

GÖSTA SELLING.
THE WARSHIP « WASA »

The archaeologists' daily work is in most cases fairly uneventful and laborious but sometimes, for a change, they make a most sensational find, when the boldest expectations are exceeded. This was the case one day in August 1956, when a zealous marine archaeologist, Anders Franzén, hauled up a piece of blackened oak from the bottom of Stockholm Harbour. For several summers he had dragged and sounded the waters of the harbour in vain to try and find the wreck of a large warship, the *Wasa*, which, according to historical documents, had gone down "With sails set, flags flying and all" in the harbour on 10 August 1628 on her maiden voyage to the theatre of war in Germany. Of course, Franzén was not immediately certain that it really was the *Wasa* that he had found, though the position tallied with the information given in the archives. However, an investigation by Mr. Fälting, the Swedish Navy's most skilful diver, confirmed this supposition. At a depth of 32 metres the hull of a large ship lay upright on its keel. A few months later the 18-metre-long foremast and some carved details of an unmistakably 17th-century type were fished up. In the inky black water Mr. Fälting also managed to make a drawing of the hull, the dimensions of which corresponded to those of the *Wasa*. His drawing later turned out to be in error by only 38 cm. All the evidence indicated that the *Wasa* had indeed been found.

The find aroused enormous interest and the Neptune Salvage Company offered to raise the wreck, if only the Navy divers would do the underwater work. But would it be technically and financially possible to raise the ship in its entirety? Could it be preserved and exhibited? Were the efforts worth while from the scientific and museum points of view?

The hull was a huge one; 47 m (150 feet) long, 12 m (36 feet) wide and 14 m (42 feet) high, i.e. almost as high as a five-storey building. Its displacement was calculated to be 1400 metric tons and its weight under water to be 700 tons. In addition there was the ballast, the equipment and all the mud in the hull. As all the forged ironwork — bolts, plates, etc. — had been eaten away by rust, it was a question whether the hull would hold together if it were raised.

We all know how difficult it is to preserve wooden objects that have lain in clay or water, to soak them and to prevent them from cracking and changing shape. Only a few hours' drying in the sun may often be disastrous.

Even the detached carvings salvaged from the wreck were troublesome on account of their size and extra-large vats had to be obtained, in which they could be soaked and prevented from falling to pieces by drying out. How was one to go about preserving the gigantic hull, which had been called "the world's biggest preservation job"? It was a considerable time before an answer was obtained to that question.

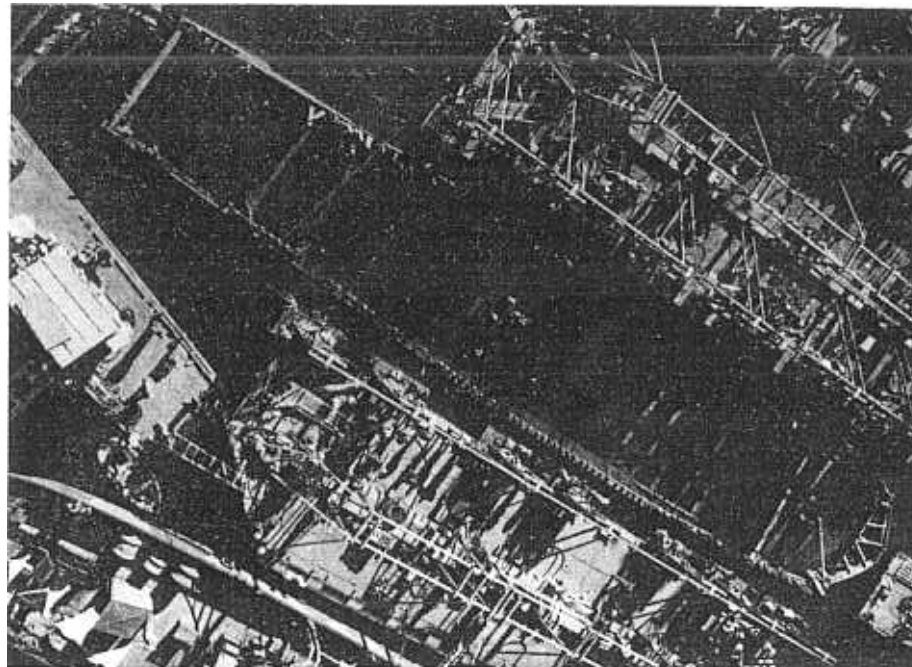


Fig. 1. The warship «Wasa». Airview from 24th April 1961.

