the site of the E. Nordevall. Diving tours were arranged to the site by commercial diving companies and others, and marketed in diving journals and on the web.

One can record that this diving has caused disturbance and damage to the hull and its fittings. The number of disturbances seems to have diminished, although possibly not ended completely, since a diving ban was established on the site in 1999. There is nevertheless still a risk that such damage might occur due to the fact that the site is far out in Lake Vättern and therefore difficult to supervise. (See 2.4 Risk assessment below)

0.9. Size of research area

The research area can be defined as the area covered by the anchoring and diving prohibition (see section 4.2.1.1).

0.10. Depth

Ca 45 metres

0.11. Owner of the terrain

The water area is owned by the Swedish state.

0.12. Reported by

Located 1980-09-27 and reported by Olaf and Åke Svensson, Motala (see The Marine Archaeological Archives at the Swedish National Maritime Museum)

0.13. Periods of research

1980-2001: See Attachment 1

0.14. Description of Research area

See also above under 0.6 to 0.9.

The ship is standing on its keel in the bottom layer of sediment with its funnel and mast standing. A large number of loose parts from the wheelhouses and the rigging and other parts of the hull are lying on the main and cabin decks. The inside of the ship is in principle intact, with a certain amount of damage due to skin diving in more recent times. Most of the cabins and saloons, bulwarks, interior decoration and fittings are still intact. The original paint is also still there. Further, most of the glass panes in the cabins are still intact. Parts of the ship, esp. of the wheelhouses, which have fallen down to the bottom are located around the hull.

(See also Attachment 1)

0.15. Deposition of archives

- Archives of the Department for the Care of Ancient Monuments of the administrative board of Östergötland County, Linköping
- Archives of the Central Office of National Antiquities, Stockholm
- The Marine Archaeological Archives of the Swedish National Maritime Museum, Stockholm

Historical information concerning the ship, its period of use and foundering may be found in central, regional and local archives in Sweden.

0.16. Legal status

Protected by the Swedish Ancient Monuments Act, and the Diving prohibition on the site enacted by Östergötland County Administration in 1999-08-17.

0.17. Recognised threats

The ship is subject to a certain degree of natural deterioration, but the extent of this has not been studied in the MoSS project, in contrast to those wrecks in Finland, Germany and Holland, which were chosen as test cases to examine

deterioration processes. It nevertheless remains very important to gain more insight into these processes and a better understanding of the natural factors working on the E. Nordevall. This is important esp. as this is a fresh water site, which is supposed to be the least destructive environment for marine archaeological remains.
It has been possible to record a considerable deterioration of the ship since it was first located due to the damage inflicted by skin diving on the site and possibly also by trawler fishing (See Attachment 2).

0.18. Date of re-assessment/re-evaluation

The site has intermittently undergone documentation since 1980 (See Attachment 1).

1. Introduction

1.1. Previous studies

(See Attachment 3)

1.2. Historical context

(See Attachment 4)

2. Assessment of the site

2.1. Description of research assignment

2.1.1. Reference to working standards

The investigations have been performed according to and following the stipulations of the Swedish Ancient Monuments Act.

2.1.2. Research objectives

The E. Nordevall shipwreck has been recorded and investigated for more than 20 years in order to safeguard the site, to salvage artefacts from it for preventive reasons, and to prepare the vessel for a possible future salvaging. Recording has also been undertaken on the hull and its fittings in order to collect data for the building of a full-scale replica of the E. Nordevall.
(See attachment 1)

2.1.3. Expected results

The investigation results have differed over the span of time and have been successively reported to the authorities (See above under 2.1.2 and Attachment 1 and 3)

2.1.4. Aims / wishes of the purchaser

Does not apply here.

2.1.5. Imposed research conditions

Stipulations given in connection with the permissions given by the authorities for the different research investigations. The conditions are based on the Swedish Ancient Monuments Act and apply to all similar events.

2.1.6. Evaluations in between

Several reports have been produced on the different investigations performed and their results since 1980. The reports have been delivered to the authorities (See Attachment 1)

2.2. Working procedure

2.2.1. Research methods

Recording with a still camera, video, filming and side-scan-sonar have all been used for the production of overall views of the site and photo mosaics and plans of the wreck. The hull, its fittings and its interior have been measured for the production of plans and for the collecting of data which will allow the building of a full-scale replica. The selective salvaging of artefacts for preventive reasons has also been undertaken.
(See also Attachment 1)

2.2.2. Imposed work conditions

None

2.2.3. Modus operandi

(See Attachment 1)

2.2.4. Natural sciences, applied sciences and other research

Sampling has occurred on the wood in the hull to investigate the wood species and if the wood in the hull is strong enough to endure the strains of a salvage operation.

2.3. Research results

2.3.1. Environmental research

None

2.3.2. Physical condition

2.3.2.1. Finds visible on surface

Many loose pieces from the ship's upper structure and of its fittings are lying on the decks. There are also a large number of these in the different parts of the ship's interior. Finds of the ship's and the crew's equipment have also been made on the decks and in the interior. These artefacts have been recorded by camera, video and filming and some of them along with the nameplate of the ship have been salvaged for preventive reasons. A few objects have also been cut loose from the ship to be salvaged such as the ship's bell and its steam whistle.

2.3.2.2. Completeness (how much does it resemble the original state, quantity)

2.3.2.2.1. Completeness of wreck parts

The hull which is standing on the bottom is in principle intact. The mast and the funnel are also still standing. Parts of the superstructure have been torn down and some elements of it are lying on the decks and on the bottom beside the hull. The interior of the ship with its compartments as well as the two side lever engines are more or less intact. Artefacts from the ship's and the crew's equipment can also be found here.

2.3.2.2.2. Stratigraphy intact

No proper excavation of the decks of the ship has been performed, and today it is not possible to state the stratigraphical situation of the many loose parts of the hull structure lying there.
The interior of the ship has remained more or less intact since it foundered apart from some disturbance caused by skin divers. Only a little silt covers the fittings of the interior.

The stratigraphy of the artefacts on the bottom around the ship has not been investigated and cannot be stated today.
The cargo hold under the cabins has not been seen or recorded at all so far.

2.3.2.2.3. Mobilia in situ

Pieces of the ship's and the crew's equipment have been located both on the decks and in the hull. Most of these seem to have been located in the places where they were left at the time of the sinking. Some objects seem to have been displaced by skin divers, and others, which were recorded by still camera and video, have been removed from the site, possibly by visiting skin divers. A few objects have been salvaged in connection with the various investigations for preventive reasons.

2.3.2.2.4. Relation between mobilia and wreck parts

See above 2.3.2.2.3 Mobilia in situ

2.3.2.2.5. Relations between mobilia

See above 2.3.2.2.3 Mobilia in situ

2.3.2.2.6. Stability of natural environment

The natural environment of the site is stable due to its depth and the lack of strong currents there.

2.3.3. State of preservation

2.3.3.1. Organic wreck parts

The wooden parts of the hull have been mainly preserved. The strength and quality of the wood has been investigated and the findings concerning this published (see Egeland & Thulin 1989). Some of the wooden parts of the hull as well as those in the interior, which have been painted, still carry the paint or its remnants.

2.3.3.2. Metal wreck parts

The iron and metal in the hull and in the engines (cast and wrought iron, copper and brass) has kept its shape and has very little concretion, while the brass has none at all. The strength and quality of the different kinds of metal have not been investigated.

2.3.3.3. Organic mobilia

Few mobilia of organic material have been observed or located. The majority of the organic objects have belonged to the hull structure or the rigging.

2.3.3.4. Metal mobilia

Several pieces of metal mobilia have been located, recorded and in a few cases

also salvaged. These have included anchors lying on deck, ceramic bowls and pieces of china as well as glass bottles. Most of these objects seem to be well preserved. Some have evidently been removed from the ship by skin divers and are not visible on the site anymore.

2.3.4. Cultural-historic and archaeological data

2.3.4.1. Identification

The ship is identified as the E. Nordevall sunk in June 1856 near the island of Jungfrun, Lake Vättern, outside the town of Vadstena. One of the nameplates of the vessel has also been found and salvaged.

2.3.4.1.1. Cultural context

2.3.4.1.2. Century

2.3.4.1.3. Exact dating

2.3.4.1.4. Function

2.3.4.1.5. Type

2.3.4.1.6. Operating area

2.3.4.1.7. Propulsion

2.3.4.1.8. Size

2.3.4.1.9. Material

2.3.4.1.10. Building tradition

2.3.4.1.11. Inventory

2.3.4.1.12. Cargo

2.3.4.1.13. Personal belongings

2.3.4.2. Constructional features

For 2.3.4.1.1 – 2.3.4.2 see:

Cederlund, C.O. 1987, The Eric Nordewall - an early Swedish paddle steamer. Theoretical Approaches to Artefacts, Settlement and Society. Studies in honour of Mats P Malmer. B.A.R. International Series 366, 1987, p 515-539.

Also in International Journal of Nautical Archaeology and Underwater Exploration (1987) 16.2, p 109-134.

Cederlund, C.O. (ed.) 1989, Rapport över den marinarkeologiska undersökningen av hjulångfartyget E. Nordevall 1985 - 1988. Statens sjöhistoriska museum, 1989 (Dupl.)

Cederlund, C.O. 1997, "E. Nordevall". Om en "marinarkeologisk" hjulångare. FORSVIKS INDUSTRIMINNEN. Skriftserie om Forsvik 2. Mariestad.

Cederlund, C.O. (ed.) 2002, Hjulångfartyget Eric Nordevall II under byggnad och under ånga. Nossebro.

Cederlund, C.O., (ed.) 2003. MoSS Newsletter. A shipwreck research project funded by the European Union.

Culture 2000 Programme. The Eric Nordevall. 3/2003.
Cederlund, C.O., (ed.) 2004. MoSS Newsletter. A shipwreck research project funded by the European Union Culture 2000 Programme. Visualisation. 1/2004.

2.4. Risk assessment

2.4.1. Natural impact

2.4.2. Human impact

(See Attachment 2)

3. Cultural valuation of the paddle steamer E. Nordevall

3.1. Experience aspects (quality)

3.1.1. Aesthetic values

3.1.1.1. Visible

3.1.1.1.1. Visible as landscape element

The ship is situated at a depth of 45m in Lake Vättern and is not visible in the landscape above the water. One important question within the visualisation theme of the MoSS project has been to discuss what are the possibilities to visualise the ship in an underwater landscape both for the divers going down to it and for the general public ashore?

3.1.1.1.2. Visible as exposition element

There has been an extensive amount of planning and preparation undertaken for the salvaging of the E. Nordevall since it was located, a development which is still ongoing. The aim is to excavate, restore, preserve and exhibit the ship in a museum in the town of Motala on the Eastern side of Lake Vättern. See also:
Cederlund, C.O. 1997, "E. Nordevall". Om en "marinarkeologisk" hjulångare. FORSVIKS INDUSTRIMINNEN. Skriftserie om Forsvik 2. Mariestad;
Cederlund, C.O. (ed.) 2003, The Eric Nordevall. MoSS Newsletter 3/2003 October 2003. Jönköping.
2003. Bärgning av en världsunik hjulångare Eric Nordevall. Föreningen Hjulångaren Nordevalls Bärgning.

3.1.2. Memory value

3.1.2.1. Historic value

See:
Cederlund, C.O. 1987, The Eric Nordewall - an early Swedish paddle steamer. Theoretical Approaches to Artefacts, Settlement and Society. Studies in honour of Mats P Malmer. B.A.R. International Series 366, 1987, p 515-539.
Also in the International Journal of Nautical Archaeology and Underwater Exploration (1987) 16.2, p 109-134.
Cederlund, C.O. (ed.) 1989, Rapport över den marinarkeologiska undersökningen av hjulångfartyget E. Nordevall 1985 - 1988. Statens sjöhistoriska museum, 1989 (Dupl.)
Cederlund, C.O. 1997, "E. Nordevall". Om en "marinarkeologisk" hjulångare. FORSVIKS INDUSTRIMINNEN. Skriftserie om Forsvik 2. Mariestad.
Cederlund, C.O. (ed.) 2002, Hjulångfartyget Eric Nordevall II under byggnad och under ånga. Nossebro.
Cederlund, C.O. (ed.) 2003, The Eric Nordevall. MoSS Newsletter 3/2003 October 2003. Jönköping.

1988, Hjulångaren "E. Nordevall". Väl bevarad, värd att bärgas. Kristianstad.
Muncktell. I.M., 1991, Hjulångfartyget E. Nordevall. Bärgning och Bevaring. Beskrivning och kostnadsuppskattning. Uppsala (Dupl.).
2003. Bärgning av en världsunik hjulångare Eric Nordevall. Föreningen Hjulångaren Nordevalls Bärgning.
Cederlund, C.O., (ed.) 2003. MoSS Newsletter. A shipwreck research project funded by the European Union Culture 2000 Programme. The Eric Nordevall. 3/2003.
Cederlund, C.O., (ed.) 2004. MoSS Newsletter. A shipwreck research project funded by the European Union Culture 2000 Programme. Visualisation. 1/2004.

3.2. Physical quality

3.2.1. Structural integrity

3.2.1.1. Presence of ship construction

For the sections Completeness of the wreck parts 3.2.1.2 to 3.2.2.2.3 Composite See above under section Research Results 2.3.

3.2.1.2. Completeness of the wreck parts

3.2.1.3. Stratigraphical conditions

3.2.1.4. Mobilia (portable antiquities) in situ

3.2.1.4.1. Relation between mobilia and ship parts

3.2.1.4.2. Relation between mobilia

3.2.1.5. Stability of the natural environment

3.2.2. State of preservation

3.2.2.1. Wreck parts

3.2.2.1.1. Organic material

3.2.2.1.2. Metal

3.2.2.1.3. Composite

3.2.2.2. Artefacts

3.2.2.2.1. Organic material

3.2.2.2.2. An-organic

3.2.2.2.3. Composite

3.3. Quality of archaeological information

3.3.1. Representative value

The E. Nordevall is the only ship in the world of the type it represents – the first generation of steam ships in Europe in the 1820s and 1830s - which is preserved in a more or less intact state, which also has the two side lever engines intact in the engine room. These are the only preserved examples of this first European marine steam engine from this period. This makes the vessel unique as a representative of its ship type.

