

# ARCHAEOLOGICAL INVESTIGATIONS OF THE ROMAN COLONY PULA HARBOUR

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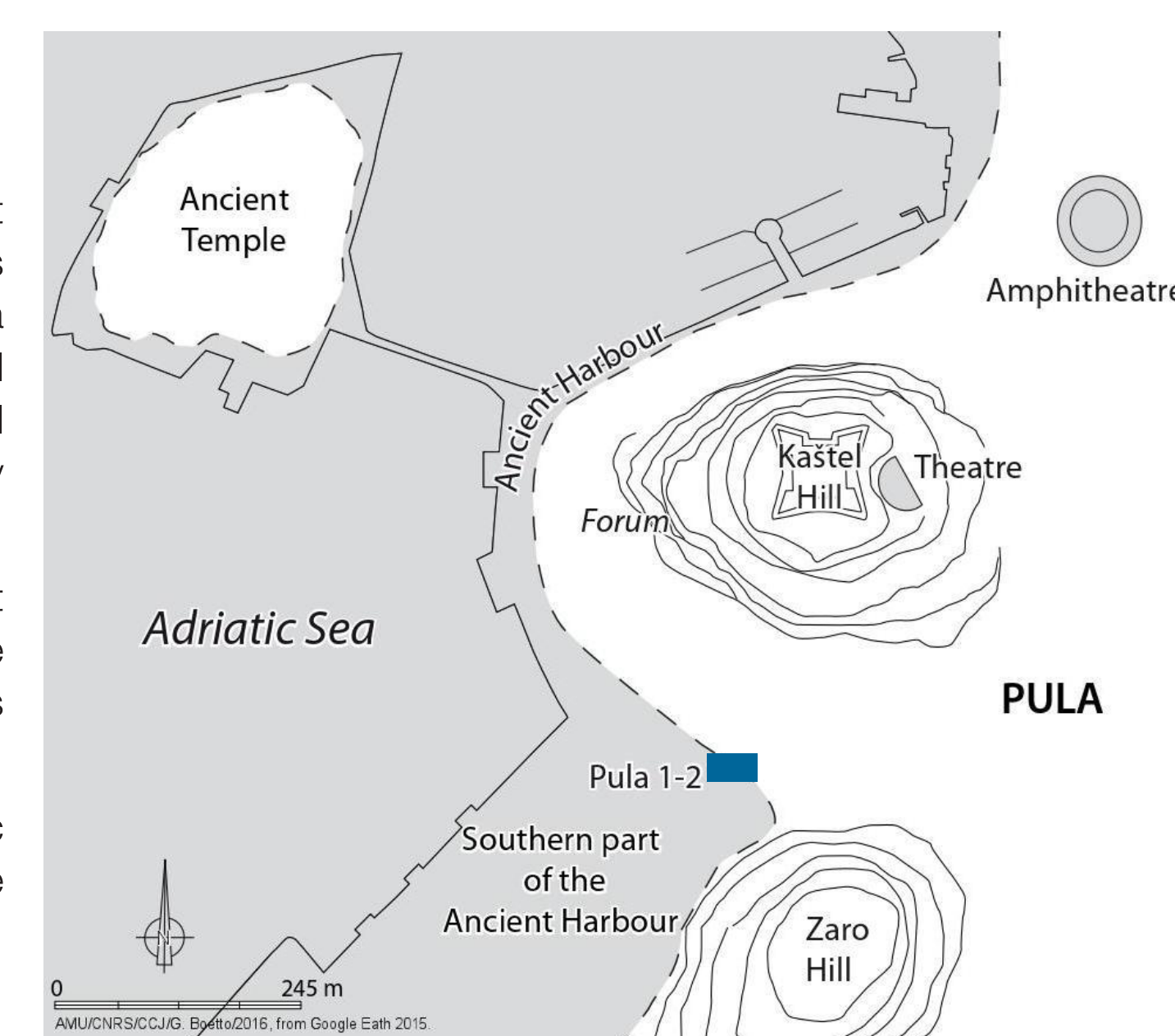
A. A. Tschobell / C. Kunz, 1842

## GENERAL INFORMATION

The Pula harbour is placed on the south end of the Istrian peninsula and is one of the most sheltered natural bays on the Adriatic coast. Today, the bay is indented 4.5 km in land, and its width is about 1 km. The inner harbour basin is naturally protected by the islands Saint Katarina and Saint Andrija. Due to the protected bay with a source of fresh water, on today's Pula's central hill, the Bronze Age and then the Histrian Iron Age settlement was developed. Archaeological research has shown that the settlement had spread to the seashore, which indicates the possibility that it served as a port or a harbour.

