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 holdest expectations are exceeded. This was the case one day in August 1936, 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sounded the waters of the harbour in vain to try and find the wreck of a large warship, the Wasa, which, according to historical documents, had gone down "With sails set, flags flying and all" in the harbour on 10 August 1628 on her maiden voyage to the theatre of war in Germany.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 could 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.

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 hydraulic 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 gun deck.

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
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 300,000 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.

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

En Avril 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 était possible.

Déjà en Avril 1961, le redressement final et l'accostage eurent lieu et les fossiles archéologiques purent commencer. Un grand nombre de sculptures déchirées 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 fungicide. 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... 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 élayée et les boulons rouillés ont 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 connaissions très peu de chose en matière de construction navale. Aucun grand navire n'a été préservé entre les Vikings et la Victoire de Nelson.