Due to its use and the motives behind its building and use it can be thought of as a representative of the early mechanical industry in Sweden as well as being a part of the establishment of modern communication systems in the 19th century.

3.3.1.1. Chronological

See 3.3.1.

3.3.1.2. Regional

The E. Nordevall was built for use on the Göta Canal going from Stockholm to Gothenburg across Sweden, which was perhaps the biggest building project in Sweden ever. The hull was built in the town of Norrköping and the engines, paddle wheels etc at Motala Verkstad in the town of Motala, i.e. both towns were in the county of Östergötland. As the ship undertook regular trade with both passengers and cargo along the Göta Canal, which included passing the aforementioned towns and Lake Vättern, its history is closely linked to these same stretches and regions in Sweden.

3.3.2. Significance of information

3.3.2.1. Geographical significance

See above under 3.3.1.2.

3.3.2.2. Historical or archaeological significance

See above under 3.3.1 Representative value to 3.3.2.1 Geographical significance.

3.3. Conclusion

The E. Nordevall has been designated as a unique representative of its type and time. Representatives from international and Swedish bodies of expertise and the Swedish state and other organisations and societies have thereby defined it as being a very important piece of evidence of early 19th century seafaring both in international, national and regional terms.
(See Attachment 1: The transmission in 1991 of the results of the invetigation of a possible salvaging of the paddle steamer E. Nordevall to authorities, institutions and companies)

4. Site management

4.1. Cost-benefit analysis and general conclusion

4.2. Site management agenda

4.2.1. Safeguarding

The main aim of the following text is to discuss how one may act to preserve the E. Nordevall under the different conditions appearing within different alternatives, and on the basis of this analysis to make a proposal for a future program for its safeguarding. There exist, broadly speaking, three possible alternatives for the future preservation of the E. Nordevall:

1. To maintain the protection of the ship at its site by the continued enforcement of the Ancient Monument Act and the diving and anchoring prohibition.
2. To salvage, conserve and make it a part of a museum exhibit on land.
3. To preserve it on its site at the bottom of Lake Vättern by the active safeguarding and monitoring of it there, and to visualize the vessel in this position in different ways for divers and for those also interested who are above water (see for the latter section 4.2.3).

These three alternatives all give birth to possible strategies that can be applied. However, a number of so far unanswered questions arise when one starts to negotiate the potential uncertainties connected to the different alternatives.

4.2.1.1. Legal

The wreck of the E. Nordevall, which foundered in 1856, is protected by the Heritage Conservation Act (1988:950): Chapter 2. 8. Shipwrecks, where at least one hundred years have presumably elapsed since the ship was wrecked.

In a resolution passed by the Östergötland County Administration of 1999-08-17 an anchoring and diving prohibition was established on the site, on the basis of the 2nd chapter, 2nd paragraph of the Swedish Code of Regulations of Traffic on Water. According to this, it was decided that a prohibition against anchoring would be established at the wreck of the E. Nordevall which is situated at the island of Jungfrun in the Vadstena municipality. The prohibition is valid in an area contained within a circle which has a radius of half a nautical mile with its centre being at the wreck site. The Östergötland County Administration in the same resolution also decided, on the basis of the 2nd chapter, 9th paragraph of the Heritage Conservation Act, that a prohibition against diving would be established in the same area as the anchoring prohibition (Östergötland County Administration, Law Dept. Dnr 559/99-412)

4.2.1.2. Previous measures for the safeguarding of the site

(See Attachment 1)

4.2.1.3. Physical

The hull of the E. Nordevall is still more or less intact. Some parts of the superstructure have been broken down since its localization and the interior

has also been subject to partial demolition.
Several artefacts from the ship's equipment have also vanished from the site in the period since it was located. Fishing vessels such as trawlers could be responsible for some of this damage, but in some cases the destruction is of such a character that divers visiting the site evidently must have done it. Such damage as has occurred to the interior of the ship could not have been caused in any other way. This ongoing deterioration is a worrying fact when seen from the perspective of the historical value this vessel has been accorded and was the reason for the anchoring and diving prohibition.
Several parts of the vessel such as for example, the gaff, were illegally removed from the ship in the late 1990s. These pieces of the ship's structure have been retrieved from the salvagers and will be re-deposited at the protected site in Lake Vättern.
The ship has been extensively documented on its site since it was located, which is one important way to preserve information about its structure, equipment etc, for the future. The information about the missing parts of the structure etc presented above is given on the basis of this documentation. The same documentation is also important for the visualization of the ship to the general public.

1. To maintain the protection created by the Ancient Monument Act and the diving and anchoring prohibition.

If the ship is left to rest on its site without active protection or safeguarding, or salvage, it will steadily deteriorate. This means that the superstructure, the wheels and parts of the interior, such as the engines, will continuously disintegrate. The hull itself will on the other hand, remain more or less in a preserved condition for a long period of time, if nothing drastic happens to it. With this alternative, in the foreseeable future, the ship as an ancient monument would loose the unique, cultural value it has today as an intact steam vessel from the first generation of these vessels in Sweden. By using the observations concerning the rate of deterioration that has occurred since it was located in 1980, it can be estimated that another twenty years without active safeguarding will bring the E. Nordevall into such a state.
It is evident that strong reasons therefore exist for undertaking an active program of safeguarding of the E. Nordevall that will hinder such a destructive development. This can be done in different ways, as will be discussed in the following sections.

2. To salvage, conserve and make the vessel part of a museum exhibition on land.

The possibility of salvaging the E. Nordevall in order to conserve, preserve and exhibit it on land has been discussed and planned at great length since the ship was located in 1980. For example, the first diving operations which took place at the site in the early 1980s, included personnel from a salvaging company who participated in order to investigate the technical conditions for this possibility. A great interest has also been shown in the possibility of salvaging

the wreck by central Swedish institutions and regional ones such as those in the county of Östergötland and also those in other areas along Lake Vättern. The foundation for the restoration of the iron steam vessel, The Great Britain, Bristol, England, has expressed strong views to the same end. The establishment of a museum for the E. Nordevall and its potential to generate tourism in the area has been underlined by the various parties referred to.

The salvaging of the complete ship

The complete salvaging and excavation of the vessel demands extensive financial resources, and these will have to be even greater for the conservation of the ship and the creation of a museum for it, which is a long-term project. One of the conditions put on a salvaging operation by the Östergötland County Administration and the Swedish National Maritime Museum is that all the necessary funding for a salvage operation, for the excavation and the conservation of the ship and for the creation of museum facilities for the ship, must be in place before the project is started. In this context, it is worth noting that the financial requirements for some of the phases in such a project, as for example with the conservation, are difficult to calculate beforehand.

The raising of the complete ship and its loose components, as well as the excavation of the ship should not present great problems either technically or archaeologically. According to planning that has been performed for this, it would be possible to execute this in a relatively short period of time. However, these steps are only the smaller, and less complicated, initial parts of a salvage project.

The establishing of a museum setting for the ship

The establishment of a museum devoted to the E. Nordevall has also been planned, and is regarded as being a viable option provided that it satisfies the condition of having sufficient resources to cover its costs.

Conservation

As with all waterlogged organic material, the wood in the E. Nordevall needs a conservation treatment in order to be safe in air. If this does not happen, then the cell structure in the wood and other materials will collapse and the objects will deteriorate. Therefore, the question concerning the conservation of the E. Nordevall after a salvage operation is of particular importance. Thanks to the work that has been undertaken on the Swedish warship Vasa from 1628 over a period of more than 40 years, Sweden has collected considerable experience on this subject. The Vasa as well as the remains of many other ships in the world today have been preserved with the polyethylene glycol method. This would therefore seem to be the natural choice for any other big, waterlogged object, as no other method has been developed and tested yet. Is it then appropriate to conclude that it would be advisable to conserve the E. Nordevall with the poly glycol method?

This question should be seen in the light of recent experiences concerning the effects of sulphur in waterlogged wood and the transformation of the sulphur into sulphur acid, when conserved with poly glycol. In this process, among other things, both the poly glycol and iron parts in the hull seem to play an active role as chemical agents in a degradation process afflicting the wood (Fors 2002; Sandström 2003).

Is it then advisable to conserve the E. Nordevall with this method? One may again refer to the case of the Vasa, the hull of which is damaged because a large amount of sulphur in the wood is now turning into sulphur acid on its surface. This is now being investigated in a recently started research project at the Vasa Museum.

One important task when preparing for the salvaging and conservation of the E. Nordevall will be to sample the wood and investigate the amount of sulphur in it. It might be the case, that this wood, being situated in a fresh water environment, contains less sulphur than is found in the wood of wrecks in more polluted environments, as in the case of the Vasa. Alternatively, the E. Nordevall may be more vulnerable to damage created by sulphur in the case of poly glycol conservation as it is built with and contains many more iron parts than the Vasa. Therefore, if one plans to conserve the hull of the ship with poly glycol, one may need to take out the metal in it, the bigger and smaller parts as well as all the bolts and nails. This on the other hand, is a very complicated and expensive task to prepare for a conservation procedure.

It is also important to put the question, if it really is worth salvaging and conserving the E. Nordevall, considering the fact that Sweden would then have two old ships of high cultural value to preserve and exhibit, the Vasa and the E. Nordevall, with only one uncertain conservation technique available. Is it realistic to do this, while the first salvaged ship is under investigation as a result of extensive conservation problems, which have to be solved if it is to be preserved in the future? At present a final solution about how to protect the Vasa from the sulphur acid processes occurring in the wood is not readily apparent. Might we even – due to the problems with the poly glycol preservation of the Vasa - see the end of the use of this method for old, waterlogged ship structures, which have sulphur immersed in the wood and with iron fastenings in the hull? The poly glycol method is thus far the only one used on a large scale in the world today. Seen from the perspective of what has happened with the Vasa however, it would seem advisable that we should preferably introduce a properly tested alternative to the poly glycol method for the conservation of the E. Nordevall before it is salvaged.

The Swedish National Maritime Museums have in January 2004 in answer to a request from the Föreningen Hjulångaren Eric Nordevalls Bärgning (Engl. The Society for the Salvage of the Paddle steamer Eric Nordevall) made the evaluation that the methodology for the conservation of composite objects such as the E. Nordevall is very complex. It is thus, at this present moment, very difficult to foresee or make any statement about a reliable final result of a conservation process which aims to preserve the E. Nordevall for a longer time period.

Referring to this current state of affairs the maritime museums hesitate to say that a salvage operation is the optimal solution at the present time for the preservation of the E. Nordevall. The preservation in situ of the vessel is on the other hand, completely in line with the recommendations put forward by UNESCO in the convention for submerged cultural recourses, "Protection of the Underwater Cultural Heritage".

The museums therefore recommend that the E. Nordevall is preserved in situ, and that a continued prohibition against anchoring, diving and fishing within a radius of 0.5 nautical miles from the centre of the site is kept (Letter to Föreningen Hjulångaren Eric Nordevalls Bärgning 2004-01-22 (SMM Dnr 1643/03-51).

The conclusion is that if a salvage operation is to be performed on the E. Nordevall, it has to be undertaken in the future when the possibility will exist to conserve it. This in turn makes it necessary to preserve the ship on its site until that time or over a longer time perspective. This has to be done in such a way that its unique qualities as a cultural and historical object are preserved and maintained.

At the same time it has to be underlined that there are also alternative action programs to consider before one leaves the question of the salvaging and conservation of the E. Nordevall:

Controlled drying as a conservation process

One alternative to conservation would be to salvage the E. Nordevall and let it – instead of being conserved - be subject to a controlled drying out process, as for example is the case with the 17th century pinass in the Ketelhaven museum in Holland (Cederlund 1983, p 114). This would mean that one does not perform a proper conservation treatment, which in its turn would make the process less costly than were it to happen. One does then not need to impregnate the wood with poly glycol or any other preserving agent. Such a drying process could occur while the ship is being exhibited on museum premises, which means that it would be available for the public more or less directly after it has been excavated.

In order to perform such a controlled drying process one needs to know what the state of the wood in the hull is, in order to calculate for example, the amount of shrinkage that will take place. One might assume that such a treatment would be easier to perform on the wood in the relatively more recent hull of the E. Nordevall, than in older ships in which the wood might have degraded more. The freshwater, relatively calm environment at the bottom of Lake Vättern might mean that the wood in the hull has deteriorated less than wood in other areas, such as in the Baltic or in salt water environments. A controlled drying out process also requires less after-treatment when compared to conservation with poly glycol or any other agent, something that also lowers the cost of the preservation of the ship. If such an alternative is considered, on the other hand one must still dismount the bigger iron and metal parts in the hull to conserve them separately with the methods that are used to do this.

It should therefore be stated that as of today, questions in connection with the preservation of bigger, composite finds such as the E. Nordevall, which have

many different types of material in their construction have yet to be solved. The conservation of the bigger, composite iron and metal objects such as the engines and their many different parts has also to be considered carefully (see McCarthy 2000).

Partial salvage

One may also discuss if it is appropriate under certain circumstances to salvage certain parts of the vessel, for example, the engines? Such partial salvage operations have been performed on other sites as for example, on the wreck of the British paddle steamer, Xantho, on the west coast of Australia in 1983-1984 (McCarthy 2000). The gun turret and the engine of the American iron clad ship The Monitor were also recently salvaged. The aim of such partial salvage operations is to conserve and exhibit the parts salvaged while the rest of the vessel remains on its site.

One case, in which the partial salvage of the E. Nordevall could be argued for, is if the ship deteriorated to such a degree that it lost its value as an intact ship. The aim of a partial salvage would then be to save and preserve those parts which may be seen as being especially valuable for historical reasons – as for example, are the two unique side-lever engines. These are today the only examples existing in the world of the first generation of marine steam engines in Europe.