It was easier to decide as to the scientific value of the *Wasa*. This ship is unique. It dates from a period in which we know little of the contemporary craft of shipbuilding, as neither drawings nor models have been preserved. No large sailing ship has been preserved from the period between the old Norse Viking ships and Nelson's *Victory* at the end of the 18th century. It is hardly likely that a similar wreck will be found anywhere else, for all woodwork is rapidly and inexorably destroyed by the ravages of the shipworm in saltier water than that of the Baltic.

In addition all the equipment on board, from the cannons to the crew's kit and personal belongings, would give an invaluable picture of the daily life of the community in the 1620s. The rich sculptural ornamentation, which has been exactly dated and was carried out by artists whose names are to some extent known to us, is an important object of research from the point of view of art history.

A committee was appointed and decided that the salvage work should be commenced. Financial support was received from two foundations, one of them the Royal Foundation for Swedish culture. In 1957 the Navy divers dug six tunnels through the clay under the hull for the lifting cables. This work had to be carried out with the aid of specially designed suction and hydraulicking hoses. At the same time a large number of detached carvings were salvaged. These decorations had been torn off in the course of time, mainly by the dropping of

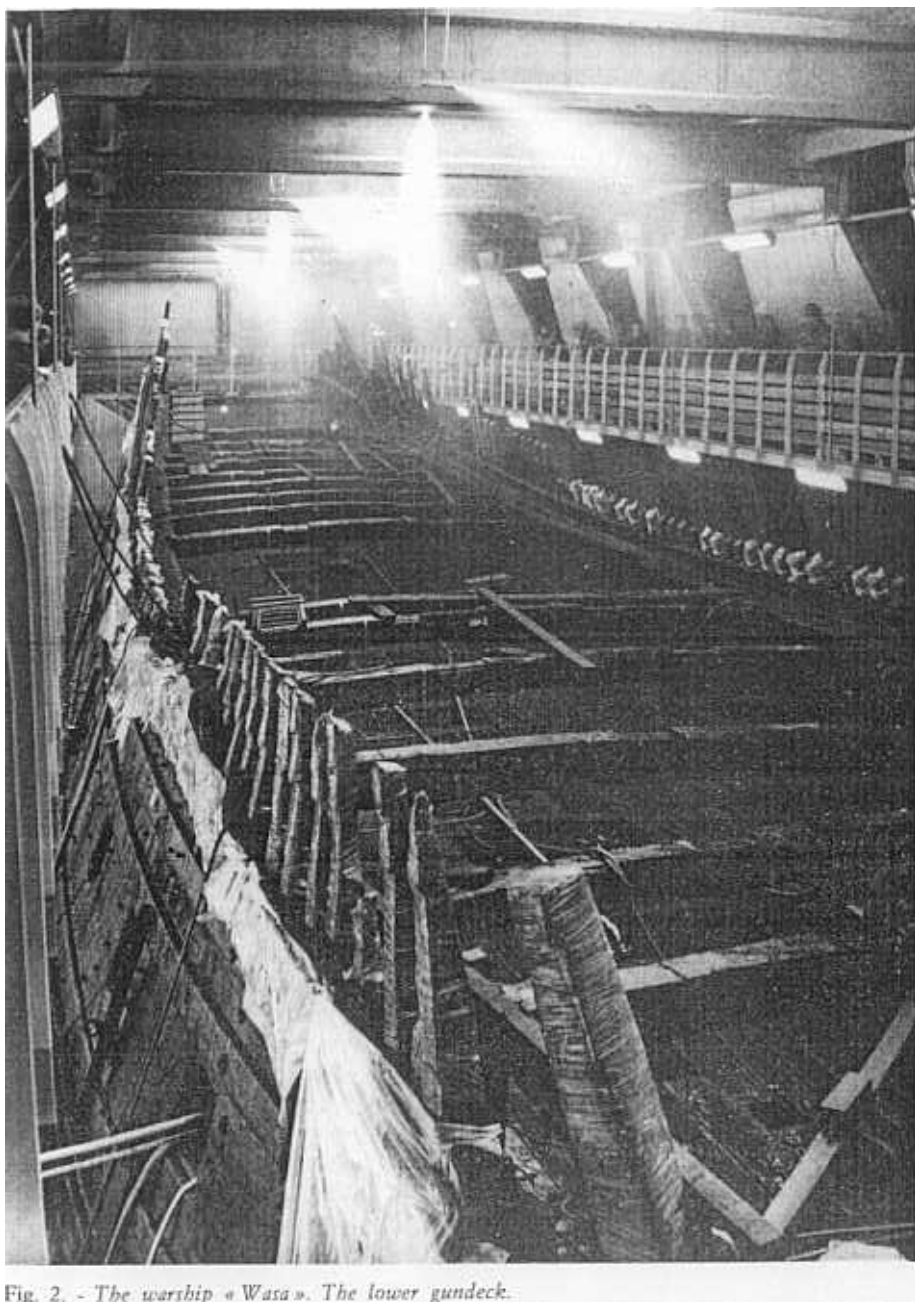


Fig. 2. - The warship «Wasa». The lower gundeck.

anchors. About thirty anchors of different periods were found in and around the sunken ship. They had caused a great deal of damage in the bows but mostly in the high poop.

