

Ostia beyond the Tiber: Recent Archaeological Discoveries in the Isola Sacra

Paola Germoni, Simon Keay, Martin Millett and Kristian Strutt

7677 words

1. Introduction (Marin Millett)

The Isola Sacra is an artificial island, situated immediately north of the mouth of the Tiber (Fig. 1). It is bounded to the south and east by the river, which turns to the south as it approaches the coast, flowing first southwards for c. 2km, before turning again to the west to the sea. Until the river changed in course in 1557, there was a tight meander in the river at the point where it now turns towards the sea, so that it flowed around a narrow salient running to the east (Fig. 2). This area was created as an island in the middle of the first century AD when, in preparation for the construction of a harbour at Portus, a pair of east–west canals was cut, connecting the Tiber directly with the coast. The more southerly of these which defines the northern limit of the Isola Sacra continued in use as the Fiumicino Canal, and is misleadingly still referred to in the archaeological literature as the *Fossa Traiana* even though there is very clear evidence that it was one of the canals referred to in the well-known inscription (CIL XIV, 85) of AD 46 that records the construction of the canals in preparation for the building of Claudius' harbour (Keay et al. 2005, 277). It is therefore clear that the Isola Sacra was created as an island as a by-product of the decision to build at Portus.

The Isola Sacra thus extends for c. 2.6km from north to south. The western limit of the island, formed by the Tyrrhenian coast, has been enlarged by the progradation of the Tiber delta since the Roman period, with the island now extending for c. 4.6km from east to west. The Isola Sacra of the Roman period, however, measured only c. 1.6km from east to west, creating a land area of c. 330 ha.

Although the land forming the island is very low lying and prone to flooding, it was clearly of immense significance after the establishment of the imperial harbour at Portus in the middle of the first century AD. It provided the terrestrial link between the harbour complex at Portus and the well-established urban community at Ostia, as represented by the road, the *Via Flavia*, which joins the two and probably dates to the Flavian period. Furthermore, as it represented a key area of land in the delta of the Tiber, an understanding of its use provides potential insights into the social and economic dynamics of Portus and Ostia as a connected working community. It was with this in mind that work in 2007–12 by the *Portus Project* used techniques of geophysical and topographic survey as previously deployed at Portus (Keay et al. 2005, 62–65) to provide a new understanding of the whole of the Isola Sacra.¹

2. Geological background (Kris Strutt)

¹ Two short seasons of geophysical survey were also conducted in the area surrounding the *Terme di Matidia* at the northern end of the Isola Sacra, in part as a training survey for students from the universities of Southampton and Cambridge, but also as a trial investigation of the zone prior to the Portus Project surveys from 2007-2012 (Strutt 2005).

The deposits of the present coastal plain at the mouth of the Tiber date to the Holocene transgression phase that occurred between 17,000 and 5,000 BP (Arnoldus-Huyzendveld et al. 2005). The river delta is subdivided into two parts (Fig. 3); the inner delta comprises alluvial and marshy deposits while the outer delta consists of dune and beach ridges (Bellotti et al. 1995, 618). The area to the north of the river Tiber, known as the *Agro Portuense*, consists of marine, dune, lagoonal and alluvial deposits (Arnoldus-Huyzendveld et al. 2005) dating to the Holocene period, with the southern part of the delta, the *Agro Ostiense*, forming an area of lagoon deposits formed from the *Stagno Ostiense*. The zone of the Isola Sacra is located in the central part of the delta, between the modern course of the river Tiber, and the so-called *Fossa Traiana*. It forms a strand plain and, as the delta has prograded since c.6500BP, the Isola has extended westwards by about 1m per year. Evidence for this is represented in the chronology of archaeological material across the modern Isola Sacra and in the presence of dipolar anomalies in the magnetometer survey results that mark strandlines in the formation of the delta (Salomon et al, 2015 in press). Data for the Tiber delta based on borehole samples relied on the dating of peat, marsh and wood fragments (Belluomini et al. 1986; Lambeck et al. 2004). The tectonic action in the area has been interpreted as showing signs of a slow rate of uplift ($0.15 \pm 0.05\text{mm yr}^{-1}$) in the Late Holocene.