Such an alternative form of action as a partial salvage would be relevant first, when the ongoing deterioration of the vessel had continued to a level at which it had lost its unique state of intactness, and when the culturally and historically valuable parts of the structure are threatened with destruction and cannot be safeguarded and preserved in situ.

It seems noteworthy that the organizations responsible for the care and conservation of waterlogged under water finds, in connection with the discussion of the future of the E. Nordevall, are prepared to consider such alternative ways of acting as the self drying of a salvaged hull and the possibilities of a partial salvage.3. To preserve the E. Nordevall on its site at the bottom of Lake Vättern by the active safeguarding and monitoring of it there.

Initially in a discussion about the preservation of the E. Nordevall at its site one has to decide in what state of preservation the E. Nordevall should be kept if it is preserved there. The planning of its preservation should then follow the decisions taken on this issue. In relation to this, three different stages of preservation can be preliminarily defined:

1. In the same state of preservation as it is at present, or when the definition is made.
2. In the present state of preservation but with the openings in the hull closed to protect the interior, and with the delicate, external parts of the structure dismounted and stored in a safe place at the site, for example, in a stable wooden box.
3. In a restored state, meaning that one plans successively to restore the ship on its site to its original form by putting back the many loose parts lying on or

beside the ship today. This alternative would then also imply the strengthening and protection of delicate structures such as the wheels and the funnel with the use of technical supports.
A scenario depicting the state of preservation of the paddle steamer E. Nordevall in 10, 50, 100 or 150 years time, if no active safeguarding is performed can also be created to show the effects of the deterioration processes at the ship's site under water.
One may also set up aims with regard to which level of preservation can be achieved provided certain safeguarding measures are taken.
If the ship is to be preserved on its site under water, the central questions concern if it is possible technically and financially to:
- Monitor and safeguard it there
- Restore it under water
- Visualize it for divers and also for a general audience on land and about how this can be done.
One may undertake an investigation of the different possibilities and of the technical and other implications of monitoring and safeguarding the E. Nordevall under water, for example through the use of:
- Continuous or intermittent camera or digitally performed surveillance at the bottom
- Continuous radar surveillance on the surface
- The closing of the openings in the hull to hinder the destruction by diving of the very delicate structures and conditions inside, for example, the engines
- The removal of the loose parts of the hull and its fittings to store them in a safe way, for example, in a closed, heavily built box on the bottom near the hull
- By the protection of the iron and metal in the ship with the application of anodes on for example, the engines and the wheels.
One important condition for the preservation of the ship is that it remains an intact hull, which also has parts of its superstructure, the funnel and the mast still standing. This makes it impossible to cover the ship in order to preserve it as is done on wrecks, which have been partially broken down and are more or less embedded in sediment on the bottom (see for example Manders 2004). It is important therefore to also investigate and develop techniques for the preservation of such intact shipwrecks like the E. Nordevall. This type of wreck is not unusual in the Baltic Sea area.

4.2.2. Monitoring

[actions planned]

Monitoring the ship on its site

No monitoring procedure has been planned or performed on the Nordevall site through the MoSS project (Cederlund (ed.) 2004).
One must, to create a basis for the development of a safeguarding program for the site, investigate how strong the forces of deterioration are on the site of the E. Nordevall in terms of a time perspective. This applies both to the conditions

in the natural environment which create such deterioration, and also to the ones caused by human interference. The former would mean that one introduced continuous or intermittent sampling and data logging at the site and on the ship, taking in data on the environment there, as well as on the condition of the ship. The latter would mean that one should through regular monitoring, follow-up and investigate if damage is still being caused by fishing, anchoring or diving at the site.

The monitoring of environmental factors should include the use of observation and sampling techniques and analyses of the state of the wood in different parts of the hull as well as of the iron and metals in the hull, in order that the potential inherent in these materials for the preservation of the ship at the site can be understood. In this context it is important to investigate for example, both the condition of the cell structure in these materials and their strength. One also has to record and analyse the status of different parts of the hull, which are of special importance, such as the joints. The same applies with regard to the delicate parts of the structure such as the paddle wheels, the engines, the windlass and the funnel. These investigations should be undertaken at regular time intervals. If there is any indication that any of these parts are being weakened by environmental conditions or due to external influence, then one should consider how they can be stabilized, or whether they should be salvaged for preservation above water.

These monitoring measures are necessary when a ship is going to be preserved on its site, in order to know how best to preserve the material on the bottom for the future. They are also important for understanding how to preserve the wood and for understanding how to conserve and preserve iron and metal on land and in air, if the E. Nordevall or parts of it are salvaged. It will also be important to develop a plan concerning which artefacts or parts of the ship it may be necessary to salvage and preserve on land, if such objects are seen to deteriorate on the site.

Finally, it is important to monitor the site thoroughly to be certain that illicit anchoring and diving are not taking place there. This may be done with special monitoring systems established at the site under water, or through radar, which can follow and record boats stopping or anchoring at the site.

4.2.3. Visualising

[actions planned]

The question of the visualising of the E. Nordevall may be divided into different alternatives depending on whether it is salvaged or not. If it is salvaged then there will be a visualization situation similar to that which occurs for shipwrecks taken care of above water, in museum settings etc. This alternative will not be discussed in this document. If the ship is preserved on its site at the bottom, one has an entirely different situation in which the ship has to be visualized at a depth of 45m in Lake Vättern. This gives us the opportunity to develop new strategies relating to the issue of wreck visualization.

The information we have about this early paddle steamer today is mainly based on the under water recording, which has been performed on it at its 45 metres depth, with a still camera and video equipment. On the basis of this and measurements of the hull, in the 1980s photo mosaics were made of it as well as two horizontal projection plans and one side view of the ship in its current state of preservation (see Attachments 1 and 2).

The replica E. Nordevall II: A full-scale replica – the Eric Nordevall II – is at present under construction at the Forsvik Shipyard Assoc. It will be launched in a few years and be used to carry passenger traffic along the routes on which the original ship was used on the Göta Canal and Lake Vättern. The replica of the paddle steamer is being built on the basis of the documentation that has been performed and contemporary information about the ship and the class of ship to which it belonged. It's being done in a way, which makes the replica as true to the original ship as possible. Two side-lever engines built using the original plans of the old paddle steamer's engines will drive the replica. The replica will make it possible for those who are interested today or in the future, to experience the environment and what life was like onboard one of the first passenger steamers in Sweden.

Visualization for divers at the site: The site of the E. Nordevall was a very popular wreck diving site until the diving prohibition was established there in 1999. It is of course, from a general perspective important that interested skin divers are able to experience and study an old ship standing on the bottom that is as well preserved as the E. Nordevall. However, in this case it proved to be impossible to maintain this possibility as the diving was leading to the destruction of the vessel. It is thus important for both the protection of the ship and its site that this prohibition is upheld in the future, especially when seen in terms of the destruction which occurred at the site before the protection was introduced in 1999.

One important issue in this context concerns the question of the granting by the authorities of special permission to dive at the site. The County Administration has given certain groups of divers special permission to visit the site under the condition that the divers in question make recordings at the site and deliver the documentation to them. It seems very reasonable to permit special diving expeditions to the site, if they result in good documentation and information being produced about the conditions at the site. The best option would be if such diving arrangements could be monitored by the County Administration or County Museum. One or more marine archaeologists, who followed the divers, and if possible, also dived with them, could do this. Such arrangements should be organized so that the monitoring archaeologists could also introduce the divers to the history of the ship, its place in the development of Swedish shipbuilding etc through for example, lectures, videos or written materials.

For its visualization, organized and monitored diving trips could be arranged to the site. These could in turn be coordinated with courses in wreck management which also included examinations in the same subject. Such monitored diving at the site should be done with one or more professional marine archaeologists

acting as diving guides.

The establishment of marine archaeological wreck parks: In many places in the world special parks have been created at wreck sites under water for visitors. One rather near example is the park that has been established at the wreck of the Swedish ship-of-the-line Kronprins Gustaf Adolf, sunk outside Helsinki in the war between Sweden and Russia in 1788-1790 (http://www.nba.fi/en/mmf_park). At such parks buoys are put out which can be moored at, there are diving trails arranged at the wreck, information has been produced in the shape of plans of the wreck in plastic holders which can be taken down by divers to the site, there are information signs there, as well as information leaflets etc for the divers.

One could investigate the possibility of arranging such a park at the Nordevall site in the future. The park arrangements could be coordinated with those safeguarding measures which need to be performed in order to keep the ship in its original state on the site.

One futuristic alternative may be the building of a transparent, water-filled dome over the hull which would protect it from various kinds of interference while at the same time allowing the possibility of monitoring the environment around the ship. This alternative, which today may seem futuristic, might not be so in a generation or two's time. It might be realized in different ways, which have yet to be investigated. It would at least give visiting divers the possibility to visit and study the ship without the risk that it would be disturbed as it would then not be approached directly. It might also make it possible to make arrangements for the visualization of the wreck on the site, for example, by the installing of electrical lights in the dome, which would make the vessel easier to see and study. The vessel could also be restored on its site within the dome, by the rebuilding of the parts of it that had been torn down, through the remounting of loose pieces of the structure found on the site etc.

Visualization of the ship on its site through digital and other media: Another issue of interest from a visualisation perspective concerns the possibility of also visualizing the E. Nordevall on the bottom for an interested, non-diving audience, which cannot see it on its site – in other words, the majority of the general public.

The easiest way to realize this would be to present video films of the wreck site in a museum setting, which can give the audience a detailed view of the ship and its constructions, state of preservation, loose finds etc.

One can also make arrangements for the continuous transference of pictures from the ship on its site through the use of digital underwater cameras, where the ship is either preserved in the water or under a water-filled dome. Such picture transference could be done virtually and could be used both in a museum display about the ship on land, and also for the continuous surveillance and monitoring of the site.

4.2.4. Finance

At present no funding exists at the County Administration for the monitoring,

safeguarding or visualization of the E. Nordevall. When needed, one has to apply for required funds at the Central Board of National Antiquities.

4.3. Date of re-assessments/re-evaluation

Re-assessment intervals have to be planned and scheduled in connection with the development of a monitoring and safeguarding program for the E. Nordevall. Conclusion and proposal concerning a program for the monitoring, safeguarding and visualization of the E. Nordeval

The E. Nordevall has been chosen as the Swedish wreck for research and discussion within the MoSS project in order that this wreck and its preservation for the future can be used as a basis for the development of ideas about the undertaking of ”management plans” for this and other similar ships

which are geared towards their preservation in a longer time perspective. In such a plan one must also consider and integrate possible ways to work for future preservation in a longer time perspective, as has been discussed above.

Although this freshwater site has preserved the now nearly 180 year-old paddle steamer to an unusual degree, the ship’s particular environment is not unique in this part of Northern Europe. Due to several aspects of the natural conditions in the waters of the Baltic esp., and in the tens of thousands of lakes in Scandinavia, several other ships of different types and ages remain in a similar well-preserved state. The monitoring, safeguarding and visualization issues discussed here are of course relevant to a high degree to these other sites too.

It seems to be that as of today, we have no confirmed or effective plan to preserve the E. Nordevall – either it remains on its site or is salvaged, as has been discussed above. It is quite evident from the conditions presented earlier in this management plan, which incidentally, is the first study of the principal aspects of such a plan, that the ship must be preserved on the bottom of Lake Vättern, either until it is salvaged in the future, or for a longer time if the former is deemed inappropriate.

A safeguarding strategy is also relevant, if (and until) the ship is salvaged for preservation in a museum in the future. If the ship is not safeguarded and preserved on its site until such an occasion, it may be that the uniqueness of the E. Nordevall is lost due to its continual deterioration. The result might then be that in the foreseeable future, there is a ship that it is not worth either salvaging or taking special safeguarding measures to protect at its site.

Just as interesting as discussing the salvaging of the ship is to discuss how one may visualize a well-preserved, old ship and its history that is situated under water both today and in the future. This idea points towards a future in which mankind through the development of under water and diving techniques, becomes more integrated in the under water world and its different kinds of environment. This is a thought with a connection to the research of the future with its techniques and potential. It also highlights the possibility for finding new ways to introduce history and archaeology to the general public with the help of underwater technical development. Maybe the thought of salvaging old ships for visualization, will be “gone” in many cases in a few generations time?

Maybe by that time it will instead be commonplace to preserve ships on their site and visualize them there both for those visiting the site and for those attending virtual representations of the ship from its site? Virtual technology is leaping forward today and such things are already feasible now.

Seen from this perspective, it would be possible to approach the preservation of the E. Nordevall from a new angle. Instead of leaving it under the protection of the law on its site, awaiting possible deterioration and an uncertain salvage operation in the future, one should instead start working on a strategy for the long term preservation of the E. Nordevall - as well as shipwrecks in a similar well preserved state - in situ. We lack both the experience and techniques for this, and thus do not have the means to perform such safeguarding as is necessary in order to preserve these kinds of historic vessels. Certain ways of doing this have been tried, and suggestions have also been advanced in this plan, but these suggestions have not yet been thoroughly discussed or tried out.

To actively preserve intact vessels of great age on their sites is thus today, a subject of which one so far has little experience. The development of a strategy for this as well as its implementation would need resources on a regular basis for fieldwork, marine archaeological and technical expertise and insight, and also time for this development to occur.

As has been described above, several municipalities and interest groups around Lake Vättern have engaged themselves with the questions concerning how to safeguard the E. Nordevall, and about how to visualize the ship on its site for the general public. The Östergötland County Administration, which has the formal responsibility for the safeguarding of the E. Nordevall, has fulfilled this role very well. The Swedish National Maritime Museum has invested extensively in its documentation, investigation and care for a long time. Another example of the efforts to preserve the memory of the ship and to visualize it comes with the building of a full-scale replica, the Eric Nordevall II, in Forsvik on the western side of Lake Vättern.