In the Roman period, the main strategic colonial harbour of the northern Adriatic was *Aquileia*, but because of the structure and the organisation of Roman power on the northern Adriatic and for the trade of goods, in the mid-1st century BC, there were three more strategic colonial harbours founded – *Tergeste* as a portorium and *Parentium* and *Pola*.

The maritime trading route that began from the colonial port of Pola went along the trans-Adriatic maritime highway in the direction of Italy (Ravenna in the west, Ancona in the south) or along the coast in the direction to *Aquileia* or *Illyricum* and beyond.



Plan of the Roman harbour in Pula / localization of two sewn ships (Pula 1-2)

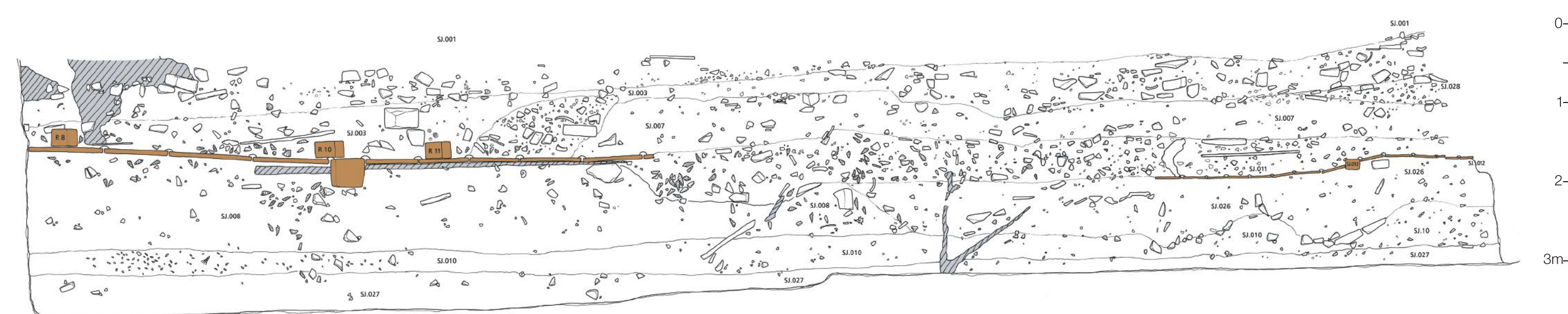
## INVESTIGATION IN THE AREA OF PULA'S HARBOUR

Between 2012 and 2013, the construction of rainwater and sewage collectors started along the waterfront of the city and was supervised by the Archaeological Museum of Istria.

In February 2013, during the excavation of a trench on Flacius Street at a depth of 5 meters below the street surface, preserved remains of sewn shipwrecks were discovered. The sewn ships (Pula 1 and 2) were investigated in the intact layers of a part of the Roman harbour situated southeast outside of the city walls. The thickness of the excavated archaeological cultural layer of the seaport is 3.40 m (0 - 3.40 m a.s.l.).

Up until the newest excavations, the assumptions about the exact place of a Roman harbour and its port installations have been based on the conclusions of archaeological patterns of urban architecture and also on the observations on the geological configuration of the area on which the Roman city was built. In Roman times, this part of the Pula port basin was a bay on whose southern part (Zaro Hill) a large Roman theatre was built, while on the northwestern part, the city's seafront was developed. The drawings of Pula from the Middle Ages give us an overview on how the city and its shore could have looked like. Due to the industrial building in the middle of the 19<sup>th</sup> century (Pula became the main arsenal of Austro-Hungarian's navy), the Roman Era traces on the shore and islands that could have been functioning as parts of the port's infrastructure have been overlaid.

