

# FORO

## Friends of Roman Ostia

### THE HIDDEN HARBOUR

11 Mar 2016

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#### The two breakwaters

Pope Pio II in his *Commentarii*<sup>1</sup> (16141) wrote: “*Emperor Claudius built a harbour protected right and left by jetties, with a mole at the entrance where the sea is deep.*” The harbour basin of Claudius is located about 2 km north of Ostia, near the Roman town of Portus

Construction commenced in A.D. 42 and was completed by Nero in the year 64. On the occasion of the inauguration, the emperor authorized the production of a series of bronze coins depicting details of the port on the reverse. The harbour of Claudius is depicted in great detail, with merchant ships floating in the sea, the two breakwaters curving on either side of the coin, and the sea entrance with a central lighthouse and statue.



Even today, part of the southern breakwater is preserved, but it is hidden under the Tiber embankment. The landside part of the northern pier, instead, is well exposed at the surface



Fig. 1 The extension of the harbour basin of Claudius, with in black the exposed part of the moles and in red the “hidden” parts; a dotted line indicates the Roman coast.

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One can say few things for certain about the origins of Ostia.



Fig. 2 Nero's coin showing the harbour basin of Claudius; the sea is on top of the image, north is to the right.<sup>2</sup>

and visible over a length of ca. 750 meters along the Via dell'Aeroporto di Fiumicino and behind the Museo delle Navi. This stretch was excavated on the occasion of the construction of the new airport of Rome in the 1960's.

Further to the west no traces of the breakwater can be seen at the surface level. In fact, trenches excavated under the auspices of the Soprintendenza Archeologica di Ostia uncovered no remains of this breakwater, even at the depth of several meters.

The disappearance of this breakwater is due to the strong growth of the dune belt in historical times, particularly in the last centuries. The moles of the harbour of Claudius were covered by sandy sediments (*see article on the coastline of Ostia*), and the real size and orientation of the harbour basin were forgotten for centuries..

### A forgotten outline

Let's get a short historical overview of how the basin of Claudius has been depicted.

In the images of the 16th and 17th centuries the basin was always (correctly!) shown to be wide, delimited to the north and south by breakwaters curved toward the western entrance, where the lighthouse island was located.



Fig. 3 Part of the northern mole of the harbour of Claudius exposed behind the Museo delle Navi of Fiumicino; photograph Gerard Huissen..

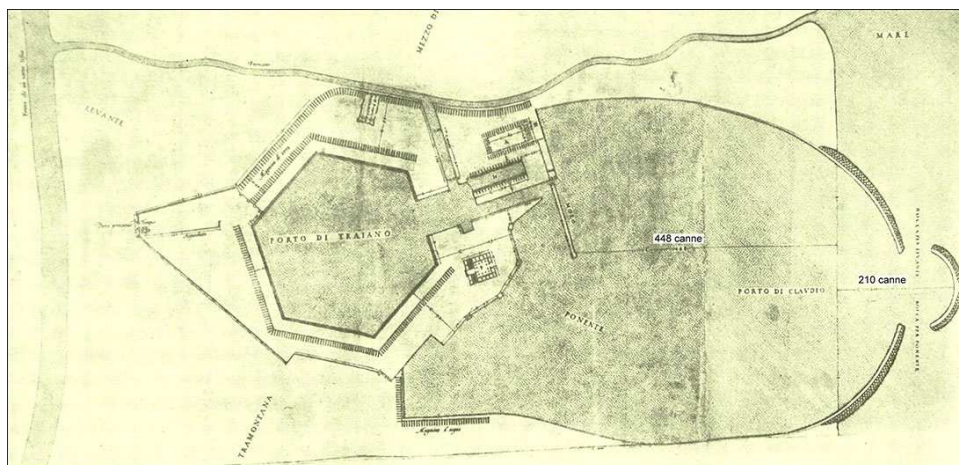


Fig. 4 Reconstruction of the harbour basins of Claudius and Trajan by Antonio Labacco 155267, tav. 29. Distances are indicated in "canne romane" (1 canna = ca. 2,234 m). The orientation is EW inverted.

But from the first half of the 19th century we begin to see plans of the harbour showing a much smaller basin, and with the central axis rotated 90 degrees towards an entrance in the north, and with the lighthouse to the left of that entrance.

This mistaken reconstruction has been unfortunately preserved even in recent publications



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### The Synagogue, Jewish life in Ostia

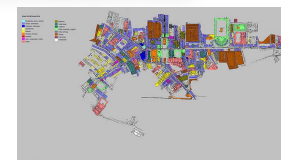


The synagogue at Ostia is a long trek from the site entrance,

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The cause of this misinterpretation is almost certainly the sheer magnitude of deposits which covered the structures during the coastline advancement of the last centuries.