It seems natural that the development of technical and theoretical understanding as well as the practical experience from undertaking the safeguarding of the E. Nordevall has to come in steps:

- A first step would involve making an initial evaluation of the necessary and primary safeguarding measures that should be taken on the site and to make an action plan for their realization.
- A plan should also be developed for the safeguarding and visualization of the ship in a longer time perspective. This should include the following steps:
- To monitor the site and the vessel as described above and use the data retrieved for an analysis of the influence of the environment on the vessel and its structure.
- To monitor the condition of the site and the ship through intermittent diving checks on its state of preservation
- To safeguard the ship on its site in different ways, meaning the strengthening of the hull, the protection of its delicate parts, possibly to restore some of them by putting back parts of the structure, which lie loose at the site. This could also include the partial salvage of those parts of the ship's structure, which will not withstand the impact of the environment.

- To visualize the site as an underwater archaeological park for visiting divers who have special permission and who are being guided around the site by marine archaeological guides.
- To visualize (and monitor) the site and the vessel for the general public through the use of cameras which have been placed at the site, with a monitor display of it being shown in a museum setting, depicting the ship and its story.

It is here suggested that the organizations responsible or engaged in the preservation of the E. Nordevall should undertake a joint venture to start the performing of this program. As the ship has an unusual historical value as is agreed by many parties today, it might be meaningful to start up this program with the development of a centre for the monitoring, safeguarding and visualization of the E. Nordevall at Lake Vättern. Such a centre could include several activities for the preservation of the E. Nordevall and also develop several ways to visualize it for the general public. The main aim of this centre would initially be to deal with the issue of the preservation of the original ship on the bottom of Lake Vättern and to develop the practical means and measures for doing this. This centre might at the same time also become a leader in the development of methodology for the monitoring, safeguarding and visualization of well preserved ships of great age under water.

The centre could also function as a museum or exhibition at which the history of the ship and period to which it belonged is shown and where the original ship is visualized at its site through video or digital recording for the public visiting the centre. At the same time, continuous monitoring of the site could also be arranged using the same means.

In the same centre it would also be possible to establish together with an appropriate university organization, teaching and training by professional marine archaeologists in the subjects of preservation management and methods and techniques for this, for ancient monuments such as old, well preserved ships under water, with the lectures and examinations offered on perhaps a degree level.

The scenario suggested here should be implemented in two steps:

- The development of a plan for the safeguarding of the E. Nordevall at its site in the first instance and as suggested above
- The establishment of a centre for the same purpose. This would then also imply some form of cooperation with teaching institutions, both on the university and the extra mural levels, in order to offer education and training in subjects related to the preservation, safeguarding, monitoring and visualization of intact shipwrecks in situ.

(The final sections of the management plan for the E. Nordevall are based on discussions with the following Swedish and international scholars and specialists in this subject area (in alphabetic order):

Lars Bergström, Director, Forsvik Shipyard Association; Bengt Breding, Coordinator, Forsvik Shipyard Association; Dr John Broadwater, The Monitor Project, Newport News, USA;

Jan Eriksson, Deputy head of the Dept. of the care of ancient monuments of the Östergötland county administration; Dr. Ian Godfrey, Western Australian

Museum; Ingrid Hall-Roth, Head of conservation, The Vasa Museum, Stockholm; Bengt Häger, Head of the Dept. of the care of ancient monuments of the Östergötland county administration; Dr Michael McCarthy, The Maritime Museum of Western Australia; Reinhard Grosch, Head of restoration, Forsvik Shipyard
Association; Ray Sutcliffe, a former BBC producer, England; Patrik Zymioni, Master shipwright, Forsvik Shipyard Association
(I would like to forward my thanks for the many constructive and stimulating discussions I have had the fortune to have with these my colleagues and very creative personalities.)

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(For more information about the E. Nordevall see: Cederlund, C. O., (ed.) 2003. The Eric Nordevall. MoSS Newsletter. A shipwreck research project funded by the European Union Culture 2000 Programme. 3/2003.)

Attachments

(For information concerning maps of the research area, maps of the location's artefacts, overview drawings, pictures of the E. Nordevall, and the finds catalogue see: The Marine Archaeological Archives at the Swedish National Maritime Museum, Stockholm and Cederlund, C.O. (ed.) 1989, Rapport över den marinarkeologiska undersökningen av hjulångfartyget E. Nordevall 1985 - 1988. Statens sjöhistoriska museum, 1989. Dupl.)

Attachment 1

The wreck of the paddle steamer "E. Nordevall" (1836 - 1856), located in 1980; and the development of its safeguarding, preservation and visualisation 1980 – 2001.

The paddle steamer "E. Nordevall" was and still is uniquely well preserved on the flat and calm bottom of the fresh water Lake Vättern. At the time when the ship was located the main part of the exterior was still intact and the interior was in the same state of preservation as when the ship sank about 150 years earlier. This situation is due to the favourable preservation conditions in fresh water environments of this character.

During the 1980s the "E. Nordevall" was subject to extensive investigation and recording. The Swedish National Maritime Museum performed extensive photographic and film documentation on the site at a depth of 45 meters during the years 1985-1989. This was done in co-operation with several other parties, such as the Göta Canal Company, the Diving Technique unit at Chalmers University of Technology in Gothenburg, the organisation for the care of ancient monuments in Sweden, represented by both the unit for this at the administrative board for Östergötland county and also the Central Office of National Antiquities, in Stockholm.

The results of these investigations were photo mosaics of the vessel, a deck plan and a side view of the ship as it appeared at the time, as well as extensive still photographs and video films.

The Swedish Ancient Monuments Act protects the vessel as it foundered more than one hundred years ago.

One of the aims of the underwater recording performed was to investigate if it was possible to salvage and preserve this unique paddle steamer in a museum environment on land. This resulted in an estimation of the costs of a salvage operation, a proposal to build a museum in the town of Motala on the eastern side of Lake Vättern, and also an investigation of the appropriate salvage and excavation techniques to be used. Those bodies and organisations in society to which the results of these investigations were submitted greeted them very positively. However, the necessary resources were not available.

While this process was ongoing in the 1980s, one could at the same time, on the basis of the extensive photo and film recordings made on the vessel in the 1980s, observe that it was deteriorating. It was evident that it had become a popular site for leisure and tourist diving and that this in turn, had resulted in the pilfering of objects and the tearing down of parts of the vessel's superstructure. Due to this, in the late 1990s the County Administrative Board established a diving prohibition on the site to prevent its further deterioration because of leisure diving.

A replica project has also been undertaken during the 1990s at Forsvik, on the western side of Lake Vättern which aims to build a full-scale copy of the E. Nordevall. The intention is to put the same form of passenger traffic on the same route as the original ship.

In the early 2000s a new initiative was taken to raise the ship in order to preserve and exhibit it in a museum in the town of Motala.
For both these projects further under water recordings have been performed on the vessel in order to collect information about its structure and condition.

The E. Nordevall – the localisation and diving activities during the first years

The paddle steamer E. Nordevall was relocated at a depth of 45 metres between the small island of Jungfrun and the eastern side of Lake Vättern on the 27th of September 1980. It was discovered by two brothers – Olaf and Åke Svensson - after being on the bottom of Lake Vättern for 124 years. During the years that followed the find, the following actions were undertaken at the site according to a recapitulation by Åke Svensson (Cederlund 1989, p 3 f).
During the weeks following its localisation in 1980, a series of dives were made at the site by the Svensson brothers and others. During these two finds were retrieved from the ship:
- the nameplate, with the text "E. NORDEVALL", mounted on the starboard side.
- the steam whistle, which was mounted on a tube half way up the funnel.
The third and perhaps most substantial find, the ship's bell, had been found already during the first dive. It was lost during the early salvaging, but was relocated and then salvaged in 1982.
During 1981 only a few dives were made to the Nordevall site. In 1982 the Svensson brothers performed several dives, and on one of these occasions, Kent Hult an under water photographer from Stockholm, took part. Among many other things at that time, he photographed the salvaging of the ship's bell.
In October of the same year the first larger survey expedition to the site was organised, in which representatives from the Swedish National Maritime Museum also took part, as well as the underwater photographer Tony Holm from Gothenburg. Two representatives from the Neptun salvage company also took part, to evaluate the possibility of salvaging the ship. The ship was photographed by Tony Holm. In May 1983 one of the first video films of the vessel was made.
In a report of 1983-12-07, Åke Berghner, one of the divers who had investigated the E. Nordevall after it was located described the recording measures taken at the site (SSHM Dnr: 1984 / 48): the report describes how several dives were performed during the first years and that one salvaged several artefacts which confirmed that it was the E. Nordevall that had been localised: the ship's bell, the steam whistle, and one name plate with the name E. Nordevall on it. The finds have been forwarded to the Göta Canal Museum in Motala.
On 1982-10-04 a more thorough documentation expedition to the site was undertaken: it started with the photographing of the wreck, which was done by Tony Holm. The next step was to record the main dimensions of the hull with the aim of creating a covering image of the wreck as a whole. After this a video recording was made of the site, followed by a visit from representatives of the Röda Bolaget, salvaging company, who were investigating the possibility of salvaging the ship.

The marine archaeological investigations of the paddle steamer E. Nordevall 1985-1989

The following presentation concerns the marine archaeological investigations performed on the paddle steamer E. Nordevall - from the establishment of a project group for this purpose in the spring of 1985 to the finishing of it in 1989. The presentation is based on the report about these same investigations (Cederlund 1989).

The ship is since the foundering positioned at a depth of 45 metres in open waters, 5 to 6 nautical miles out from the Nässja and Kampudden peninsula, west of the town of Vadstena.

The loss of the vessel and the wreck site, as well as the ship type and its history are described amongst other things in the following publication in English:

Cederlund, C.O., 1987 The Eric Nordewall - an early Swedish paddle steamer. Theoretical Approaches to Artefacts, Settlement and Society.
Studies in honour of Mats P. Malmer.
B.A.R. International Series 366, p 515-539.
Also in the International Journal of Nautical Archaeology and Underwater Exploration 16, p 109-134.

Special presentations on the same subjects in Swedish can be found in the report on the underwater investigations 1985-1989:

Cederlund, C.O., 1989 Rapport över den marinarkeologiska undersökningen av hjulångfartyget E. Nordevall 1985-1988. Statens sjöhistoriska museum, Stockholm.

In this there can also be found bibliographical information about the material published up to that point in time on the subject of the E. Nordevall.

Initial planning

In a proposal by C. O. Cederlund dated 1984-11-02 presented to the present-day Göta Canal Company, an initial plan for the under water investigation and documentation was given:

Step 1: a covering documentation of the ship under water by way of measuring, photographing and video recording. In connection with this, the strength of the hull is studied and calculated in order to prepare it for a possible salvaging.

Step 2: the salvaging of objects lying loose on the deck and elsewhere. This may also comprise those parts of the hull, which are delicate, as well as things which are still attached to the hull, and must be cut loose.

Step 3: the preparation for and performance of a salvaging of the hull, the preservation of it and the arranging of a museum for it in the town of Motala.

In the spring of 1985 a plan for the investigation of the ship was presented which comprised two phases:

1. Photographic recording of the vessel to give an overview of and basis for, the recording by measurements of the ship in the form of a side view and horizontal projection; selective still photography; video recording, and finally marine archaeological evaluation of the possibilities of salvaging artefacts from the site.

2. The salvaging of loose objects from the ship.

The project group also established the "Sea Owl group" with its main task being to investigate the usefulness of the Swedish ROV, The Sea Owl, for the investigation and recording of the site.

The investigations were planned and performed in a cooperative arrangement between the Swedish National Maritime Museum, the Department of Marine Technique at the Technical University of Gothenburg, the Göta Canal Company, and the private diving enterprise Dykoil, Valdemarsvik.

Investigations during 1985

During 1985 the aft part of the starboard side and certain parts ahead of the paddle wheel, and of the stern part and the flat stern, were systematically photographed for the creating of negatives for photo mosaics of the ship. Free hand photos of different parts of the hull were also exposed.

The ship was at the same time video taped where esp. the starboard side, parts of the flat stern and certain parts of the main deck and the port side were recorded.

(For the work during 1985 see plans for the documentation by C. O. Cederlund of 1985-06-19 (SSHM Dnr: 1293/85), Plan for the photo documentation for a photo plan by Cederlund 1985-08-16 (SSHM Dnr 1541/85) and the reports by the same author from 1985-06-15 about test work with the ROV The Sea Owl etc at that time, and 1985-08-15 (SSHM Dnr: 1542/85) about the performance of the photo recording

At the end of 1985 a plan for the continued work on the E. Nordevall was presented at the last meeting 1985-12-04 of the project group for that year.

Investigations during 1986

As a preparation for the investigation and documentation work in 1986, there was a plan to clear the wreck of the wires and fishing nets etc which had stuck to the structure over time; and to put out points and measuring tapes on the hull for its measurement; certain loose artefacts on the ship were also salvaged.

The photo documentation performed during 1986 comprised a continued photo recording of the galleon head; starboard side of the bow; the upper parts of starboard side from the bow to the paddle wheel; the ship's side on the cabin deck as well as the upper part of the flat stern. The photography was undertaken to create a basis for the photo plans of the parts of the ship photographed.

Video recording of esp. the starboard shipside occurred; and to some extent also of the port side, parts of the flat stern and smaller parts of the main deck. The following parts of the interior were also recorded in this way: the aft saloon, passenger cabins, the forecastle, as well as certain parts of the engine room and the engines.

During this year the following artefacts were salvaged from the vessel: one block and one china-washing bowl.

During 1986 work started the on the photo plans of the ship, esp. on the aft part of the starboard side and the flat stern of the ship.

Investigations during 1987

In this year the work comprised vertical photography of the cabin deck, the main deck on the port side and part of the starboard side, for the creation of a photo plan of these areas, as well as video and film recording of the same parts of the ship and its interior. At the work this year a film group from BBC, UK, took part in the filming of the site for the program Underwater Discoveries. This group performed its own filming of the exterior and interior of the ship for its program work.