The most prominent change to the form of the Isola Sacra and the course of the lower Tiber in the medieval and post-medieval period occurred at Ostia in 1557 (Bellotti 1998; Keay et al. 2013, 341), when the river flooded and breached a bend in the river, changing its course (Arnoldus-Huyzendveld & Paroli 1995;

Arnoldus-Huyzendveld Corazza, A., De Rita, D., Zarlenga, F. 1997). During excavation at this point on the line of the Tiber, three phases of lateral meander displacement were noted; one of Roman date, ascribable to the 1st century AD, and two dating to 1530 and 1557 (Arnoldus-Huyzendveld et al. 2005, 19). The latter displacement truncated the south-east isthmus within the ancient bend in the Tiber, cutting off the area from the Isola Sacra and forming the *Fiume Morto* oxbow to the north-east of Ostia Antica (Bravard et al. 2015 In Press). It is difficult to imagine the topography of the ancient Tiber and the south-east part of the Isola Sacra, due to the modern constraints on the terrain formed by the river. However, an understanding of this is crucial to evaluating the results of the recent magnetometer surveys on the Isola Sacra, and the relationship between both banks of the Tiber in the formation and layout of Ostia.

3. The Administrative Context (Paola Germoni)

Our survey work on the Isola Sacra needs to be understood against the background of the long history of archaeological work that has focused on the island. The Isola Sacra exemplifies the history of protection of the archaeological heritage in Italy, and the fundamental role played by current regulatory requirements (*dispositivi normativi vigenti*). These permit research that is intended to promote the understanding and conservation of cultural heritage that is in the public interest to be undertaken on private property. The SS-Col² have played a key role in implementing this in recent years, coordinating and undertaking development-led excavations and watching briefs on a range of

² *Soprintendenza Speciale per il Colosseo, Museo Nazionale Romano e Area Archeologica di Roma*, previously the *Soprintendenza Speciale per i Beni Archeologici di Roma (Sede di Ostia)*, and the *Soprintendenza per I Beni Archeologici di Ostia*.

sites. The areas coloured in red on Fig. 4 have been declared to be of archaeological interest in the sense of the D.Lgs 42/04, with the similar concentrations of significant Roman settlement closer to Ostia and Portus standing in contrast to the less intensively settled areas in the centre of the Isola Sacra. This archaeological reality was used in the definition of the urban planning document used *par excellence* in modern urban contexts, the *Piano Regolatore Generale* (Fig. 5). In this, the territory of the Isola Sacra is sub-divided into Type 1 Archaeological Areas and Type 2 Areas of Archaeological Interest, with different technical norms for each type, making preventative archaeology possible not just in the context of large public works. The results are summarised in the accompanying archaeological map that includes discoveries down to and including 2012 (Fig.6). This has been previously published as part of a study of past work on the Isola Sacra, and includes a full gazetteer, much of which remains otherwise largely unpublished (Germoni et al., 2011, 239–55). One of the objectives of our survey, which was undertaken in close collaboration with the SSCol,³ was to use new information from systematic survey to enhance existing efforts at protecting the archaeological heritage by providing information about hitherto undiscovered sites.

4. Previous Archaeological Discoveries in the Isola Sacra (Martin Millett)

Roads were a defining characteristic of the Isola Sacra. The *Via Flavia* was the most important of these, and acted as the main axis of communication between Portus and Ostia from at least the later 1st c AD onwards. Stretches of the road discovered to date indicate that it had a width of up c. 10m and that while some

³ In the person of Dottssa Paola Germoni

sections had a surface of basalt blocks akin to consular roads leading out of Rome, others were composed of rammed gravel between stone retaining margins (Germoni et al. 2011: Sites 36, 37 and 38; Fig. 6: Sites 36, 37 and 38). Another key stretch of road, with basalt paving, ran along the south side of the *Fossa Traiana* (Germoni et al. 2011: Site 3; Fig. 6: Site 3).

A glance at the gazetteer for the Isola Sacra as a whole in Fig. 6 highlights a series of key features relating to the topography of the island that may be summarized briefly.⁴ Three broad zones of activity have been revealed, comprising the southern edge of the *Fossa Traiana* in the north, areas beside the *Via Flavia* to the west, and the stretch along the northern side of the Tiber to the south, the latter being the least extensively explored. The northern area includes evidence for the *statio marmorum* (Germoni et al 2011: Fig. 6; Fig. 6; Site 28a) that lay close to the junction of the canal with the river at the north-east corner of the island, *Capo Due Rami*. Further west along the canal there is evidence for a series of quays and associated structures (Germoni et al. 2011: Fig. 6: Sites 1, 3, 4, 5, 12; Fig. 6: Sites 1, 3, 4, 5, 12). Set back behind these there were buildings belonging to a settlement centred on the point where the *Via Flavia* crossed the canal via a bridge. Exploration in this area in the 1970s uncovered structures relating to the port quarter in the vicinity of the later basilica dedicated to Saint Hippolytus, including a bath house (Germoni et al. 2011: Fig. 6: Sites 12, 13, 14; Fig. 6: Sites 12, 13, 14; Veloccia Rinaldi and Testini 1975) and further towards the coast a complex identified as an Isaeum (Germoni et al. 2011: Fig. 6: Site 7; Fig. 6: Site 7). In the area to the south of this settlement there were extensive burials, including

⁴ With reference made to the site numbers used in the gazetteer published in Germoni et al. 2011

some substantial mausolea (Germoni et al. 2011: Fig. 6: Sites 11, 16, 18-24, 27, 30; Fig. 6: Sites 11, 16, 18-24, 27, 30).