The investigated part of the Roman harbour, because of glacio-eustatic changes, hydrological features, and human activities throughout the past, is now located at a distance of 160 m from the modern coastline and positioned deep within today's urban space. The investigated layers of the harbour are mostly alluvial and originate from today's still active stream, Pragraunde, which flows on the south-eastern edge of the old city. Preliminary processing of the selected archaeological material and the layers from which the samples were collected showed that the material dates from the first to the fifth century AD.



Pula, Flacius Street, northern profile, ships Pula 1 & 2 (in brown color) M 1:50

## SHIPS

The remains of two sewn ships, Pula 1 (8.1 m long and 4.1 m wide) and Pula 2 (6.1 m long and 2.1 m wide), were explored and partially extracted from the site.

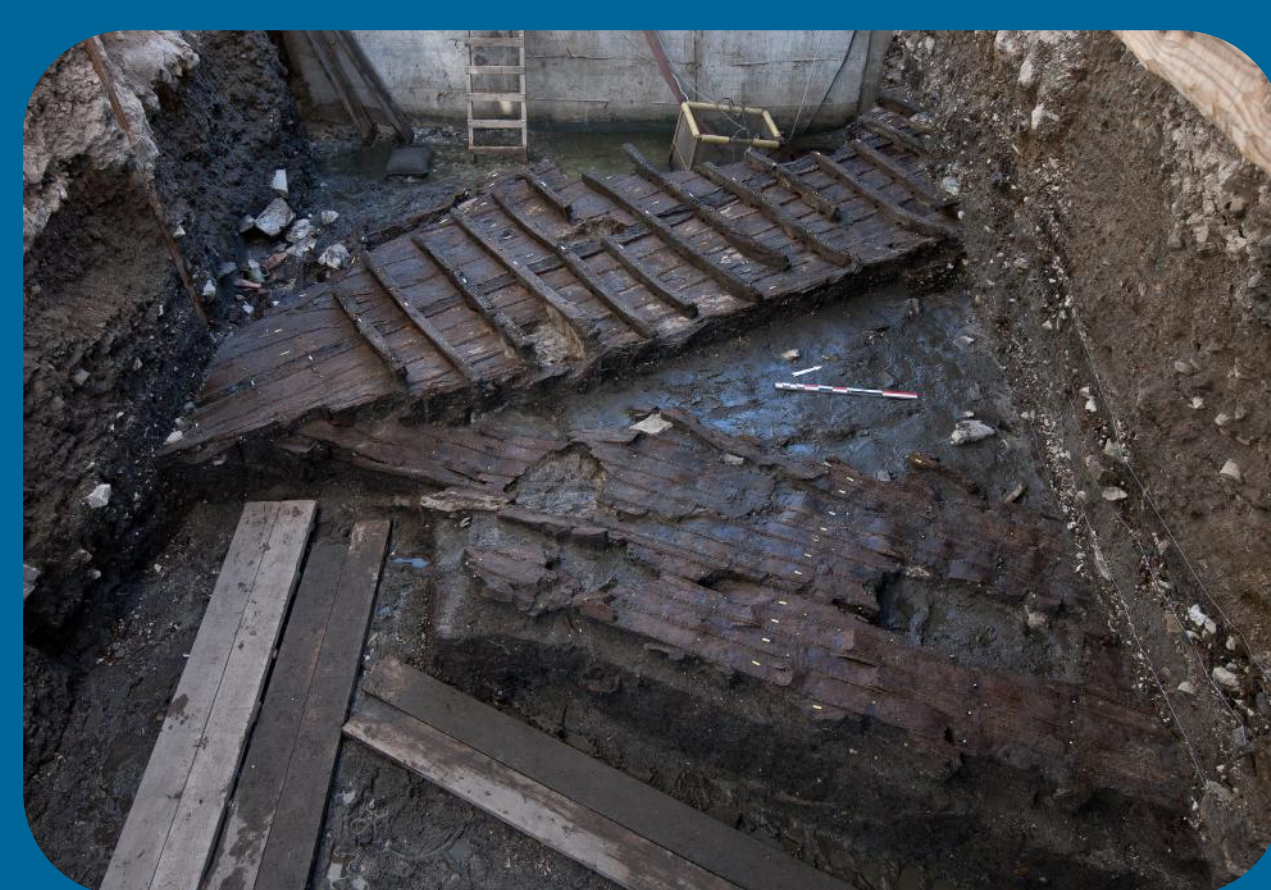
Their architectural characteristics, sewing pattern and original dimensions are different, but they were built with the same shipbuilding premise.