Investigations during 1988

Vertical photographing of the main and cabin decks was undertaken in 1988, as was the photographic recording of parts of the starboard side of the hull, the wheels and the wheel houses on both sides. The same parts of the hull were recorded with a video camera.

During this year the following artefacts were salvaged from the vessel: one china jug and one metal artefact, possibly belonging to a mechanical part of the ship, perhaps its engines.

Conclusion of the field investigations 1985 to 1988

The recording of the E. Nordevall during the period 1985 to 1988 created documentation in the shape of photographic negatives for the creation of photo plans of:

- larger parts of the upper part of the starboard side, including the wheel and the wheelhouse;
- smaller parts of the lower part of the same side of the ship;
- the flat stern
- the whole of the fore deck with bowsprit and galleon head
- larger parts of the main deck with wheels and wheelhouses
- the main part of cabin deck
- the windlass
- the gaff lying on the port side of the deck afore

The video recording during 1985-1988 comprised the documentation of the upper part of starboard side and cabin deck, as well as to a lesser degree, the port side, the main and cabin decks, the fore deck and the upper part of the flat stern.

The video recording of the interior documents in the first instance the forecastle, the fore and aft saloons, as well as a couple of the passenger cabins. The galley, its storerooms, the engine room and certain cabins, as well as the hold of the ship were only recorded to a small degree during this time.

The report on the investigations 1984-1988 from 1989

Following the field recording, work centred around the creation of photographic mosaics of the ship as it had been preserved with the use of the photographic material produced and with the guidance of the videotapes that had been made. On the basis of these materials, plans of the ship were drawn up – to illustrate the ship as it was preserved on the bottom of Lake Vättern at the time of the investigation. Two horizontal plans and one side view or projection of the ship as it was at the time were created.

A report was written about the investigations in which a selection of photo plans and still photos of the vessel as well as the plans themselves and an explanation of their fulfilment were presented (Cederlund 1989).

Investigation of the technical conditions for a salvage operation of the E. Nordevall

During the same year of 1989 and as a part of the project, an evaluation of the technical conditions for the salvaging of the E. Nordevall was undertaken as an examined thesis in the Dept of marine technique, at the Technical University of Gothenburg. The result which was presented showed that the hull would hold up very well to a salvage operation (Egeland & Thulin 1989).

The investigations 1990 – 1991 of the possibilities to salvage, preserve and exhibit the E. Nordevall

The underwater recordings of the E. Nordevall during 1985-1988 and the report of 1989 about them had the dual aims to both record and to create a basis for the investigation of the possibilities of salvaging and preserving the ship. In September 1990 a meeting was arranged at the head office of the Göta Canal Company for a discussion about the continuation of the project. Present at this meeting were representatives of the administrative board of Östergötland county, in the shape of county governor Rolf Wirtén, the head of the care of Ancient Monuments section in the former, Sven Norén; representatives from the museum of Östergötland county; Linköping University; the Swedish National Maritime Museum; the towns of Motala and Norrköping; the Göta Canal Company; and the Swedish National Administration of Shipping and Navigation.
At this meeting it was decided to establish a working group to investigate the possibilities and the methods and costs of a salvage operation; methods and costs of an excavation, conservation and preservation; and the preparation of premises, for the exhibition of the E. Nordevall in the town of Motala.
The members of this investigation group were elected from the following organisations:

- Motala town and municipality
- The County Museum of Östergötland
- The Göta Canal Company
- The Swedish National Administration of Shipping and Navigation
- The Swedish National Maritime Museum
- The administrative board of Östergötland County
- The University of Technology, Gothenburg

In May 1991 the results of the work of this investigation group were presented in a report by Ing-Marie Muncktell, curator at the Seafaring and Canal Museum in Motala (Muncktell 1991). The work in the investigation group is also presented in the minutes of their meetings (see the archives of the administrative board of Östergötland county).

The salvage method

The investigation group stated that a salvage operation is possible when considered from a technical perspective. The use of a conventional salvage technique was advised – something which had been proposed in the examination thesis from The University of Technology, Gothenburg (Egeland & Thulin 1989). A salvage company from Östergötland county had presented a cost estimate of and offer to do the salvage work.

The question of the strength of the hull in connection with a salvage operation

At the meeting of the investigation group 1991-03-01, the specialist on conservation techniques at the Swedish National Maritime Museum stated that we did not yet have proper information about the firmness of the wood in the hull, and that this had to be tested. She proposed that further sampling should take place on the hull. The representative of the University of Technology in Gothenburg after the same meeting stated that according to their testing of the wood it could withstand the stress of a salvage operation (the minutes of the meeting of the investigation group 1991-03-01).

The investigation group finally decided, with the support of investigations of the hull and its strength made by The Technical University of Gothenburg, that the wood in the hull was firm enough to withstand a salvage operation. The representative from the Swedish National Administration of Shipping and Navigation confirmed this statement. He had also conferred with, among others, the salvage company "Röda Bolaget" on this issue.

Archaeological measures to be taken before the salvaging

Carl Olof Cederlund, representing the Swedish National Maritime Museum in the project group for the investigation of the salvaging of the E. Nordevall, 1991-01-18 presented a specified plan for the measures that needed to be taken before the raising, in order to register, record and deal with information about finds and find circumstances in and on the ship and on the bottom surrounding it (and an expanded version of this on 1991-02-22):

- documentation of loose finds on the bottom around the ship before the raising of it
- raising of these finds and delicate parts of the structure of the hull, as well as their recording
- protective measures such as the staying of the funnel and the raising of parts of the paddle wheels

Archaeological measures to be taken during the salvaging

The archaeological measures during the salvage operation comprised the following stages:

- continuous control of the strength of the hull, and if needed, the strengthening of it.
- the retrieving and registration of artefacts onboard
- the registration, recording and storing in water of artefacts retrieved

The establishing of the excavation site

The group advised that the vessel should be placed in one of the dry docks at Göta Canal in Motala, for its excavation. The preparations for the excavation were also included in the same phase, such as the arranging of excavation tools, storing facilities, the organisation of a find registration system etc.

The excavation

The general aims of the excavation were defined as the gathering and registering of knowledge about the ship, its structure and state of preservation, for the reconstruction of the hull and the engines, for research, exhibition and information purposes.

The excavation was estimated to comprise the following steps:

- the dismounting of the mast, funnel and paddle wheels
- the registering and photographing of artefacts, sampling
- the dismounting and the lifting of the engines out of the hull
- the conservation of the engines
- the measuring and the preparation of plans of the hull
- the archaeological photo documentation of the hull and the excavation process

Photographing and filming of the salvage and excavation

According to the investigation group the project as a whole should be subject to filming, video recording and photographing in all its phases, both under and above water, both before, during and after the salvage operation and during the excavation and work processes which follow.

Formal responsibility for the excavation and the excavation report

According to the minutes of the meeting of the investigation group 1991-02-01, the County Museum of Östergötland explained its willingness to take formal responsibility for the excavation, in co-operation with experts from the Swedish National Maritime Museum. The excavation report with find registration catalogue, enclosed plans and photographs, as well as analyses results, were intended to create a basis for future research, provide information, and help with the future exhibition and preservation of the E. Nordevall.

Preservation, conservation and visualisation

The investigation group consulted the conservation department of the Swedish National Maritime Museum. After an evaluation done by them 1991-02-28, it was suggested that the conservation should be undertaken with the use of poly glycol – through the spraying of the hull in premises where there was a possibility to control humidity and temperature, and the submerging of loose pieces in poly glycol solution. It was estimated that the time period needed for the conservation of the wooden hull would be 10 to 15 years. Metal and iron parts of such things as the engines, had to be taken out, cleaned and blasted. The engines had also to be possibly treated with electrolysis at an industrial establishment.

In connection with the investigation two different scenarios for the preservation and visualisation of the E. Nordevall were developed:
- as a museum exhibit with the hull and its fittings exhibited in a museum hall. This alternative also meant that the hull, engines etc had to be conserved to be preserved.
- as a floating ship in which those parts which could not be used in a floating vessel had to be exchanged. This alternative meant that major parts of the hull would have to be exchanged with new wood.
The preservation technique was to a high degree dependent on which alternative would be chosen.
It was estimated that the cost for its preservation as a floating ship would be much less than for the exhibiting of it in a museum. On the other hand, the former alternative implied the recurrent exchange of parts such as the timbers in the hull.
When consulted, the Central Office of National Antiquities stated that if the vessel was to be preserved and used as a floating ship then it would no longer be a relic under the terms of the Ancient Monuments Act. The material in the structure of the ship would be continuously exchanged with new material. According to the investigation group, in such a case the vessel had to recorded in full and then struck off as an ancient monument. The representative of the Swedish National Administration of Shipping and Navigation stated that one could not judge if it was possible to preserve the vessel in a floating condition until it had been salvaged (the minutes of the meeting of the investigation group 1991-03-01 and 1991-04-08).

Museum premises

According to the minutes of the meeting of the investigation group 1991-02-01 two alternatives for a museum presentation of the E. Nordevall were considered within the premises of the Motala Verkstad. The town of Motala explained that it would be interested in making available premises for a permanent museum for the salvaged E. Nordevall within a project relating to a museum of industrial history there. The Göta Canal Company also stated that it could make available a mooring place for the paddle steamer near the dock at the Motala Verkstad if it was preserved in a floating state.
The manager of the Göta Canal Company on this occasion informed the participants that the municipality of Karlsborg (on the western side of Lake Vättern) had also stated that it was interested in taking care of the E. Nordevall after it had been salvaged.

The diving in connection with the salvaging of the E. Nordevall

On 1991-01-28 the Department of Marine Technique at the University of Technology, Gothenburg, and Lennart Kullander from there presented the results of an investigation into the diving and the costs of the diving in connection with the salvaging of the E. Nordevall. This was done as a follow up to the implementation of the archaeological program in connection with a salvage operation, as proposed by Cederlund:

The marine technicians at the University of Technology, Gothenburg, had taken samples of the wood in the hull to test the firmness of it and its possibility to withstand stresses in connection with the salvaging of the hull (Egeland & Thulin 1989). According to the minutes of the meeting of the investigation group from 1991-04-08, the results had shown that no more testing was needed and that it would be possible to salvage the E. Nordevall in its present condition.

The conclusions of the investigation group concerning the salvaging etc of the E. Nordevall

The members of the investigation group were of the unanimous opinion that the E. Nordevall carried a unique importance when seen from a general cultural perspective as well as from an industrial history perspective. It could, if it was salvaged, become an extraordinary attraction in the town of Motala and the county of Östergötland. The risk of pilfering and plundering at the site was seen as another argument in favour of a salvage operation. The wreck is difficult to preserve on its wreck site.

The following statements were made concerning the undertaking of the project:

- Salvage is possible
- The transporting of the hull to the dry dock at the Göta Canal in Motala through the lock there in the Göta Canal can be done with the ship partly submerged
- Immediately after the placing of the ship in the dry dock, it should be sprayed with water
- Premises to be transformed into museum locations did exist in Motala

The investigation group recommended the preservation of the ship in a museum environment as the primary alternative, but pointed out that the alternative to preserve the ship in a floating condition was a realistic alternative. Both alternatives for the ship's future preservation could be realised. The majority of the members of the group preferred the preservation of the hull in a museum environment.

In the minutes of the next to last meeting of the group on 1991-04-08 the chairman stated that the risk of the destruction of the vessel on its site was reason enough to salvage the E. Nordevall.

The establishment of a foundation for the project

At this time, the creation of a foundation as the formal body of the project was discussed within the investigation group and at the administrative board of Östergötland county and the conclusion was reached that it was now an appropriate time to establish such a body.

The transmission in 1991 of the results of the investigation of a possible salvaging of the paddle steamer E. Nordevall to authorities, institutions and companies

In the Fall of 1991 the administrative board of Östergötland county transmitted the results from the investigation concerning a possible salvaging of the E. Nordevall, described above, to 19 different societal organisations, authorities, scientific and other institutions, foundations and societies, and also private companies, for their evaluation.

The responses to the transmission were summarised by Carl Olof Cederlund in April 1992 (SSHM Dnr 340/91). This evaluation summary was distributed by the administrative board of Östergötland county in January 1993 (dnr 229-10616/91) to the organisations which had responded on the issue, and to others: All but a few had responded to the transmission and had delivered their evaluation of the issues in the investigation. The Central Board of National Antiquities did not deliver its own judgement, but rather referred to the one given by the Swedish National Maritime Museum. The Göta Canal Company delivered its answer through the Crown Lands Board.

In the conclusion and summary of the answers mentioned above, the parties were organised into four different groups according to what type of organisation they represented, namely:

1. Organisations for the care of ancient monuments and museums
2. Other state authorities
3. Societal organisations in Östergötland County and at Lake Vättern
4. Foundations and societies

The different organisations forwarded evaluations and points of view on different issues in the text that was transmitted. If one summarises them, the answers concerning different issues in the investigation can described in the following way (it should be noted that not all bodies answered or had points of view on all the issues in the transmitted text).

1. Evaluations of organisations for the care of ancient monuments and museums

The historical value of the E. Nordevall:

The Swedish National Maritime Museum:

The museum made the evaluation that E. Nordevall is a very interesting ship from the point of view of ship and technological history. It would - exhibited in a museum - be a very interesting document of shipbuilding and marine engineering from the time to which it belonged. The modern way of travelling at sea could also be illustrated in connection with such an exhibition.

The Swedish National Maritime Museums (during this period comprising The Swedish National Maritime Museum and the Vasa Museum):

The organisation of The Swedish National Maritime Museums delivered an addition to its answer in the form of an evaluation sent in from the Foundation of SS Great Britain, Bristol, England, concerning the seafaring history and historic

shipbuilding value of the E. Nordevall, seen from the British point of view. The British evaluation saw the salvaging and preservation of the ship as a very valuable and important measure, seen in terms of both the British and the European perspective of seafaring history.