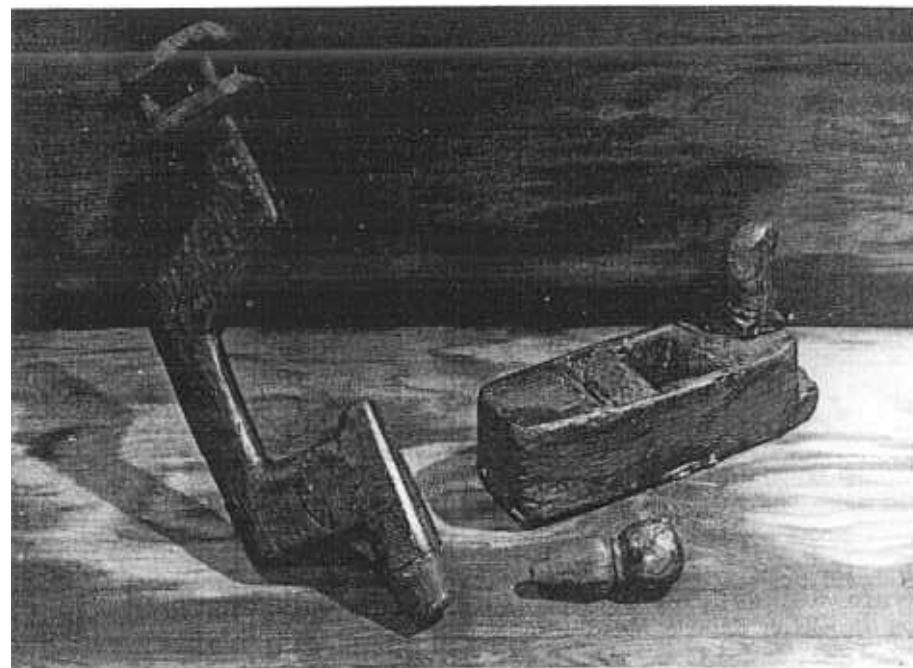


Fig. 3. The warship «Wasa». Some of the carpenters tools found on board (borer and plane)

By the autumn of 1959 the preliminary work had been done and with the aid of two large pontoons the hull was successfully drawn out of the clay. It held together! Slowly — in 18 stages — it was towed in towards shallower water and set down at a depth of 16 m. During 1960 and 1961 the divers worked on the stopping up of all the cannon ports, bolt-holes and damaged parts and on temporary repairs to the gaping hole in the stern. The work was easier at the smaller depth but there was still total darkness; the divers' success in these circumstances is a fantastic achievement. In order to lighten the ship, the clay and mud were sucked up through large-sized hosepipes and substantial objects and finds were filtered out.

In the meantime the preservation of all the loose finds was proceeding. At first glycerine and linseed oil were used to replace the evaporating water and prevent the formation of cracks, but the result was not satisfactory. Other Preservatives, such as arsenic, acetone and methyl cellulose, were tested but it was finally decided to use the polyethylene glycol method patented by the Swedish firm of Mo & Domsjö Company. Polyethylene glycol in a slowly increasing concentration and at a temperature rising to 70°C was used as a stabilizing medium. A fungicide — as a rule, phenol in a low concentration — had also to be introduced into the solution.

On 4 April 1961 the Neptune Company were ready for the final lift and on 24 April the *Wasa* surfaced again after 333 years in the depths. It was a

thrilling occasion, watched by crowds of spectators and broadcast by radio and television to various parts of the world. As soon as the upper deck was above the surface of the water, pumping began — the pumps had a capacity of 30.000 litres per minute — and on 4 May the hull was floating so high out of the water that it could be towed, with a pronounced list, into a dry dock. It was placed on a specially built concrete pontoon, in which it was shored up with iron hoops and stays. In order to prevent drying out, all prominent parts were covered with plastic sheeting and a sprinkler system was also installed, by which the whole ship was wetted day and night. At the same time this sprinkling, which went on for 10 months, cleaned all the free surfaces, a much-needed and very valuable piece of work.