In the western part of the Isola, activity is focused on the line of the *Via Flavia* which runs north–south just inland from the Roman coast and separated from it by a band of sand dunes, the inland movement of which later covered and preserved the Roman landscape. The known remains from this area are dominated by the well-known *Necropoli di Porto* (Fig. 7) excavated in the 1930s (Germoni et al. 2011: Fig. 6: Site 35; Fig. 6: Site 35; Calza 1940), but further burials have also been explored, linking this cemetery with those noted above (Germoni et al. Fig. 6: Sites 32, 34-5; Fig. 6: Sites 32, 34-5).

Recent discoveries are starting to suggest that the southern part of the Isola Sacra was far more significant than has been previously thought to have been the case. Small funerary sites and occasional single burials have been identified in the vicinity of the *Via Flavia* (Germoni et al. 2011: Fig. 6: Sites 39 and 40; Fig. 6: Sites 39 and 40) some distance to the south of the *Necropoli di Porto*. Still further to the south, rescue excavations in advance of preparatory work for a new bridge over the Tiber on the eastern margin of the *Via della Scafa* revealed the remains of two ships of 2nd c AD date (Boetto et alii 2012; 2014; Fiore et alii 2015) (Fig. 6: Red Square). These perhaps need to be understood in relation to a Roman bridge over the Tiber between the Isola Sacra and Ostia, and known from unpublished archival evidence (Germoni et al. 2011: Fig. 6: Site 50; Fig. 6: Site 50). To the east of this, structures identified in the late 1960s suggest the northwards expansion of Ostia from the first century AD to the late antique period. Small-scale

excavations revealed evidence of warehouses (Germoni et. al 2011: Fig. 6: Sites 41–46; Fig. 6: Sites 41–46; Zevi 1972, 406-7).

4. The Context of the Current Survey Work (Simon Keay)

The discoveries discussed in this paper have to be understood, first of all, in the context of the long-standing programme of overseeing the protection of the archaeological heritage in the Isola Sacra by the *SS-Col*. Some of the sites discussed in section 3 were first discovered in the early 20th century, while others have been the subject of major campaigns of excavation, most notably the *Necropoli di Porto*⁵ (Calza 1940; Baldassare et al. 1978), but also the church of Sant' Ippolito (Germoni et. al 2011: Site 14; Fig. 6: Site 14), the Isaeum (Germoni et. al 2011: Site 7; Fig. 6: Site 7) and the *Terme di Matidia* (Germoni et. al 2011: Site 12; Fig. 6: Site 12) immediately to the south of the *Fossa Traiana*. Knowledge of the existence of many others, however, has been the work of the Ostia office of the *SS-Col*, which has recorded sites that have been revealed by building works and clandestine activities. While this approach was clearly successful in recording sites accidentally revealed by intrusive activities, it could only ever be a response to circumstance. The *SS-Col* was quick to recognize the success of the geophysical survey at Portus (Keay et al. 2005) in locating hitherto unknown sites in areas between the hexagonal basin and the Tiber, and to calculate that the adoption of similar blanket coverage of the Isola Sacra would greatly support their efforts in protecting its buried heritage. This interest coincided with the research strategy of the *Portus Project* that was keen to use geophysical survey to learn more about the topography of the Roman Isola Sacra and, thus, the

⁵ Otherwise known as the *Necropoli dell'Isola Sacra*.

relationship of Portus to Ostia. The discoveries discussed here, therefore, are the result of a joint programme of heritage management and research.

5. Brief Description of the Main Discoveries between the *Fossa Traiana* and the Tiber (Kris Strutt)

Results of the geophysical surveys from 2007 to 2012 identified a large number of different monuments, sites and features across the Isola Sacra, that are best discussed in order. A series of linear and rectilinear anomalies were found along the Tiber (Fig. 8), marking the presence of tombs and mausoleum enclosures fronting onto the river. The western extents of these features were generally identified with their eastern facades extending under the modern flood defences along the Tiber bank.