The administrative board of Skaraborg County and the County Museum:
The administrative board of Skaraborg County forwarded the point that the ship type of the E. Nordevall is unique and that the find is preserved in a way, which is very unusual. The cultural and historical value of the E. Nordevall is beyond discussion. A salvage operation and an exhibition are without doubt valuable for the region from the point of view of tourism. The County Museum on the basis of these points of view gave its full support to the project.
The County Administrative Board forwarded the opinion that E. Nordevall, which is the only preserved ship of the so- called "fiolbåt" ("fiddle shaped boat") type, which had been in traffic on the Göta Canal, is of course of great historical interest and would be a considerable tourist attraction, not least for the travellers on the canal today.

The proposal to salvage the E. Nordevall:
The Swedish National Maritime Museum:
The museum supported the proposal of a future salvage operation, but only on the condition that financial resources are available to undertake the project from the recording on the bottom to its final exhibition in a local museum.

The planning of a salvage operation:
The Swedish National Maritime Museum:
The museum forwarded the opinion that certain proposals in the text concerning the investigation of the salvaged E. Nordevall, should be decided on only when the ship had been salvaged and one had had a possibility to observe and record its interior. These parts of the text were the ones referring to the excavation, the photo and film recording and reporting of it, and also to the preservation of the ship.

The financing of a salvage operation:
The Swedish National Maritime Museum:
The museum made the evaluation that the cost estimation for certain archaeological measures in connection with a salvage operation had to be raised. The museum saw the other cost estimates in the investigation as being very uncertain due to the difficulties in planning the recording of the ship and its interior.

The Skaraborg County Museum:
The museum highlighted how the responsibility for future costs within the project had not been dealt with in the investigation. It stated that there should be long-range planning in which future questions concerning the responsibility, not least for economic matters, are taken up.

The preservation of the E. Nordevall:
The Swedish National Maritime Museum:
The museum made the evaluation that partial solutions to the salvage question were not advisable from an antiquarian point of view. In relation to this, proposals were mentioned to salvage, record and return the vessel to its wreck site. The museum opposed the proposal put forward during the investigation of the project that the original ship could be fitted out and used as a floating historical ship. Such a program would interfere too much with the originality of the vessel as it is preserved.

2. Evaluations of state authorities

The historical value of the E. Nordevall:
The Crown Lands Board:
The board had the view that the salvage and preservation would have a considerable interest both from the point of view of general history and seafaring history.

The Swedish National Administration of Shipping and Navigation:
The board had the view that E. Nordevall represents the beginning of the epoch of mass communication and belongs to the early generation of ships that were driven by engines. The ship, which is still on the bottom of Lake Vättern after 130 years, is intact and very well preserved. Because of this, the technical conditions for a salvage operation and its continued preservation are good. When restored the E. Nordevall would fit well in the technical history museum exhibition, which is planned in the town of Motala, and could become a considerable tourist attraction.

The Swedish state power board, Eastern Sweden:
The Swedish state power board, Eastern Sweden, considers the ship as a unique find, which should be preserved for the future. It is also important to recognise that the ship is connected to a larger context, that comprises the phase of early industrial development, which among other things is represented by the establishing of the Motala Verkstad.

The proposal to salvage the E. Nordevall:
The Swedish National Administration of Shipping and Navigation:
The board forwarded the view that, as no other comparable shipwreck exists in the world today, it is of very great importance from a technical and cultural history viewpoint that the E. Nordevall is salvaged and preserved for the future.

The financing of a salvage operation:
The Swedish National Administration of Shipping and Navigation:
The board also forwarded the view that a salvage operation should only be performed on the condition that the resources, which the investigation has shown to be necessary, can be obtained. If it is not possible to acquire these resources at present, then the wreck should for the time being be left untouched.

The Crown Lands Board:
The board had through the Göta Canal Company, invested resources in the work so far performed. Unfortunately, it had no possibility to take part in the further financing of the project.

The Swedish state power board, Eastern Sweden:
The Swedish state power board, Eastern Sweden, might be able to sponsor the project to some smaller degree. On the other hand, it did not have the possibility to carry the cost of the project.

The establishment of a foundation for the E. Nordevall project:
The Swedish National Administration of Shipping and Navigation:
The board was of the opinion that the proposal from the investigation to create a foundation, which in the future would be responsible for the salvaging and preservation of the E. Nordevall, was a very good one. The first task of this foundation would then be to obtain the necessary resources for the salvaging, excavation and restoration of the ship.

The Swedish state power board, Eastern Sweden:
The … also recommended that a foundation should be created as an appropriate vehicle for the financing and as an organisation which could be responsible for the continued work.

3. Evaluations of societal organisations in Östergötland County and at Lake Vättern

The historical value of the E. Nordevall:
The cultural affairs committee of Karlsborg municipality:
The council forwarded the opinion that a vessel of the type of the E. Nordevall, the so-called "fiddle boat type" is something unique at present, and that it is part of the history of the Göta Canal. It is therefore of importance from Karlsborg community's cultural and historical point of view.

The municipal executive board of the town of Motala:
The municipal executive board was positive about the proposal to salvage and preserve the E. Nordevall.

The cultural affairs committee of Norrköping municipality:
The council concurred with the opinion expressing the great value of the ship from a cultural and industrial history viewpoint. It stated that the ship had a special value as it was built at the Hammarsten shipyard in the town. It could therefore shed light on one part of the manifold history of the harbour and the seafaring of Norrköping, something which has yet to be fully documented. From the point of view of technical history this well-preserved steam ship can be judged as an outstanding example of its kind. It would – if it were salvaged and conserved and integrated in its historical context – stand as a symbol for the early phase of industrialism in Sweden. Because of this it could become a first

class historical attraction, connected to one of the most important monuments of Sweden – the Göta Canal.

The cultural affairs committee of Vadstena municipality:
The council stated that from the point of view of cultural history, it would be incredibly valuable to be able to salvage and preserve the E. Nordevall in an appropriate way. The ship might also, considering its construction, have a great value from the point of view of technical history. A salvaged and preserved E. Nordevall would be something worth seeing and become of great value for the cultural tourism in the whole of the western part of Östergötland county.

The municipal executive board of the town of Vadstena:
The municipal executive board stated that it fully supported the declaration of the council of culture with the addition that the town sees the salvage operation as being of concern to the whole nation.

The council of tourism of the county of Östergötland:
The council concurred with the opinion in the investigation report that the E. Nordevall would be a unique tourist destination in Östergötland County. The ship would create much interest, not only in Sweden, but also abroad. It was certain that a salvage operation would be of a great value from a medial point of view.

The proposal to salvage the E. Nordevall:
The cultural affairs committee of Karlsborg municipality:
The council stated that it was positive about the salvaging, conservation and preservation of the E. Nordevall. The municipal executive board of the town concurred with the council of culture.
The cultural affairs committee of Norrköping municipality:
The council stated that the investigation group had produced a high quality piece of work concerning the investigation relating to a salvage operation.

The financing of a salvage operation:
The cultural affairs committee of Norrköping municipality:
The council forwarded the view that it had difficulty in taking a standpoint on the question of the financing of a salvage operation and preservation process, as the investigation group itself had not taken any standpoint on the same issue.

The municipal executive board of the town of Norrköping:
The council concurred with the point of view expressed by the council of culture concerning the financing of the salvaging of the ship. It was of the opinion that its possibility to contribute to the covering of the costs in current conditions was very small.

The municipal executive board of the town of Vadstena:
The council forwarded the opinion that resources for the salvaging and preservation of the ship should be sought not only in the region.

The council of tourism of the county of Östergötland:
The council commented on the notion that according to the calculations presented the salvage operation was supposed to amount to only 1 % of the whole sum, while the measures which would follow had been calculated to amount to as much as the remaining 99 %. It stated that the total cost of 17 million Swedish crowns seemed to act as a deterrent.
The council of tourism expressed the view that it would be possible to sell the rights to show the salvage to one of the TV channels and in this way acquire financial resources for the project. TV companies from abroad might also be interested.
The council stated that it would be important to clarify how long it would take before the ship could be shown to a general audience, what the costs would be and what revenue (entrance fees etc.) could be counted on.

The question of financial support:
The municipal executive board of the town of Karlsborg:
The municipal executive board stated that at the moment it could not set aside any financial support for the salvage or the preservation of the ship.

The municipal executive board of the town of Motala:
The municipal executive board stated that the financing of the project could not be done with resources from the municipality because of the current economic situation of the town.

The council of tourism of the county of Östergötland:
The council declared that it would be interested to participate in the project by distributing information to travel agencies, the general public and others.

The preservation of the E. Nordevall:
The Local building committee of the town of Karlsborg:
The council advanced the point that the ship was in use on the Göta Canal between 1837 and 1856. Referring to this, it stated that localities other than Motala Verkstad might be relevant for the creation of a museum and the exhibition of the ship. Within the town of Karlsborg such premises could be arranged at Forsvik Industrial Heritage. The big forgery hall there could be used to house the ship.

The municipal executive board of the town of Karlsborg:
The municipal executive board concurred with the council of culture and building construction that there was a great deal of interest in preserving and keeping the E. Nordevall for example, at Forsvik Industrial Heritage in the municipality.

4. Evaluations of foundations and societies

The historical value of the E. Nordevall:

The foundation "Skärgårdsbåten", Stockholm:

The foundation put forward the view that a well-preserved steam ship from 1836 is completely unique in international terms. There is nowhere else in the world where a ship exists in a preserved state that is representative of the first generation of steam ships. The E. Nordevall can be compared to the 17th century naval ship the Vasa and should be treated likewise.

Other old steam ships preserved are both younger and have been rebuilt to a much greater degree. Only smaller parts of these ships are still original … Of the few, which have been preserved in the world, there is no other that is as completely preserved as the E. Nordevall with its steam engines and everything else. The ancient engines are of special value and lack any comparisons. Moreover, the hull of the ship and its state generally are of substantial interest. The ship represents the very old period when steam ships still bore a strong similarity to the traditional shape of sailing ships. The E. Nordevall is the only paddle steamer that has been preserved in Sweden … It represents the first fully developed generation of steam ships. Also, internationally the ship represents a certain phase… It is well worth having it raised to forward our understanding of this important period of steam propulsion. It might even be considered that there is an obligation to do this, when one has at one's disposal the unique potential, which the E. Nordevall constitutes.

The SS Great Britain Project, Bristol, England:

The foundation stated that in the earliest phase of civilian steam shipping the majority of the steam ships were small passenger- and case-goods carriers driven by side-lever engines of a British design and with paddle wheels. A few side-lever engines still exist in British museums, but not one of the many early steam ships exists above water today. The E. Nordevall therefore has an enormous international interest and value, as it is the only existing case of a steam ship from the first generation of stem ships as well as being very typical for its class. The steam ship has usually been seen as a British product and feat, at least when it comes to the European development in this field. The E. Nordevall constitutes an excellent example of the type of ship which was developed out of this British pioneering technology. Therefore the salvage, conservation and exposition of the ship would be of the greatest interest to historians in Great Britain. The ship would constitute an excellent complementary example of a steam ship from the first generation, to the remaining example from the second generation, the iron- and propeller ship, The Great Britain. The latter was taken care of in the Falkland Islands 20 years ago and is now under conservation and restoration in Bristol.

The society of Rear Admiral J. G. Von Sydow´s descendants:

The society supported the project, not only due to the fact that its members are descendants of the man who designed the E. Nordevall. It agrees with the

investigation group that the ship has a great value from the point of view of cultural and technological history, and that the ship preserved in a museum in Motala may be of great importance not only for the town and the county but also internationally.

The proposal to salvage the E. Nordevall:
The foundation "Skärgårdsbåten", Stockholm:
The foundation strongly recommended that the E. Nordevall should be salvaged, conserved and preserved in a museum arranged for this purpose.

The SS Great Britain Project, Bristol, England:
The foundation held the strongly expressed hope that an operation to salvage and stabilize the E. Nordevall would be undertaken. Sweden with its prior knowledge and experience in this field, obtained through the Vasa project, is situated in a uniquely strong position, when it comes to the performance of this.

The society of Rear Admiral J. G. Von Sydow´s descendants:
The society wholeheartedly supported the future salvaging of the ship.

The financing of a salvage operation:
The foundation "Skärgårdsbåten", Stockholm:
The foundation held the view that it had the competence to judge the costs for the creation of a museum and for the conservation, but is not apt to recognise that these will be very extensive. Possibilities ought to exist for a partial financing both through sponsors and also through an extensive, general subscription. The foundation wanted to especially highlight the different organisations for the sea and for seafaring, which should be prepared to respond.

The question of financial support:
The foundation "Skärgårdsbåten", Stockholm:
The foundation is quite sure that a great willingness to contribute to the project existed among its 3000 members.

The preservation of the E. Nordevall:
The society of Rear Admiral J. G. Von Sydow´s descendants:
The society recommended the option of the ship's preservation in a museum before the one with the ship afloat. The latter alternative would be too costly in the long run.

The foundation "Skärgårdsbåten", Stockholm:
The foundation had the view that such an old wooden ship must be preserved indoors. If not, then in practise all the wood would have to be exchanged. Thereby the main part of the historical interest in the ship would be lost. Other wooden ships, which are preserved outdoors, are proof of this. Without exception all the wood has had to be exchanged in them.

Conclusions

All the bodies answering the transmission about the investigation were very positive to the proposal concerning the salvaging and preservation of the E. Nordevall. Most of them held the view that this would have a great value from the point of view of cultural history, seafaring history and technological history, both in a regional, Swedish and an international perspective. Certain parties held the opinion that the ship has either an enormously great or unique value. Several of the bodies which responded also stressed the point about the positive influence that a salvaged ship in a museum setting would have for the tourism of Östergötland County and the area around Lake Vättern.

The Swedish National Maritime Museum and the Swedish National Administration of Shipping and Navigation supported a salvage operation only if the costs are fully covered from the beginning.

Concerning the means to preserve the ship several of the answering bodies pointed out that they would prefer the preservation to occur in a museum setting before the option of restoring the ship in a floating condition for traffic.