From the 19th through the first half of the 20th century, this wrong reconstruction was generally accepted. In the 1960s it was called into question specifically by Castagnoli and Giuliani<sup>4</sup>. Aerial photographs, among other things, led these scholars to return to the former hypothesis: a large EW oriented basin.

But even then the size of the harbour was underestimated, as was later discovered.

### Return to a former idea

Only in the last decade a series of deep drillings (Fig. 6) have confirmed, without a doubt, that the basin is indeed eastwest oriented and that it juts out farther into the sea than previously suspected: the distance between the inland margin (Monte Giulio) and the lighthouse island is about 2 km.

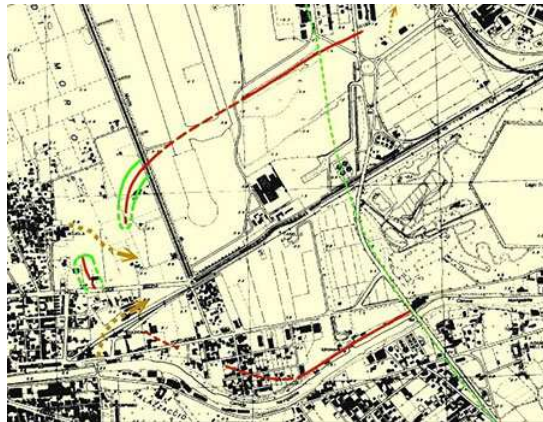


Fig. 8 Reconstruction of the outline of the piers, the lighthouse island and the entrances of the Claudian harbour, based upon drilling data collected between 2004 and 2007.

It is interesting that the various distances indicated by Antonio Labacco<sup>7</sup> map of the 16th century turned out to be approximately correct (see Fig. 4).

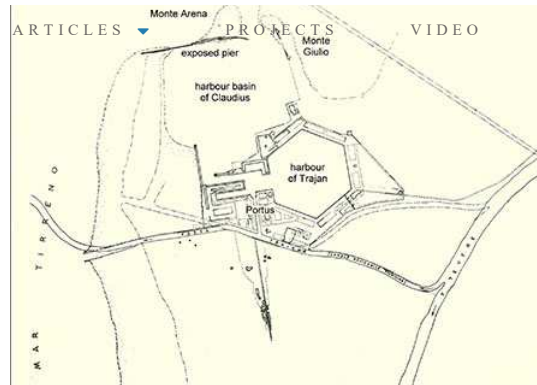


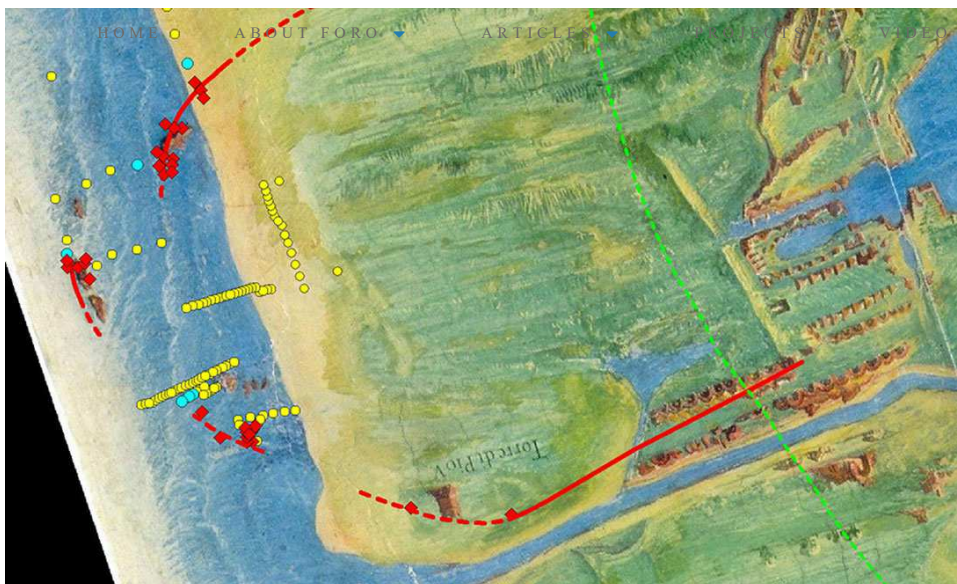
Fig. 5 Erroneous reconstruction of the harbour basin of Claudius, with a reduced size and a northern main entrance<sup>3</sup>.