One important observation about the magnetometry results is that road alignments lack definition, and in some stretches even appear to be absent. The results of the magnetometry survey and recent excavations suggest that one of the reasons for this is because some of the roads were constructed from gravel and beaten earth (Germoni et al. Forthcoming), meaning that it is difficult for the magnetometer to detect them. At some points along the line of the *Via Flavia*, the road surface is rendered invisible by a covering layer of dune deposits. Clearly these features would respond more positively to a more integrated approach, utilising air photographic evidence together with GPR and resistivity survey. Together, these should better detect the characteristic variations in moisture content and interfaces between materials of different density caused by the surface of the roads.

A system of regularly-spaced parallel alignments and negative linear features (Fig. 9) may form part of an orthogonal network of drainage ditches or channels that ran from east to west across the Isola Sacra. It is interesting to note that these features run from the back of the *Necropoli di Porto*, but at a slight tangent to the alignment of the tombs located within the excavated area and the line of the *Via Flavia*. Their alignment also runs at an angle of 25° to the line of the 19th and 20th century *Bonifica* drainage ditches, suggesting that they relate at least in part to an ancient field system or artificial drainage system.

In addition to this field system, the dominant feature located in the 2009 survey results is a massive canal running from north to south across the survey area, from the *Fossa Traiana* in the north towards the mouth of the Tiber to the south (Fig. 10) (Germoni et al. 2011; Salomon et al. 2015 Forthcoming). The western edge of this feature is only poorly defined, predominantly where it cuts through dipolar deposits. The eastern edge is better defined and this may suggest some form of revetment similar to other canal features elsewhere at Portus (Keay et al. 2005, 126). The canal that these features define measures at its greatest width some 90m across, although it narrows significantly to the north, where it eventually arrives at the line of the *Fossa Traiana*, and to the south. It is feasible that this feature is a continuation of the *Canale Romano* to the north of the *Fossa Traiana* located to the south of the hexagonal basin at Portus (Keay et al. 2005). The line of the canal is traversed by a series of positive features, one of which is still visible as the *opus caementicium* pier belonging to a bridge that would have crossed the line of the canal. From this point southwards the canal widens to

90m, and the pattern of sediment showing in the feature suggests that the central portion of the canal silted up, possibly forming a small island. The later narrower bands of sediment are visible to either side of this feature.

The southernmost part of the Isola Sacra provided the most exciting results in the survey (Fig. 11). A substantial area of settlement measuring at least 600m by 200m was located in the results of the magnetometry. A series of structures, are visible in the results, many suggesting a form reminiscent of excavated warehouses in Ostia to the south of the river Tiber. These are discussed in more detail below.

Several substantial archaeological features were also recorded close to the line of the modern *Via Redipuglia* (Fig. 12) in the north of the Isola Sacra. In particular a large structure was found to have been cut by the line of the modern road. This may form part of a complex of buildings and related deposits located along and to the north of the road around the church of Sant' Ippolito. The evidence from the geophysical survey, together with the Isola Sacra site gazetteer, suggests that there was a concentration of structural remains in this zone of the Isola, potentially associated with the *Fossa Traiana* and the *Statio Marmorum*.

5. A Preliminary Description of the Warehouses and the Northern Wall

Circuit (Martin Millett)

The principal features identified in the survey in the southern part of the Isola Sacra relate to a previously unknown defensive wall and a series of warehouses and other large buildings that line the bank of the Tiber. Elements of these latter

structures had been discovered in the 1960s, but the circumstances of that work meant that they could not be explored on a very large scale (Germoni et al. 2011, Sites 41–46; Zevi 1972, 406–7).

The defensive wall can be traced clearly from the present bank of the Tiber in the east, running in a line for *c.* 345m to the west south-west (Fig. 13). This orientation is shared both by a pair of boundaries to the south, and by the general alignment of the Roman field systems revealed by our survey further to the north of the Isola Sacra. Along this stretch, the wall is about 3-5m thick, and has three rectangular external towers (6m x 8m) placed about 80m apart. A probable fourth tower lies partly beneath the trackway a further 74m to the west. To the east, the wall has clearly been cut by the river when it changed course in the 16th century, but we may note that its projected line would have run close to the northern edge of the projected continuation of the island before the river moved.

To the west, the wall changed course, turning to run north–south, but this corner was in an area unavailable for survey. A 75m stretch of the north–south course is visible in the survey, ending about 20m short of one of the warehouses. Here, restrictions on the area available for survey mean that its course could not be mapped. One possibility is that it turned again to the west, to run along parallel with the river, while another is that followed the western side of the warehouse.