The Swedish National Administration of Shipping and Navigation and The Swedish state power board, Eastern Sweden had the view that a foundation should be created for the project.

Few of the bodies who answered the transmission were able to offer any economic support for the project. The council of tourism for the county of Östergötland wanted to contribute through the dissemination of information about the project. The town of Karlsborg stated that there was great interest to preserve the ship in a museum at Forsvik´s Industrial Heritage in the municipality. The foundation "Skärgårdsbåten", Stockholm, was convinced that among its 3000 members a great interest would exist to contribute to the project.

It is also possible to conclude that the most wholehearted and elaborate support for the Nordevall project came from one particularly category of organisation to which the transmission was made, namely the one which consisted of foundations and societies.

Follow up actions to the investigation of 1991

Efforts to create an action group for the salvage of the E. Nordevall

During 1992 – 1993 efforts were made to create an action group for the salvaging of the E. Nordevall (see correspondence in the archive of the dept of the care of ancient monuments at the administrative board of Östergötland county).

Motions to the Swedish parliament concerning the salvaging and preservation of the E. Nordevall during the years 1993/94 to 2001/02

Since the Parliamentary session in the year 1993/1994, the liberal member of Parliament, Karl-Göran Biörsmark of Östergötland county, has presented a series of motions in Parliament proposing that it might, along with the government request an investigation into the issue of how the paddle wheeler E. Nordevall could be salvaged and preserved in a museum. The aims and motives of these motions have differed somewhat over the period they have been presented to

Parliament. In this text the ideas and proposals expressed concerning the E. Nordevall will be presented in a summarised way. The presentation starts from the assumption that the situation in which a Member of Parliament engages himself with a marine archaeological salvage project must be anchored in society in several ways. Following on from this, the evaluations made in the motions become of general interest in this context.

In the first motion of 1993/1994, Biörsmark advanced the case that the E. Nordevall was a monument to the history of industry and technology and of high value when seen in a world perspective. Due to the fresh water in Lake Vättern the E. Nordevall is well preserved to a very unusual degree. Everything is preserved – from the rigging and the high funnel to the steam engines, from the gilded figurehead in the bow to the panels and the paint on the walls in the saloons and cabins.

Nowhere else does there exist a completely preserved steamship of the first generation like the E. Nordevall. Museums have been built for the visualisation of very old steam ships in other parts of the world. These ships are all not only younger but also have only minor parts preserved in them which originate from the first phase of the ship's existence.

Even if it is smaller and younger the E. Nordevall is fully comparable to the regal ship, the Vasa. The vessel is unique and represents an early and important phase in the development of ships, steam engine propulsion and steamship seafaring. It has also aroused a well-grounded international interest. …

Biörsmark later in the text of this first motion states that good reasons can be advanced for the creation of a museum for this ship in the town of Motala. Considerable interest exists in many places about this extraordinary ship as well as buildings which are appropriate for the housing of a museum devoted to the ship on the premises of the Motala Verkstad (Motala Mechanical Factory). … Private persons, organisations and private enterprise have all expressed their willingness to contribute – but at the same time, it is important that the state should be engaged in this process in order to facilitate the realisation of this important museum.

In a motion from the following year – 1994/95, Mr Biörsmark´s intentions were similar although new angles on the ship and its specific value were included. For example, Biörsmark stated that steam was the first modern kind of energy, which underpinned the development of modern, industrialised society. The steam ships made it possible for ordinary people to travel and also created the basis for a transportation network in a modern sense. Nothing is better suited for the spreading of knowledge and interest than being able to visualise real objects on a full scale. The motion of 1994/95 forwarded as its petition the wish that Parliament would give the government details about the information forwarded in the motion concerning the salvaging of the paddle steamer E. Nordevall and its future preservation in a museum setting.

The motions in the Parliamentary sessions of 1996/97 and 1998/99 were similar to the original one in their structure and intentions. In both, the same request is advanced that was presented in the motion from 1994/95. In the motion to the

1999/2000 session, Biörsmark also referred to the statement by the Swedish National Maritime Museums: that if the ship was exhibited in a museum it would create an interesting time document on the subjects of both ship building and the transportation industry. The beginning of modern sea travelling would also be visualised in such an exhibition.

He also referred to the Foundation for Archipelago Ships (Stiftelsen Skärgårdsbåten), and its evaluation that a well preserved steam ship from 1836 is not only very unusual from an international point of view, but is also completely unique in all respects. Nowhere else in the world does a ship exist which represents the first generation of steam ships. This motion ended with the statement that an extensive marine archaeological investigation of the E. Nordevall had been performed. A body of unified expertise has proposed that the ship should be salvaged. The hull, its interior and the engines are in such good shape that their restoration is fully feasible. According to the mover of the motion the state is the body that should take the initiative and responsibility for the salvaging of the ship. The motion to the 2000/2001 session had the same content as the previous one.

At the time of writing this, the last motion presented was for the Parliamentary session of 2001/02. This included the evaluation of the administrative board of Östergötland county, within whose borders the ship is situated, that the E. Nordevall has a very high value as part of our cultural history in several respects. It has a high value from the point of view of the history of technology as she belongs to the first generation of steam ships, which includes the steam engines built under the strong influence of British engineering at that time. Seen from the point of view of communications history it has a value because the vessel is a so-called "fiolbåt" ("fiddle boat"), built especially for narrow canals. The vessel has a value from a representative point of view more generally as she belongs to a group of ships which have disappeared. The vessel also has a special value when judged in terms of its rarity because it is, in the right sense of the word, unique. Last but by no means least, the ship has a special value as regards its authenticity as it is also so well preserved. Referring to these special values of the ship, a diving prohibition has been imposed on the wreck site.

Different plans have been developed to salvage the paddle steamer E. Nordevall over a period of several years. The Central Office of National Antiquities gave a statement on the 22nd of May 2001, concerning a request from the "Föreningen för hjulångfartyget Eric Nordevalls bärgning" ("The Society for the Salvage of the paddle steamer Eric Nordevall") to be allowed to salvage the paddle steamer. The Central Board stated that it had a full understanding of the ongoing efforts which aimed to salvage this paddle steamer, by many verified to be very valuable, in order to be able to exhibit it. The Central Office therefore had no objection against such a salvage operation. On the other hand, it was of the opinion that such a permission had to be followed by the condition that the project is fully covered financially before the work is initiated and that this should include all of the archaeological work before, during and after the salvaging, as well as money for the preservation of the ship after it has been salvaged. Uncertainties

concerning the means with which the ship is to be housed and exhibited must also be removed. The Swedish National Museum had no objection against the granting of the petition, under the same conditions, which had been stipulated by the Central Office of National Antiquities. In its letter on this issue the museum mentions that it has been engaged in the plans to salvage the wreck of the E. Nordevall over a number of years.

Referring to the statements by the Central Board, the National Maritime Museum and the administrative board of Östergötland County, the mover of the motion forwarded the idea that the paddle steamer E. Nordevall should be seen as a matter of national importance. To be able to comply with the demands made by among others, the Central Board, in order to be able to salvage the E. Nordevall within the reasonably near future, some kind of support must be made available by the state.

Chronological description of measures taken for the safeguarding of the wreck of the E. Nordevall 1976-2003, or for the salvaging and exhibition of artefacts from it, by the authorities and; with summaries of the motivations for these actions

1976:

In a letter of 1976-04-28 to the Motala town municipality, a private individual and civil engineer, Gunnar Samuelson, forwarded the proposal that the wreck of the E. Nordevall should be located in order to, if possible, salvage it or parts from it. Samuelson´s intention was to organise an investigation of the wreck, and his letter was an application for financial support for this purpose. In relation to this, he had been in contact with various parties, among them the head of the care of ancient monuments at the county administration (Dnr SSHM: 1976:938).

1981:

On 1981-10-02 (3265/81) the Central Office of National Antiquities, after discussions with the Swedish National Maritime Museum, gave permission to the Canal and Seafaring Museum in Motala for the salvaging of the wooden name plate, the steam whistle, and a few smaller objects from the wreck. The finds were supposed to be handed to the latter museum for registration, recording and conservation. This was to be performed in co-operation with the preservation department of the Swedish National Maritime Museum, and if necessary, the technical department at the Central Office and the Museum of National Antiquities. The Canal museum was to be responsible for the costs of conservation, and was also responsible for the continued care and maintenance of the objects in appropriate premises.

In connection with the salvage to be performed during 1981-82 it was planned that a video recording of the ship would be made. The costs for this recording were to be split between the Central Office and the Canal Museum. The latter would receive the video films and keep them in its custody.

1982:

In a letter dated 1982-08-11 to the Swedish National Maritime Museum, the Society and Museum of Local History in the town of Motala (Motala Musei- och hembygdsmuseum) suggested that the former museum could deposit the engine and boiler (at this time not yet salvaged from the wreck) of the E. Nordevall in the museum of Industrial History connected to the Motala Verkstad. As they had been constructed at Motala Verkstad they would fit very well in the collections to be displayed in the old, so-called Locomotive Hall (Lokhallen) which was then planned to be used for an exhibition of the collections of the Motala museum (SSHM Dnr: 1982/1525).

On 1982-10-14 (4437/82) the Central Office of National Antiquities in a letter to Motala Musei- och hembygdsförening (The Society and Museum of Local History in Motala) stated that it was not the intention of the former to recommend further salvages from the E. Nordevall. If investigations were going to continue, according to the Office, these should in the first instance be concerned with making recordings of the wreck. At that time the nameplate, the steam whistle and the ship's bell and a few smaller objects had been salvaged from the vessel.

1983:

In a report of 1983-12-07 Åke Berghner, one of the divers who had investigated the E. Nordevall after it was located described the recording measures taken at the site (SSHM Dnr: 1984 / 48).

1984:

In November C. O. Cederlund advanced a plan to the manager of the Göta Canal Company for the investigation of the E. Nordevall in order to, if possible, prepare it for salvaging, conservation and exhibition in a museum (ERIC NORDEWALL. SO M MARINARKEOLOGISKT PROJEKT. Några planeringsfrågor 1984-11-02).

1985:

On 1985-03-11 the manager of the Göta Canal Company invited individuals to a meeting at the head office of the company on 1985-04-25 to establish a project group for the investigation of the E. Nordevall. A plan for the first two steps of this had at this time been developed and was enclosed with the invitation.

Shortly after this, Cederlund reported on the preparations for the performing of a photo plan of the ship and other recording measures. From June 1985 the field investigation started.

1986:

From early on the project was intentionally directed towards gathering information and the visualisation of the E. Nordevall through different media – for example, through exhibitions, radio, newspapers and research. This appears clearly in the minutes of the meetings of the project group. A plan for the

marketing of the project was ordered at the meeting of the project group on 1986-02-05. It was also decided at this time that the under water documentation should be performed in such a way that it could visualise the vessel as well as it was possible to do. A special plan was developed for this.

1987:

A report on the documentation work during 1986 was produced on 1987-03-06 together with a special description of the Swedish ROV used for the work.
During the spring of 1987 the plans for the investigations during this year were produced at which those artefacts which might otherwise be damaged or disappear were to be salvaged. A plan for the field investigations was produced by Cederlund on 1987-06-25.

1988:

On 1988-03-04 Åke Berghner reported about the diving on the E. Nordevall during 1986 and 1987. During this year Cederlund (1988-05-03) produced a report on the investigations during 1985-1987. A plan for the complementary recording of photo plans of the E. Nordevall was produced by Cederlund on 1988-08-09.
At the meeting of the project group on 1988-09-21 it was decided to establish a technical group for the planning of the salvaging of the ship, and also a special group for the storing of the vessel after its salvage, as well as a group for the archaeological treatment and conservation of the vessel (see minutes of the meeting on 1988-09-29)
During this year the technical aspects of a salvage operation started to be planned and actual plans were produced for this purpose. The archaeological measures necessary for the salvaging were also considered and put in writing (see the correspondence in The SMA, as well as the minutes of the meetings within the project group and the planning group for the salvage operation).

1989:

During 1989 the University of Technology in Gothenburg performed tests on the wood in the E. Nordevall to investigate if it was strong enough to be salvaged.
During the summer of 1989 Cederlund wrote and presented the antiquarian report on the investigations during 1985 to 1988 (Cederlund 1989).
Chalmers University of Technology produced a report on the salvage methods that could be used to salvage the E. Nordevall (Egeland & Thulin 1989).

1990-1991:

During 1990 and 1991 the planning and investigation of the salvaging, excavation, preservation and exhibition of the E. Nordevall was performed within the special investigation group established at the Östergötland county administration (see the meeting minutes, plans etc in the SMA, SSHM). These developments are more thoroughly described in the section about the salvage plans in this presentation.

1992-1993:

During 1992 and 1993 a report about the salvage investigation was disseminated and the responses evaluated, as described in another section of this presentation.

1996:

In 1996 some of the bigger parts, such as the gaff from the E. Nordevall´s rigging were illegally removed from the ship's site. The objects had been located on the bottom at some distance from the ship. The removed objects were salvaged and taken care of by a private individual and were later taken to the Göta Canal company to be deposited at the ship's site again. Cederlund in a letter to the dept of the care of ancient monuments at the Östergötland county administration of 1996-12-05 highlighted the ongoing deterioration and illegal salvaging on the E. Nordevall and asked for action to be taken for the protection of the ship (see below; 1999-11-24).

1999:

In a letter 1999-06-04 (360/99-411) from The Swedish National Maritime Museum to the Östergötland County Administrative Board the former recommended that the wreck and a zone on the bottom around the wreck would be protected through a diving and anchoring prohibition. The main reason for this was that the museum had been studying the wreck for a long time, and was thus able to observe extensive, intentional disturbances and destruction on the site.

In connection with this, the museum also suggested that the mast boom, which had been salvaged, would be returned to the site.