Remains of structures were encountered in the drillings executed between 2004 and 2007, only from a depth of several meters on, being covered by dune and marine sediments (Fig. 7). The buried remains of the lighthouse island and the final parts of both piers are located to the west of the Viale Coccia di Morto of Fiumicino. The extremity of the southern breakwater is under the Leonardo Da Vinci Rome Airport Hotel (a former glass factory) along the Via Portuense, and the lighthouse island is below the junkyard to the north of the Via della Foce Micina opposite the Via dei Capitoni.

The modern reconstruction shows two protruding moles and a lighthouse island, separated by evident entrances<sup>5</sup>. A third, narrower entrance (probably only a channel) was demonstrated to exist between the northern pier and Monte Giulio<sup>6</sup>. It is very







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Fig. 9 In red lines the outline of the Claudian harbour overlain on a digitally stretched image of the fresco of A. Danti of 1582 (Vatican Museum).

The collected data have also been overlain, as well as possible, on a (digitally stretched) image of a fresco of A. Danti of 1582 which demonstrates not only the reliability of this fresco but also the visibility, at the time, of the remains of the lighthouse island and the mole extremities still in the sea, before their burial by the sediments of the advancing coast.



Fig. 10 One of the over 20 images of the lighthouse known from Ostia and Portus (mosaic in statio 46 on the Square of the Corporations, Ostia)<sup>8</sup>

Contemporary writers confirm the visibility of the ruins of the lighthouse<sup>8</sup> in the sea. Giuliani mentions Biondo Flavio, who on that subject writes in 1558: *"We still see a good part of this tower standing, although there is not much left of the marble with which it was covered"*<sup>9</sup>. But it is Pio II, writing in 1614, who conveys the most useful information: *"There are still traces of this tower which can be seen from far out at sea. Everything else has perished utterly."*<sup>10</sup>

#### Two different stretches

In the drilling cores executed along the outer stretches of both piers, no hydraulic mortar was encountered, only large blocks of basalt and lithoid tuff embedded in coarse sand, forming a ridge-like rubble mound with a base width of at least 60 meters. This



suggests that the mole was constructed by piling stones on the seabed, which lines up with Pliny the Younger's description of the construction of the harbour at Civitavecchia<sup>11</sup>: *"The left arm of this port is defended by exceedingly strong works, while the right is in process of completion. An artificial island, which rises at the mouth of the harbour, breaks the force of the waves, and affords a safe passage to ships on either side. This island is formed by a process worth seeing: stones of a most enormous size are transported hither in a large sort of pontoons, and being piled one upon the other, are fixed by their own weight, gradually accumulating in the manner, as it were, of a natural mound. It already lifts its rocky back above the ocean, while the waves which beat upon it, being broken and tossed to an immense height, foam with a prodigious noise, and whiten all the surrounding sea"*.



Fig. 11 – The main stone types composing the rubble mounds of the moles and lighthouse island: from left to right: basalt, red lithoid tuff and the same blackened from long immersion in sea water.

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In the westernmost drillings the base of the northern breakwater has been found at a depth of 15-16 meter from the surface. Furthermore, it was found that the level of the sea bed directly beneath the structure is deeper than the surrounding area, with a difference of up to two meters. We may presume that this is due to the weight of the stones sinking into the soft sea bottom, a process that may have started from an early phase of the construction on.

But there is more. De Graauw<sup>12</sup> shows how modern, loosely piled up breakwaters undergo a lowering of the top and a widening of the base due to wave action, transforming it from an emerging into a submerged mole. This usually happens in a later phase.

The gradual sinking of the base and lowering of the top of the rubble mounds, combined with the accumulation of sandy sediments due to the changing coastline, helps us to understand why the top of the remains are found several meters below the surface. We must also keep in mind that when the remains were first revealed in the waters close by the advancing coastline, people may have taken stones away from the moles for reuse elsewhere.



Fig. 12 The western extremity of the exposed part of the northern mole, view to W<sup>16</sup>

from land, using lorries moving over the top of the pier above sea level<sup>15</sup>.

As noted above, even today the inland part of the northern breakwater is well preserved. Testaguzza has given us an elaborate description of the structure. It is composed of several stretches made with different construction techniques: whole square blocks or mixed layers of concrete, tuff stones, brick fragments and mortar.