Given the character of this wall and especially the provision of external towers, there can be no doubt that this is a town wall delimiting the settlement on this

side of the Tiber. Its layout and relationship to other boundaries found in the survey suggests that it was laid-out as part of a broader planned landscape. Its dating is discussed further below.

In the area enclosed between the wall and the present course of the Tiber, the survey has produced evidence for a series of major buildings, all aligned broadly with the river. The evidence is somewhat fragmented because it was not possible to survey the whole area, but there is sufficient evidence to understand the basic layout, although the all-important relationship between the buildings and the river remains obscure.

There is evidence for five principal buildings, some only fragmentary. From the west, the first and most completely understood building is a courtyard warehouse *c.* 175m wide and more than 175m long (Building 1). It appears to comprise a range of store rooms facing onto a portico that surrounded a courtyard; the plan of its southern part is uncertain, but there is possibly a second courtyard towards the river frontage. The form of this building bears similarities to the layout of the *Grandi Horrea* and the *Piccolo Mercato* at Ostia, supporting its identification as an *horreum*, although the latter is smaller in size (Rickman 1971, 24–30). Adjoining this building to the east, and sharing a common boundary, is a further courtyard building, with storerooms similarly opening onto a portico (Building 2). The western range extends for at least 75m, whilst the northern that lies at an obtuse angle can be traced for about 25m. This is almost certainly a further rectangular *horreum*. There is a gap in our survey data to the east of this building, with enough space to contain a further *horreum*

of similar size. The next building to the east (Building 3) is represented by a building section of similar form, with a north–south range of store rooms facing a portico to the west, which can be reasonably interpreted as the eastern range of this. The row of storerooms excavated in the 1960s (Germoni et al. 2011, Site 42; Zevi 1972, buca 2) that lie to the south of almost certainly formed part of the same building.

The north-east corner of another courtyard building has been located further to the north-east, but this is set back considerably further from the river. It is also slightly different in plan, with rooms only visible in its eastern range, and these are of different proportions and flanked by a corridor on both sides (Building 4). This arguably suggests a different function, with no clear parallels amongst the structures excavated at Ostia. Finally, closest to the Tiber at the eastern edge of the Isola there is a further large building on the same alignment and again set back from the river to the south, although very different in form (Building 5). It is about 50m wide and at least 50m deep, divided into two by a north–south wall. The space to the west contains three or perhaps four rows of regularly spaced columns *c.* 8m apart. The function of the building is uncertain, although the differences between its layout and those of the other buildings to the west would argue seem to against it being a warehouse. The character of the rooms to the east is less clear.

6. Initial Interpretation of the Discoveries (Simon Keay)

A key characteristic of the geophysical results in the area around Buildings 1 to 5 is the relatively “quiet” background, with very little evidence for any other

structures. This would suggest that the warehouses were not preceded by earlier structures, a hypothesis that is supported by the fact that none of the excavated sondages in this area revealed any residual Republican pottery, although admittedly the sample of published material is very limited.

In terms of the buildings themselves, it is important to recognize that none of them are *per se* dateable. The nature of the magnetometry evidence is such that the chronology of detected structures can only be roughly gauged, either in terms of clearly differing structural alignments, or through their similarity to other published structures of known date. Nevertheless there is enough circumstantial evidence to provide us with a rough indication.

The orientation of the buildings respects the roughly east-west orientation of the field divisions that were detected across the rest of the Isola Sacra by the geophysical survey, suggesting that the two were broadly contemporary. This alignment is also shared by the *Via degli Aurighi* and *Via della Foce* and associated buildings at the western end of Ostia; it differs, however, from the orientation of the street grid centred upon the *Castrum* and the *Decumanus Maximus* to the east. What this signifies is unclear. Coarelli (1994: 39) argues that the area between the *Via del Foce* and the Tiber was related to the early port, which lies further to the west, even though the chronology of some of the standing buildings would appear to date to the 2nd c AD.

Overall, therefore, the evidence we have points to a date rather later than the initial development of Ostia between the late 4th c and 1st c BC.⁶ This is supported to some degree by the chronology of the structures excavated in the late 1960s. A date of the 1st c AD was assigned to structures in *buca* 1 (Zevi 1972, 407) that probably belonged to the southern side of Building 1. Furthermore, the construction technique of the walls found in *buca* 2 (Zevi 1972, 407), found to the south of Building 3, was dated to the 2nd c AD. The similarity of the plan of Building 1 to the *Grandi Horrea* at Ostia, dateable to some time between c. 100 BC (Coarelli 1994: 40-2) and the reign of Claudius (Calza 1921, 360-83), would tend to support this hypothesis. It is also similar to the layout of the *Piccolo Mercato* dated to between AD 119-120. Taken together, this evidence would suggest that the buildings probably dated to some time during the 1st or earlier 2nd centuries AD.