On 1999-08-05 (509/99-412) the Swedish National Maritime Museum in a letter to the Central Office of National Antiquities recommended that the finds salvaged from the E. Nordevall in the 1980s – the ships bell, the nameplate, a steam whistle, a porcelain plate and a block - would be formally allotted to the Kanal- och Sjöfartsmuseet i Motala (Canal and Seafaring Museum in Motala), for storing and exhibition there.

On 1999-08-17 (125-4403-99) the Östergötland County Administrative Board delivered its decision on an anchoring and diving prohibition on the site of the E. Nordevall. The reason was the recurrent diving on the wreck site and the destruction of the wreck because of it. The anchoring prohibition was to be valid at the wreck of the E. Nordevall at its site near the island of Jungfrun in Lake Vättern. The prohibition was valid in an area covered by a circle with its centre at the shallows near the island of Jungrun, and this area would have a radius of half a nautical mile. The prohibition decision was to be effective from the end of August 1999.

On 1999-11-24 (221-13102-99) the Östergötland County Administrative Board delivered its evaluation and decision on the permission granted to Motala Musei- and Hembygdsmuseum to salvage and preserve a mast boom (the gaff) from the wreck of the E. Nordevall in accordance with the Ancient Monuments Act. The former had been salvaged in connection with fishing activities in the area

and was at the time lying in a small fishing harbour in Vadstena community (see the year 1996 above). The County Administrative Board granted the request on condition that the project was performed under the supervision of the Swedish National Maritime Museum. A further condition also stated that the County Administrative Board would determine the way in which the final storing of the mast boom was arranged.

2000:

In its decision of 2000-06-13 on the matter of the allocation of objects salvaged from the E. Nordevall, the Central Office of National Antiquities (325-3945-1999) stated to the Swedish National Maritime Museum that the objects should be allocated to the latter museum. Also in accordance with the decision of the central office, the same thing was stated in a letter to the Kanal- och Sjöfartsmuseet i Motala of 2000-08-01 (509/99-412) which gave the information that it would deposit the same objects in the care of the latter museum.
In a letter of 2000-06-13 the Central Office of National Antiquities stated that it had decided to transfer the formal ownership of artefacts raised from the E. Nordevall in the early 1980s to the Swedish National Maritime Museum. In a letter to the administrative board of Östergötland county of 2000-10-16 the Swedish National Maritime Museum declared that it had decided to grant the formal deposition of the same artefacts to the Canal and Seafaring museum in Motala, where they were already stored and exhibited. In a letter to the Canal and Seafaring museum in Motala of 2000-08-01 (dnr 509/99-412) the Swedish National Maritime Museum asked for co-operation with the formal handling and registration of artefacts from the E. Nordevall stored at the former museum.
In a letter of 2000-10-16 (506/00-412) to the administrative board of Östergötland county administration, the Swedish National Maritime Museum stated that since the introduction of the diving prohibition at the Nordevall site more finds had evidently disappeared from there apart from the ones salvaged from the site in the1980s, namely a bronze part of the steering handle and also the mast boom from the vessel.

2001:

On 2001-01-16 (220-558-01) the administrative board of Östergötland county administration received a request for permission to salvage the paddle steamer E. Nordevall from "Föreningen Hjulångaren Eric Nordevalls bärgning" (The society for the salvage of the paddle steamer Eric Nordevall). The request was transmitted to the Central Board of Ancient Monuments, the Swedish National Maritime Museum and the Östergötland County Museum for consideration.
On 2001-05-22 the Central Office of National Antiquities responded to the request by saying that the salvage could be performed on condition that the full coverage of the cost of a salvage operation could be guaranteed before the salvage work was started. This financial condition should also apply to the archaeological work before, during and after the salvage operation, as well as to the conservation of the ship. The questions about how the ship would be

preserved and exhibited also had to be agreed upon before the start of the work.

The Central Office of National Antiquities in its written statement of 2001-05-22 (321-809-20019) appreciated the strivings to salvage this very valuable shipwreck and to exhibit it thereafter. It had no objections against this. Permission had nevertheless to be connected to the condition that the full financial covering of the project is obtained before the work is started, including that relating to the archaeological work before and after a salvage operation, and for the conservation of the hull. Uncertainties about how the ship was to be stored and exhibited after the salvage operation also had to be resolved.

The Swedish National Maritime Museum in its statement of 2001-03-27 (Dnr 198/01-51) had no objections against salvage permission being granted under the same conditions which had been given by the Central Office (see above). The museum was prepared to assist the association established for the salvage with the calculations of the cost for the archaeological work connected with the salvage.

The administrative board of Östergötland county in its judgement on the application for the salvaging of the E. Nordevall on 2001-07-03 (220-558-01), stated that the ship had a high value from the point of view of cultural and technological history, as it belonged to the first generation of steam ships. The administration agreed with the statement that the ship had to be taken care of in one way or another in order that it was preserved for the future. It would also be of great value if it could be exhibited and shown to the public. On the other hand, it did not agree with the proposal about museum premises suggested by the society for the exhibition of the E. Nordevall.

The country administration is positive about the idea of salvaging the E. Nordevall but is, on the other hand, not prepared to grant permission for this until the applicant has been able to show that the conditions which were stipulated in the statements on this issue given by the Swedish National Maritime Museums and the Central Board of National Antiquities have been met. The salvage application was referring to that not agreed to by the County Administrative Board, which has the responsibility to take the formal decision on issues of this kind.

On 2001-02-21 (125-646-01) the administrative board of Östergötland county gave permission for a skin diving group in Linköping to dive at the E. Nordevall in order to record the ship. According to the report given by the group on 2002-03-01 six diving operations had been performed in order to photograph and film the vessel. An unedited version of the video film made was submitted to the County Administrative Board.

On the other hand, in August 2001 a skin diving group from Jönköping were not given permission by the country administration (125-10231-01) to dive on the E. Nordevall, as the diving was not intended to record the wreck, which was seen as the only reason to give such permission.

2002:

On 2002-06-14 the County Administrative Board gave permission to a skin diving group in Linköping (see above under 2001) to dive at the site and make recordings on the E. Nordevall on condition that a report was delivered about the diving.

The paddle steamer "E. Nordevall" in the European Community Culture 2000 Programme: "Monitoring, Safeguarding and Visualising North-European Shipwreck Sites: Common European Underwater Cultural Resource Management" (MoSS).

The paddle steamer "E. Nordevall" has been chosen as the Swedish study case in the marine archaeology project within the European Community Culture 2000 Programme: "Monitoring, Safeguarding and Visualising North-European Shipwreck Sites: Common European Underwater Cultural Heritage – Challenges for Cultural Resource Management" (MoSS). The Swedish partner in the project, Södertörns högskola (University college of South Stockholm) and professor Carl Olof Cederlund there, will study the conditions, options and alternatives available to preserve and visualise the paddle steamer "E. Nordevall" in society - today and in the future.

Attachment 2

Deterioration and damage to the wreck since its location had been identified

General aspects

The identification of depredation to the wreck of the E. Nordevall is based on divers´ observations, and comparisons of early surveys, still photos, film recordings with a hand-held camera and ROV and the condition presently observed.

When the wreck was located in 1980 it was festooned with fishing nets, ropes etc. caught by the ship on the bottom. Several times [for example in 1986] debris had been cleared away, but over the years new debris had accumulated. This meant fishing and other activities continued over the site. Fishing equipment not only became snagged by the wreck, but also tore loose structural parts. For example the gaff, which earlier was resting on the fore deck had been displaced to the bottom a short way from the ship (see the following).

The ongoing corrosion of iron in the hull is substantial, which has the effect that screws, nails and bolts simply rust away. Lighter constructional details thereby come loose and fall away.

A light current exists in the area. An indicator of this are the erosion pits in the bottom sediments, caused by the currents around the wreck and other bigger objects on the bottom. The current may also have carried smaller, loose pieces of the ship's structure away.

Finally there are examples of diver intrusion and depredation. This is particularly evident below deck, which is protected against currents and fishing damage. Examples of such damage are the stairs down to the cabins in the stern which have been removed, a cupboard demolished in the captain's cabin as well as the bulkhead between the fore saloon and the engine room which has been torn down.

It should be mentioned that no more windows or portholes have been broken since the early survey of the ship. The present situation is that of the ten larger glass windows in the cabin, four were missing or broken at an early stage, the others are intact.

The superstructure

The early survey showed that the compartments forward and aft of the wheelhouses were partly torn down, with the exception of the one forward of the wheel on the port side, housing the heads, which was nearly intact, except for the roof. Today all this is demolished.

The doghouse for the stairs down to the cabins and for the cargo hatch has lost the roof and hatchway lids. The combined binnacle and skylight on the aft deck has been partly demolished.

Loose construction parts lying on deck

Mid ships there was a scattered pile of planks consisting mainly of parts of the wheelhouse. Planks and boards have been added to the pile from compartments of the wheelhouse, the pile is still getting smaller as wood is taken. For example the long planks, which once may have constituted the bridge, are not possible to locate. It is possible that some of this material has moved to the lakebed, but on a recent survey little could be found.

The davit on the port side at the stern had been lying on the deck and is now missing. The starboard davit, which had been in the right position is now torn loose and lies at the steering position.

Hull construction

The structure supporting the figurehead is now missing from the starboard side. One stanchion supporting the figurehead has partly been loosened from the hull.

The gates in the openings in the safety rail on the aft part of the port side were in position but are now missing. The gates on the other openings have been missing since the recording of the ship started. No changes have been observed to the state of the hull itself.

Other constructions and artefacts on deck

The funnel, which was standing supported by stays, may have lost some of its height. The upper part is since the localisation lying on the deck aft of the funnel towards the port side. A diving line damaged the vertical safety valve during work in May 1990. This copper tube (diameter 2-3 inches) has been bent down to deck level and now points forward. One of the brass tips, which were on the ships steering mechanism, is missing. The handle itself is manufactured of iron and is heavily corroded. The mast is intact. The gaff, which was lying on deck earlier, was carried away from the ship and later relocated and salvaged (see the following). Several metal and ceramic artefacts lying on deck and recorded in early photo documentation are now missing.

Constructions below deck

In the fore saloon the fixed benches are more dilapidated than earlier. The legs of fixed tables are gone. The aft bulkhead of the saloon towards the engine room has been demolished. A large number of empty (return) soda water bottles stored in this saloon have all been taken away illegally.

The stairs going down to the cabins in the stern part of the ship have been tossed stern wise and are blocking the corridor between the cabins. The cupboard in the captain's cabin has been demolished. Damage has taken place to many detailed parts of the interior, for example, the carafe holders in the aft saloon have been partly demolished.

Conclusion

The natural environmental deterioration processes have been accelerated by human activity since the wreck of the E. Nordevall was rediscovered. This process is partly inevitable, in spite of the unusually good conditions in Lake Vättern, which has enabled the wreck of E. Nordevall to survive. On the other hand, it is no brave statement to say that unauthorised diving on the wreck, before and after the diving ban, has accelerated the destruction. According to a letter to the county administration from the Swedish National Maritime Museum the demolition of the ship has continued after the introduction of the ban [16th October 2000; Dnr 506/00-412].

Attachment 3

Previous studies:

Printed sources:

Cederlund, C.O. 1987, The Eric Nordewall - an early Swedish paddle steamer. Theoretical Approaches to Artefacts, Settlement and Society. Studies in honour of Mats P Malmer. B.A.R. International Series 366, 1987, p 515-539.
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Egeland, L., & Thulin, K., 1989, Bärgningsmetoder / bärgning av Erik Nordewall, CTH, Göteborg.
1988, Hjulångaren "E. Nordevall". Väl bevarad, värd att bärgas. Kristianstad.
Muncktell. I.M., 1991, Hjulångfartyget E. Nordevall. Bärgning och Bevaring. Beskrivning och kostnadsuppskattning. Uppsala (Dupl.).
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Cederlund, C.O., (ed.) 2003. MoSS Newsletter. A shipwreck research project funded by the European Union Culture 2000 Programme. The Eric Nordevall. 3/2003.
Cederlund, C.O., (ed.) 2004. MoSS Newsletter. A shipwreck research project funded by the European Union Culture 2000 Programme. Visualisation. 1/2004.

Attachment 4

The historical background of the paddle steamer E. Nordevall (1836 – 1856)

In 1980 scuba divers located the wreck of the paddle steamer "E. Nordevall" on the bottom of the large Lake Vättern in the central part of southern Sweden. The vessel was built at Hammarsten´s shipyard in the town of Norrköping in 1836-1837 and launched in 1837. It was built for traffic on the Göta Canal across Sweden, which had been opened to its full length just five years earlier. The ship represents the first generation of steam ships in Europe that were in general use. This ship type was originally developed in Scotland for traffic on rivers and river estuaries there in the 1820s. The two side-lever-engines in the E. Nordevall were designed by Daniel Frazer, a Scottish engineer, who was the technical leader of Motala Verkstad at this time. The Motala Verkstad was one of the first mechanical factories in Sweden, and of dominant importance for the development of marine steam engines and shipbuilding in the country in the 19th century.

The "E. Nordevall" was designed by one of Sweden's most well-known ship designers in this period, the naval officer Johan Gustaf von Sydow, for the shipping company started for steam ship traffic on the Göta Canal. The vessel was named after the engineer Erik Nordewall (1783-1835). He was one of the most prominent technicians in canal and lock building in Sweden in the late 18th and early 19th centuries, and designed and dug the channels for, among many others, the locks at Trollhättan and Södertälje, both part of the Göta Canal.

See for further information on the historical background:

Cederlund, C.O. 1987, The Eric Nordewall - an early Swedish paddle steamer. Theoretical Approaches to Artefacts, Settlement and Society. Studies in honour of Mats P Malmer. B.A.R. International Series 366, 1987, p 515-539. Also in the International Journal of Nautical Archaeology and Underwater Exploration (1987) 16.2, p 109-134. and Cederlund, C.O. (ed.) 1989, Rapport över den marinarkeologiska undersökningen av hjulångfartyget E. Nordevall 1985 - 1988. Statens sjöhistoriska museum, 1989 (Dupl.)