It has been shown that the western extremity of this construction rests upon a sea bed at a depth (in Roman times) of about 7.5 meters<sup>13</sup>. This inland stretch was probably constructed, according to the indications of Vitruvius, with wooden formworks filled with hydraulic mortar and stones, eventually resting on top of a rubble mound. It would have been built out

The most recent drillings, executed within the Airport of



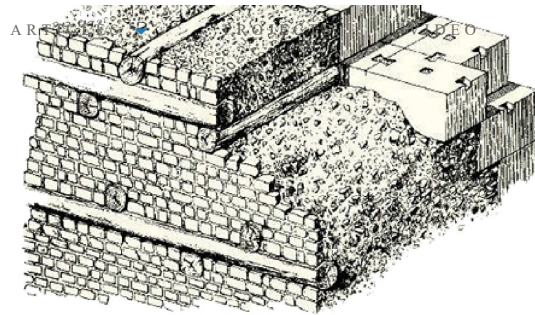


Fiumicino on behalf of the Soprintendenza Archeologica di Ostia, are confirming the direction and base width of the “hidden” part of the northern breakwater as hypothesized earlier by Morelli et al.

Our current hypothesis explaining the difference in preservation of the two stretches of the northern breakwater of the harbour of Claudius is a difference in construction technique: the inner stretch made from caissons filled with hydraulic mortar and stones, against the seaward part made only of stones loosely piled upon the sea bed. The abruptness of the transition between the two stretches, proven to occur at a distance of less than 50 meters, is one of the arguments in favour.

But not everything is resolved and understood, e.g. why didn’t we find, at least up to now, any traces of the arches indicated on the coins along the northern pier?

This topic will be discussed in a next contribution..



*Figura. 13 Concrete reinforced with timber, a construction type possibly used for the exposed part of the northern breakwater<sup>14</sup>*

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*Fig. 6 A deep drilling in action over the pier remains (2005).*



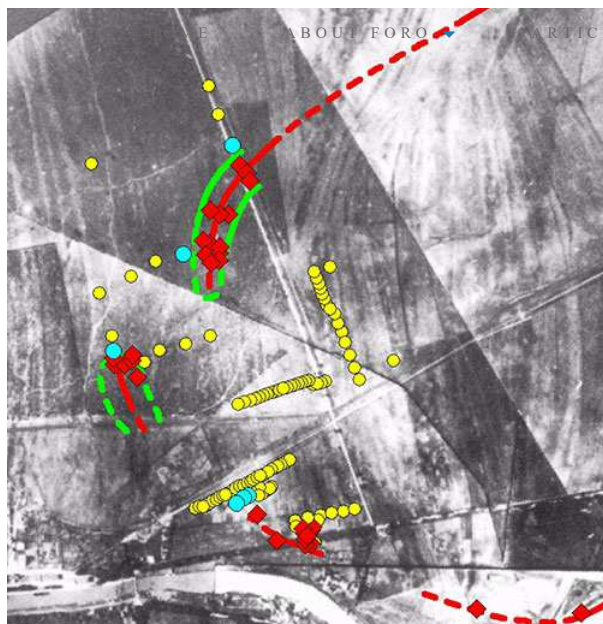


Fig. 7 The drilling data collected until 2007 and their interpretation overlain on a photo mosaic of 1911; red diamonds indicate structures encountered in the drillings; the NS road is the modern Viale Coccia di Morto..