There is little doubt that the stretch of the defensive walls running from east to west across the survey area is the most unexpected result of the survey, with profound implications for our understanding of the topography of Ostia as a whole. Our principal challenge at the moment, however, is to date the period of their construction. Some indication can be gained by looking at their structural relationship to the warehouses. At the western end of their course, the walls turn sharply southwards in the direction of the northern wall of Building 1: the results are not sufficiently clear so as to be sure that the walls directly abutted it. This would suggest one of two possibilities. Either they preceded the

⁶ However Coarelli (1994: 39) argues that the area between the *Via della Foce* and the Tiber may have been the site of the early port of Ostia.

construction of Building 1 and were cut by the northern wall of the warehouse when it was constructed in the 1st or 2nd c AD. Alternatively, they could have been built at some date after the construction of Building 1 in an attempt to incorporate the standing walls of the structure into the defensive circuit. Since the geophysical readings close to the point of junction are not entirely clear, this relationship is an issue that can only be resolved by excavation. The existence of a very strong magnetic anomaly running down the western side of Building 1, however, might be an argument in support of the latter possibility.

The most obvious question is to ask whether the walls represent a northward continuation of the 63-58 BC wall circuit known from east and southern sides of Ostia (Zevi 1998). It has been argued for the area south of the Tiber between the Castrum and the *Porta Romana* being an area for the unloading and transshipment of grain and other goods from the 2nd c BC prior to storage in warehouses running along the south side of the Decumanus Maximus (Coarelli 1994: 39-42; Zevi 2002: 54-7), and it would be tempting to see the warehouses on the north side of the Tiber playing a complementary role. However, the characteristics of the walls would seem to argue against this. They are c. 3-5m wide, square towers (6m x 8m) that were located on straight stretches of wall and faced out northwards. This stands in contrast to the walls on the eastern and southern sides of Ostia, even though published evidence is admittedly slim. These had a thickness of 2.5m, while the towers were circular, much less frequent than on the Isola Sacra wall, and were situated at internal angles rather than on straight stretches (Calza 1953: 79-88). However, one recent aerial photograph has revealed parch marks that show evidence for a single external

square tower, although it is unclear whether or not this was a later addition to the original scheme.⁷

There are thus significant differences between the Isola Sacra wall and the rest of the Ostia wall circuit. This, together with the likely early Imperial date of the warehouses, would argue in favour of a date for the walls at some time after the 1st to 2nd c AD. How much later than this is hard to establish, although there would not seem to be any *prima facie* administrative context for the construction of the northern circuit in the course of the early Imperial period. This would leave the late antique period as the most likely horizon for their creation, even though there is no firm evidence to assign them a late antique date. One argument in favour of this would be the similarity of the arrangement of the internal stretch of late antique wall at Portus known as the *Contramura Interna* and which included the *Arco di Santa Maria*. This is comprised of exterior facing square towers c. 7m x 8m and is dated to c. AD 480 (Keay et al. 2005: 106-12; 284-5; 291-3).⁸ It should be noted, however, that Procopius, writing about events ninety years later in c. AD 570, notes that Ostia was “without walls” (*History of the Wars* V. XXVI. 9).

7. Implications of the Discoveries for our Understanding of Ostia (Fig. 14)

(Simon Keay)

⁷ I would like to thank Dr. Carlos Rosa for this information.

⁸ Although this stretch of wall has not been dated *per se*, it forms part of the late antique circuit. This has been dated to c. AD 480 by excavations at the *Antemurale* (Paroli & Ricci 2011: 140).

It is now clear that in general topographic terms, Ostia encompassed a much larger ground area than had previously been thought. The geophysical survey undertaken by Heinzelmann in the 1990s revealed that during the Imperial period, the southern sector of the port extended for up to c 300m beyond the line of the 1st c BC wall (Heinzelmann 2002: Abb.1). Our work has shown that it also extended northwards beyond the line of the Tiber for a similar distance. Although our survey only covered the area between the *Ponte della Scafa* and the modern bend of the river, there is every reason to expect a similar spread of buildings between the latter and the ancient river meander at the *Fiume Morto*, an area in which structures have indeed been reported. In this new topographic reality, we have to re-think the general layout of the port as being bisected by the Tiber, rather than delimited by it.

