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## The Late Hellenistic shipwreck from the Bay of Paržine, Island of Ilovik (Kvarner, Croatia)

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Paržine Bay opens up to the southeast of the island of Ilovik in the Kvarner archipelago.

Here, Miran Erič, an expert archaeologist of the Ministry of Culture of Slovenia, discovered a shipwreck in 2016, that he rightly considered ancient due to the presence of “tenons & mortises” joints in the planking. He reported the discovery to the director of the Museum of Lošinj, Zrinka Ettinger Starčić and, the following year, Igor Miholjek of the Department of Underwater Archaeology of the Croatian Conservation Institute, organized a short survey that confirmed the interest of the site and the good preservation of the wooden structures.

During the survey, the upper part of the north side of the ship was partially uncovered. Twenty frames and three strakes assembled by "tenons and mortises" joints were documented. Then, the result of the radiocarbon AMS analysis of a sample of wood from the hull placed the construction in the first half of the second century BCE.

In 2018, Igor Miholjek contacted the Centre Camille Jullian in order to start an international collaboration focused on the excavation and study of the ship’s remains. The 4<sup>th</sup> campaign had just been completed two weeks ago.

Thanks to an agreement signed between the Croatian Conservation Institute and the Croatian Ministry of the Interior, the project had the opportunity to house all the participants in a building belonging to the Special Forces of the Police, in the Kovčanje Bay on the island of Losinj.

The collaboration with the Special Forces of the Police offered all the logistical support necessary for an underwater archaeological mission (inflation of tanks, storage of diving equipment and archaeological furniture, running water, basins for desalination, work spaces, internet) including the motorboat to reach the bay of Paržine, which is 13 nautical miles south from Kovčanje.

Each year, the work program was divided into several activities beginning with the excavation and the cleaning of the findings and the ship’s structures, continuing with the systematic application of the photogrammetry as the principal method of documentation but also employing direct measurements and observations, realizing selective dismantling of structures to reach and document hidden parts of the hull, sampling for analyses, and ending with the final site protection with sand and sandbags. In parallel, a huge number of others activities of documentation were carried out in the Kovčanje base.

The first campaign was conducted in September 2018. The last one, as already said, finished two weeks ago.

In 2018, although the portion of the hull located in 2017 could not be found. Instead a small survey revealed the forward end of the bow complex and part of the cargo consisting of timbers and amphoras. In September 2019, the trench was expanded reaching a total area of 58 m<sup>2</sup>. The entire stem complex was cleared for a length of about ten meters.

The main objective of 2020 mission was to relocate the part of the hull seen in 2017 wasn't found in 2018. The initial program called for systematic trenching in the north/south, east/west, and northeast/southwest directions, starting from the 2018-2019 trench. Finally, the stern of the ship was found at around 20 m of distance from the bow complex. This part of the shipwreck was excavated in 2020 and 2021.

The ship was transporting a cargo of timbers and wine.

The wine was contained in amphoras belonging to the Adriatic Greco-Italic types. The existence of these wine amphorae, long unknown, was assumed by André Tchernia on the basis of epigraphic and historical evidence. Findings in contexts and in workshops have provided definitive proof. The earliest evidence are dated to the mid-third century BCE in a workshop dump in Rimini and in the Grado 2 shipwreck. The end of this production is difficult to date precisely because the form evolves towards the Lamb. 2, which will replace the Adriatic Greco-Italic in the first decades of the 1st century BCE. So a precise date for the Parzine amphoras is difficult to determine on the basis of comparisons because complete specimens are rarely found in well-dated contexts. Marie Brigitte Carre who realized a preliminary study, tends to date the amphoras within the 2<sup>nd</sup> or 3<sup>rd</sup> quarters of the 2<sup>nd</sup> century BCE.

Regarding the timbers: those are poles cut from evergreen oaks, stone pines and others Mediterranean small trees and shrubs as Phillyrea and Rhamnus. They conserved the bark.

The hull bottom, mainly in the stern area, was covered by a compact layer of rocks and pebbles corresponding to the ballast. During the 2021 campaign the rocks were retrieved in order to study the architecture of the ship. 864 rocks (from 1 to 40 cm) were examined by two geologists from the European Centre for Research and Teaching in Environmental Geoscience (CEREGE). All are predominantly carbonate sedimentary rocks. A selection of 72 samples was made for further laboratory studies. The samples will be used for the fabrication of thin sections which will allow a finer microfaciological and micropaleontological characterization. Geochemical (carbon and oxygen isotopes of carbonates) and petrophysical (porosity, permeability) analyses will also be carried out to refine the characterization of these materials in order to better constrain their origin.

Were also found fragments of black glazed and cooking ware, a small lamp and a fragment of grinding stone, and some carpenter tools. But the most sensational finding was a small female statuette in bronze, maybe the tutelar goddess on board. This statuette is actually under conservation process at the HRZ.

The ship presents some typical characteristics of the Hellenistic Ship Type as defined by P. Pomey. The keel forms with the garboards a typical wine-shape section. The garboards are trapezoidal in section and joined to the rabbets cut in the upper angles of the keel by large pegged tenons closely spaced.

In the direction of the stern, the keel is assembled to a transitional timber by a hook scarf secured by a vertical key.

The connection between the transitional timber and the stern post is similar.

This scarf is reinforced by an apron. The assembly of the garboards and the others strakes into the rabbets is secured by nails.

The only part that survived of the prow is the axial carpentry composed by two elements, an apron, part of the garboards and second strakes and a chock.

The foremost timber of the axial carpentry rises gradually and ends abruptly. Its upper surface is carved with a large mortise to settle a stem post. This gives to the ship a very peculiar shape, rarely documented by the archaeological record.

The planking is flush-laid carvel built and assembled by tenons and mortises joints.

The frame was found in its original position only in the stern area. It was assembled to the planking by treenails.

The frames present the classical alternation between floor timbers and half-frames. It seems possible to connect the empty space at the level of two half-frames at stern with the existence of a bilge pump.

The bottom was covered by a ceiling found under the ballast still in its original position at stern, (click) and completely destroyed and mingled to the cargo of timbers at prow.

Finally, the hull was covered by a thick layer of pitch. A metallic sheet was also observed inside the recess of the stem post to ensure tightness of the joint.

Unfortunately, any element belonging to the internal axial carpentry was preserved. Some displaced floor timbers found near the prow present the typical recesses to settle a keelson or a mast step.

In any case, some elements of the rigging were found strengthening the assumption that the Ilovik-Parzine ship was a sailing ship.

Although the study of the ship is at an early stage, it is possible to visualize some of the main characteristics of the ship shape.

Worth of note is the longitudinal section towards the prow with a the stem post almost forming a right angle with the keel. Precisely, one of the challenges of a future project of reconstruction will be the study of the possible profile of the prow.

Thanks to the completion of the archaeological study, and the comparison with some iconographical and archaeological evidence, we hope that it will be possible to arrive to a satisfactory reconstruction of the original ship.