**Notes:**

- 1 Original text : <http://www.ostia-antica.org/anc texts.htm>, Later Texts, Pius II.
- 2 From [www.ancientportsantiques.com/a-few-ports/portus/#5](http://www.ancientportsantiques.com/a-few-ports/portus/#5). Source: Oleson, 2014 (British Museum)
- 3 Testaguzza O., 1970 - *Portus, Illustrazione dei Porti di Claudio e Traiano e della Città di Porto a Fiumicino*; Julia Editrice, Roma.
- 4 Giuliani C.F., 1996 - Note sulla topografia di Portus; in: Manucci V. (eds), 1996, *Il Parco Archeologico Naturalistico del Porto di Traiano*; Ministero per i Beni Culturali Ambientali, Soprintendenza Archeologica di Ostia, pp. 29-44.
- 5 Morelli C., Marinucci A., Arnoldus-Huyzendveld A., 2011 - Il Porto di Claudio: nuove scoperte, in *Portus and its Hinterland, recent archaeological research*, Simon Keay & Lidia Paroli (eds), *Archaeological Monographs of the British School at Rome*, pp. 47-65.
- 6 Goiran J.-Ph., Salomon F., Tronchere H., Carbonel P., Djerbi H., Ognard C., 2011 - Caractéristiques sédimentaires du bassin portuaire de Claude: nouvelles données pour la localisation des ouvertures, in Keay S., Paroli L. (a cura di), *Portus and its Hinterland, Archaeological Monographs of the British School at Rome*: 31-45.
- 7 Labacco A. (1552-67) - *Libro appartenente a l'architettura nel quale si figurano alcune notabili antichità di Roma*. Roma, Antonio dall'Abacco.
- 8 From [www.ostia-antica.org](http://www.ostia-antica.org).
- 9 "di questa torre ne veggiamo insino ad hoggi una buona parte in pie, se non che ne sono stati tolti i marmi, dei quali ella era incrustata"
- 10 "ancora rimangono vestigi della torre le quali si vedono là nel mare; tutti gli altri monumenti sono periti interamente"
- 11 Letters LXXI; translation from [https://www.gutenberg.org/files/2811/2811-h/2811-h.htm#link2H\\_4\\_0071](https://www.gutenberg.org/files/2811/2811-h/2811-h.htm#link2H_4_0071).
- 12 De Graauw A., <http://www.ancientportsantiques.com/ancient-port-structures/failure-of-rubble-mound-breakwaters-in-the-long-term/>
- 13 Goiran Jean-Philippe, Hervé Tronchère, Ferréol Salomon, Pierre Carbonel, Hatem Djerbi, Carole Ognard, 2010 - Palaeoenvironmental reconstruction of the ancient harbors of Rome: Claudius and Trajan's marine harbors on the Tiber delta, *Quaternary International* 216 (2010) pp. 3-13.
- 14 De Graauw A., <http://www.ancientportsantiques.com/a-few-ports/portus/#5>.

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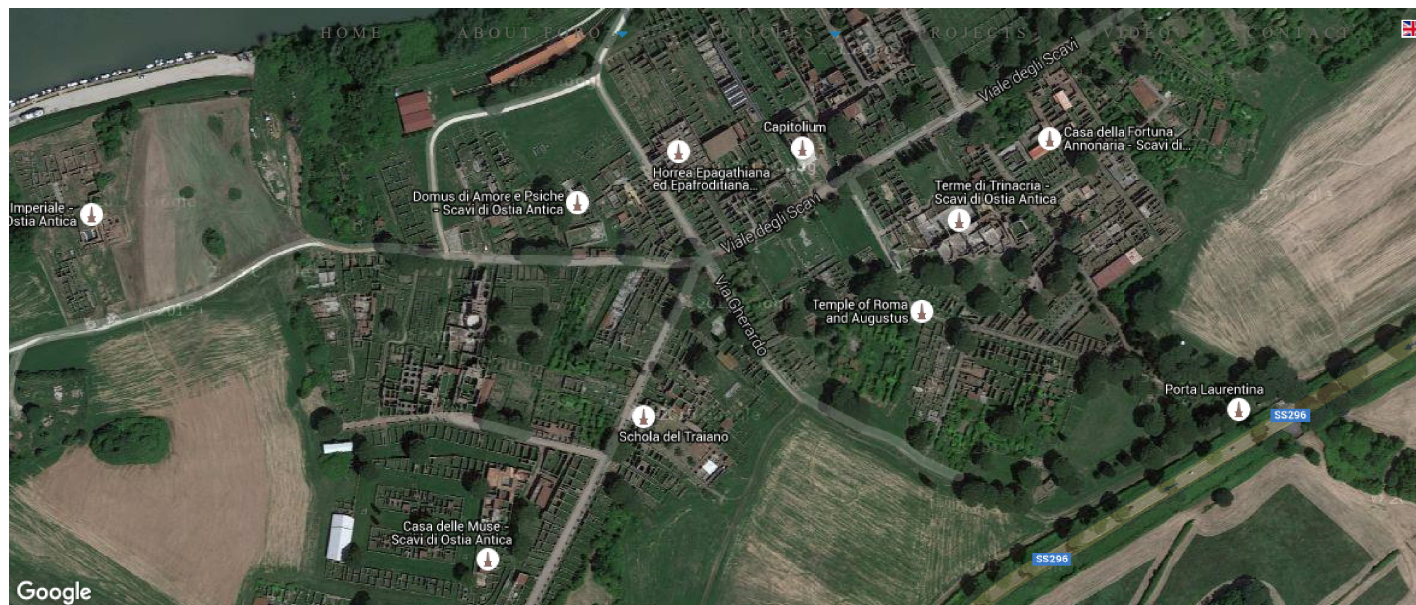
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