Unlike the area lying to the south of the Decumanus Maximus and beyond, our quarter of Ostia “beyond the river” appears to have been largely given over to warehouses with no apparent residential occupation. The increase in storage capacity that this represents is very significant. Published evidence for total warehouse space at Ostia in the 2nd c AD was c. 31,882m² (Keay et al. 2005, 3012 Table 9.1). If we add to this a very crude estimate of the ground area of the three possible warehouses in the southern Isola Sacra, arguably in the order of magnitude of 26000m²⁹, then the total storage space at Ostia rises to c. 57,882m². To this should probably be added the area lying between the modern bend in the Tiber and the Fiume Morto, as well as the yet un-quantified and

⁹ Working on the assumption that Building 1 covered very roughly 8667m² and that the other two warehouses were of similar size. This would exclude the large building closest to the modern course of the Tiber.

unpublished evidence for additional warehouses that has been revealed by geophysical survey within the southern half of the walled area of Ostia (Heinzelmann 2002, Tafel IV.2).

This very substantial increase in storage space raises important issues about the role of the river port as an entrepot in the early Imperial period. It seems likely that much of what was stored here would have been destined for Rome, with some also retained for local consumption and presumably some also for redistribution. Whatever views one takes on this issue, however, it is clear that it needs to take into account other aspects of port infrastructure in the Isola Sacra and Ostia, and the relationship between Ostia and Portus.

8. Towards a New Perspective on the Relationships between Ostia and Portus (Simon Keay)

There is as yet very little evidence for any occupation of the southern side of the Isola Sacra prior to the early Imperial period. Following the creation of Portus in the mid 1st c AD, there was clearly a need to establish infrastructure that would enable it to function in conjunction with Ostia as a major transshipment and storage depot for imported foodstuffs and other supplies. The *Via Flavia* was the main element of this, running from the *Fossa Traiana* at Portus at a point close to the mouth of the *Canale Trasverso*, southwards to the Tiber at a point close to the modern *Ponte della Scafa*, opposite the small harbour basin at Ostia. (Fig. 14) The development of the warehouses in the southern sector of the Isola Sacra would seem to make most sense following the creation of the road, enabling goods

bound for export and consumption to be moved more easily between Ostia and Portus.

The second element was the Portus to Ostia canal, which measured c. 90m wide in the north to c. 25m further south, and which was discussed above. It ran from a point on the *Fossa Traiana* roughly opposite the mouth of the *Canale Romano* southwards towards Ostia. While it seems to initially head for the Ostia harbour basin, it appears to veer gently south-westwards before reaching it and flowed into the Tiber close to its mouth. The two boats discovered near the *Via della Scafa* were found in a silty context that is probably to be identified with deposits relating to the canal. The date for the construction of the canal is uncertain, but would seem to make most sense in the context of the Trajanic replanning of Portus (Keay 2012).

This new waterway would have complemented the *Via Flavia* and greatly facilitated the flow of traffic between Portus and Ostia. Indeed the possibility that Building 3 may have dated to the 2nd c AD is further evidence to the support arguments that the Trajanic enlargement of Portus and its associated infrastructure may provided a significant stimulus to the construction of new warehouses and other buildings noted at Ostia in the course of the Trajanic and Hadrianic period,¹⁰ particularly in the area between the *Via degli Aurighi* and the Tiber. All of this is further evidence for the idea that for the early and middle Imperial period at least both Ostia and Portus played complementary roles in what has been termed the port system of Imperial Rome (Keay 2012).

¹⁰ See for example Delaine 2002; Mar 2002: 144-53.

The northern circuit is also a very significant discovery that would seem on balance to be best understood in the context of the late antique city rather than that of the late Republic or early Empire. *If* the late 5th c AD does prove to be the likely horizon for its construction, it suggests that it may have been constructed by the same authority that was responsible for building the walled circuit that enclosed much of the central area of Portus. While the identity or the motive for this remains unclear, it would probably make most sense in the early years of the Ostrogothic Kingdom of Theoderic.

The implications of this for Ostia are profound. While it has been argued that the port underwent some kind of economic reversal in the course of the 3rd c AD (Pavolini 2002), there is good evidence that it continued to act as some kind of administrative and ecclesiastical centre well into the 4th c AD if not later. If this wall circuit was constructed in the late 5th c AD it would argue that the port had continued to play a of some kind in supplying the City alongside Portus up until that date, or that it was part of an attempt to fortify the mouth of the Tiber.

References

Calza, G. (1921) Ostia. Gli horrea tra il Tevere e il decumano, nel centro di Ostia Antica. *Notizie degli Scavi di Antichità*: 360-83.