The characteristics of the hulls of the two vessels show that they were based on a shell structural concept and on a longitudinal strake oriented hull-shape. The building process was shell-first. The smaller one, Pula 2, could be identified as a coastal transport boat, 9-10 m long, and probably propelled using both oars and sail. On the other hand, Pula 1 could be identified with a small sailing ship around 15 m long.

The Pula 2 boat is significantly similar to the sewn shipwrecks of Caska 1 and Zaton 1-3 found in Dalmatia region, which are dated to the second half of the 1<sup>st</sup> c. AD.

The results of six AMS dates for each shipwreck indicate date for the construction of the vessels between 28-214 AD for Pula 1 and between 73-226 AD for Pula 2.

The Adriatic area constitutes regional and cultural context where the use of sewing techniques in shipbuilding developed and survived for a long period of time. Through archaeological research, it was possible to distinguish two sub-traditions: a northwestern tradition mainly used during the Roman Empire and late Antiquity from the area of the Po River delta to the Gulf of Aquileia, and an northeastern tradition used in Istria and Dalmatia. The famous boat of Zambrotija, which dates from the late Bronze Age, is the oldest sewn vessel in the Adriatic and could be considered as being an archetype of the sewn-boat traditions found within the Adriatic geographical zone.



Ship equipment. Selected finds.

## OTHER ARCHAEOLOGICAL FINDS

Together with the two Roman ships, during the archaeological excavations of the Roman harbour and its layers, different archaeological artefacts were collected, out of which a large number were almost perfectly preserved. Some of the mentioned artefacts include ceramic *amphorae*, ceramic table and kitchenware, ceramic lamps, different usable objects made in glass, wooden usable objects, parts of ship equipment, wooden and leather objects, architecture elements from the nearby port as well as residential objects, and remains of stone monuments. Considering the large amount of artefacts found on the site, the analysis of the artefacts and data processing is still in progress.

The *amphorae* from Flacius Street show the commercial influence from different Mediterranean regions. The *amphorae* from Italic, Iberian, North-American, and oriental workshops can be seen in the layers.

Among Italic *amphorae*, the most represented are *vinaria* *amphorae* types Dressel 2-4 and Forlimpopoli, while the minor findings belong to *olearia* *amphorae* Dressel 6B and Grado I, which reflect the commercial influence in the 1<sup>st</sup> century, after the Pola colony was founded.

However, most of the findings are local *amphorae* for olive oil that were produced in workshops of village of Fažana, near Pula, which point that the *amphorae* were distributed from the main port. Among Iberian *amphorae*, the fragments of Hispanic *amphorae* from workshops of the Betic region were found, and they were used for the transportation of fish sauces in the 1<sup>st</sup> century.

In the group of the North American types, most of the *amphorae* come from today's Tunisia and Libya region, from the 2<sup>nd</sup> to 4<sup>th</sup> century, including types as *Africana 1*, *Africana 2*, and *Africana 3* (Bonifay 2004) from *Pronconsularis* workshops in Africa. Tripolitanian *amphorae* were also identified from workshops of the 3<sup>rd</sup> century in Tripoli and Leptis Magna, as well as the Tunisian *amphorae* of the Spatheion type, which put an end to the use of that part of the harbour. Among oriental *amphorae* types, there are some wine *amphorae* from the workshops of today's Palestine, Egypt, and Asia Minor.