Meanwhile the archaeological excavation of the ship's interior proceeded. In its three centuries underwater the hull had been filled with more than 1000 cubic metres of mud. From this mud eleven archaeologists recovered a large quantity of the ship's equipment and the crew's effects, several casks for food and ammunition and the skeletons of some of those drowned, which now received a belated burial in the Stockholm Naval Cemetery. Most of the objects are of wood but other objects found included shoes and clothing, coins, ornaments, pottery, pewter vessels, articles made of bronze and brass, the largely decayed anchor hawser and remains of sails. On the other hand, as has already been mentioned, all the forged iron had been eaten away by rust. The work was very difficult, especially on account of the continuous artificial rain and the confined spaces. The archaeologists had to don rubber clothing for work and wear crash helmets as a protection against falling objects.

Of the ship's 64 cannons, only three were found, while practically all the wooden gun-carriages were preserved. It turned out that in the 1660s a total of 54 cannon had been successfully recovered with the aid of a primitive diving bell, a fantastic achievement at so great a depth at the time, as the largest cannons weighed about 1700 kg.

The excavation was completed in September 1961 and by then about 16.000 objects had been recorded. In the autumn of 1961 the aluminium housing which now protects the ship was built on the thermos-flask principle, and the temporary museum known as the Wasa Dockyard was erected. Inside the aluminium housing a very high degree of humidity — about 95% — is maintained, in order to prevent the wood drying out and cracking. Polyethylene glycol is sprayed on the hull at the same time. In addition the hull is being propped up and all rusted bolts are being replaced by new ones of stainless steel. It is expected that it will gradually be possible to reduce the humidity, but the ship's preservation will certainly take about another 5 years. Checks are being made all the time on the extent to which the wood is absorbing the preservative.

Certain parts of the ship have to be detached, in order to give them preservative treatment in the building specially erected for preservation work. Here chemists are working on methods of preserving the many different materials represented amongst the finds. An account is given of a number of these methods at the exhibition here in Venice.

Diving is going on at present on the site of the disaster and sculptures and other objects are continually being found. This diving work will presumably have to continue for another couple of summers.

The measurement and photographing of the hull and its details are proceeding. This work is to serve as a basis for the final restoration of the ship. It is expected that it will gradually be possible to replace the carvings, the rudder, the broken masts, the cannon ports, etc. in their correct places. The guiding principle is to use original material as far as possible.

In the present museum premises exhibitions of finds, as they are preserved, are being arranged. The public also has access to the actual pontoon housing, where the huge hull can be seen from the outside in its watery mist.

The *Wasa* has aroused great interest all over the world and up to now the museum has had nearly 500.000 visitors each year. It is intended to build a permanent Wasa Museum, as soon as it is possible to survey the results of the reconstruction and preservation work in their entirety.

GÖSTA SELLING
LE NAVIRE DE GUERRE "WASA".
RÉSUMÉ.

En Août 1628, le grand navire de guerre Wasa, au cours de son voyage inaugural du port de Stockholm au théâtre de Guerre en Allemagne, coula en quelques minutes. 328 ans après, la coque fut retrouvée dans le port, à 32 mètres de profondeur, reposant toute droite sur sa quille. Il fut alors décidé de chercher à sauver le navire, difficile et coûteuse entreprise s'il en fut, et, en Avril 1961, le redressement final et l'accostage eurent lieu et les fouilles archéologiques purent commencer. Un grand nombre de sculptures détachées furent récupérées dans le limon du port. Pour leur conservation on a utilisé du polyéthylène glycol en lente et croissante concentration et à une température allant jusqu'à 70° C., avec un fongicide. De la coque on a retiré une grande partie de l'équipement et des effets de l'équipage: des chaussures, avec vêtements, de la monnaie, et également de la vaisselle, des vases d'étain etc... etc... en tout plus de 16.000 objets: un édifice spécial pour la conservation de toutes ces choses a été bâti...

La coque est maintenant placée dans un logement d'aluminium, sur le principe de la bouteille thermos, où une humidité de 95% est maintenue afin de prévenir les dessiccations et les ruptures du bois. La coque a été étayée et les boulons rouillés on été remplacés par des boulons en acier. La conservation avec le polyéthylène glycol durera encore pendant cinq ans.

Le Wasa est unique. Il date d'une période de laquelle nous connaissons très peu de chose en matière de construction navale. Aucun grand navire n'a été préservé entre les Vikings et la Victoire de Nelson.