## ARCHAEOBOTANY

In order to get information about plant species which were consumed, transported, or cultivated in the city of Pula and its surroundings, the archaeobotanical waterlogged material was collected and analysed. In all stratigraphic units, fig (*Ficus carica*) remains are the most numerous, which must be partly due to the fact that fig fruit contains more than a hundred pips. The plants *Pinus pinea*, *Olea europaea* var. *sativa*, *Vitis vinifera*, *Rubus fruticosus* agg. and *Cucumis melo*, *Juglans regia*, *Triticum aestivum/durum*, and *Rumex crispus* are one of the five most numerous species in at least one stratigraphic unit. These are mostly the remains of plant species that are used for human nutrition.

Archaeobotanical research of plant macrofossils shows that most of the plant remains belong to the group of fruit trees and nuts and fruit collected from the wild. Useful plant species can be assumed to have been cultivated or collected near the site and to have arrived at the port as food for the local population or sailors or even as an import/export product. Only for the species of seabest plum (*Cordia myxa*) is it assumed that it certainly came to the port as an import from south eastern Mediterranean or Africa.



## BIBLIOGRAPHY

- Arnaud P., 2006. La navigation en Adriatique d'après les données chiffrées des géographes anciens, u Les routes de l'Adriatique antique. Géographie et économie, Bordeaux-Zadar, pp. 39-50.
- Boetto G., Rouzet C., 2011. Traditions régionales d'architecture navale en Adriatique à l'époque romaine, *Hestia Antiqua* 21, Pula, pp.427-441.
- Boetto G., Koncani Uhač I., Uhač M., 2014. Navires del l'âge du Bronze à l'époque romaine en Istrie, In: P. Pomey (ed), Ports et Navires dans l'Antiquité et à l'époque byzantine, *Congress of Archaeology 364*, pp. 22-25.
- Boetto G., Koncani Uhač I., Uhač M., forthcoming. Sewn Ships from Istria (Croatia): the Shipwrecks of Zambrotija and Pula in Balto and Beyond. Change and Continuity in shipbuilding. Proceedings of the 14th International Symposium on Boat and Ship Archaeology 9, In: J. Uthén and M. Östergren, Göteborg 2015.
- Degrassi A., 1962. La data della fondazione della colonia romana di Pola, in *Atti 1<sup>o</sup> Veneto di Scienze, Lettere ed Arti, Classe di Scienze morali e Lettere*, 102, 2, Venezia, 1942-1943, pp. 667-676.
- De Franceschi C., 1934. Il porto e l'acquedotto Pola romana, *Atti e Memorie della Società Istriana di Archeologia e Storia Patria*, XLVI, Pola, pp. 220-242.
- Essert S., Koncani Uhač I., Uhač M. and Šotarić R., 2016. Plant remains and amphorae from the Roman harbour under Flacius Street in Pula (Istria, Croatia), *Archaeological and Anthropological Sciences*, pp. 1-17.
- Gries A., 1911. Forschungen in Istrien. Jahreshefte des Österreichischen Archäologischen Instituts 14, pp. 188-194.
- Koncani Uhač I., Uhač M., Boetto G., 2015. Arheološka istraživanja prapovijesnog broda u Zambrotiji. In: Rezultati arheoloških istraživanja na prostoru Šibensko-kvarnerske županije, *Sbornik 2015, Abstracts Book, Hrvatsko Arheološko Društvo, Šibenik*, pp. 17-19.
- Kotermán J., 2005. Protoni navstak austrijske Pule, in: M. Bertola, Pula. Tri tisućljeća mita i stvarnosti: 1815 godina povijesti Pule, C.A.S.H., Pula, pp. 113-162.
- Mattajoli R., 2001. I porti dell'Istria e della Liburnia, in "Strutture portuali e rotte marittime nell'Adriatico di età romana", *Antichità Altoadriatiche*, 46, Trieste-Roma, pp. 101-174.
- Pomey P., 1965. Mediterranean Sewn Boats in Antiquity, In: S. McGrail and E. Kendrick (eds), *Sewn Plank Boats*, BAR, Int. Series 276, B.A.R., Oxford, pp. 35-47.
- Pomey P., Boetto G., forthcoming. Ancient Mediterranean Sewn Boats Traditions, In: L. Blue (ed), *The Sewn Boats of the Indian Ocean Workshop*, The Indian Ocean Conference Series, Muscat, Oman 2015.