Calza, G. (1940) *La necropoli del Porto di Roma nell'Isola Sacra*. Rome: Istituto Poligrafico dello Stato.

Calza, G. (1953) *Scavi di Ostia I. Topografia Generale*. Rome.

Coarelli, F. (1994) Saturnino, Ostia e l'annona. Il controllo e l'organizzazione del commercio del grano tra II e I secolo a.C. In AAVV *Le ravitaillement en blé de Rome et des centres urbains des débuts de la République jusqu'au Haut Empire. Collection du Centre Jean Bérard 11. Collection de l'École française de Rome 196* : 35-46. Rome, EFR.

Baldassare, I. (1978) La necropoli dell'Isola Sacra. Un decennio ricerche archeologiche. *Quaderni della Ricerca Scientifica* 100: 487-504.

Boetto, G. Germoni, P. and Ghelli, A. (2014) Nuove scoperte di navi romane a Isola Sacra, Fiumicino. In A. Asta, G. Canuato and S. Medas (eds), *NAVIS 5- Atti del II Convegno Nazionale di Archeologia, Storia, Etnologia Navale. Il patrimonio marittimo e fluviale (Cesenatico 13-14 Aprile 2012)* Padova: 43-8.

Boetto, G. Germoni, P. Ghelli and A. Luglio, A. (2012) Due relitti d'epoca romana rinvenuti a Isola Sacra, Fiumicino (RM): primi dati sullo scavo e sulla struttura delle imbarcazioni. *Archeologia Marittima Mediterranea* 9: 15-38.

Boetto, G. Ghelli, A. Germoni, P. (In press) New Shipwrecks from Isola Sacra, Rome, Italy. *XIII International Symposium on Boat and Ships Archaeology (ISBA 13)*. Dutch Maritime Museum, Amsterdam 8-12 October 2012.

Borzi, M. Carboni, M.G., Cilento, G., Di Bella, L. Florindo, F. and Girotti, O. et al., (1998) Bio- and Magneto-Stratigraphy in the Tiber Valley Revised. *Quaternary International* 47/48: 65–72.

Bravard, J. P., Goiran, J.P., Keay, S., Pannuzi, S., Rosa, C., Salomon, F. and Strutt, K. (2016 In Press) Ostia Antica, località Fiume Morto: una rilettura della problematica archaeological alla luce delle nuove indagini geofisiche e geomorfologiche. *Fasti Online*.

Delaine, J. (2002) Building Activity in Ostia in the second century AD. In C. Bruun and A. Gallina Zevi (eds) *Ostia e Portus nelle loro relazioni con Porto. Acta Instituti Romani Finlandiae* 27: 41-101.

Fiore, I., Tagliacozzo, A., Germoni, P., Ghelli, A. and Boetto, G. (2015) I resti di animali di età romana rinvenuti nei livelli di II e III sec. d.C. a Isola Sacra. In U. Thun Hohestein, M. Cangemi, I. Fiore, J. De Grossi Mazzorin (eds), *Atti del VII Convegno Nazionale di Archeozoologia (Ferrara-Rovigo 22-24 Novembre 2012)*, *Annali dell'Università di Ferrara*. 11.2: 105-8.

Germoni, P., Keay, S., Millett, M. and Strutt, K. (2011) The Isola Sacra: reconstructing the Roman landscape. In S. Keay and L. Paroli (eds) *Portus and its hinterland*. *Archaeological Monographs of the British School at Rome* 18: 231–60. London, BSR.

Heinzelmann, M. (2002) Bauboom und urbanistische Defizite – zur stadtbaulichen Entwicklung Ostias im 2. Jh. In C. Bruun and A. Gallina Zevi (eds) *Ostia e Portus nelle loro relazioni con Porto. Acta Instituti Romani Finlandiae 27*: 103-21. Rome, Institutum Romanum Finlandiae.

Keay S., Millett, M., Paroli, L. and Stutt, K. (2005) *Portus: an archaeological survey of the port of the imperial Rome*. London: Archaeological Monographs of the British School at Rome 15. London, BSR.

Keay, S., Millett, M. and Strutt, K. (2014) The Canal System and Tiber Delta at Portus. Assessing the Nature of Man-Made Waterways and their Relationship with the Natural Environment . In *Journal of Water History* 6. 1: 11-30.

Keay, S., Parcak, S. and Strutt, K. (2014) High Resolution space and ground-based remote sensing and implications for landscape archaeology: the case from Portus, Italy. *Journal of Archaeological Science* 52: 277-92.

Keay, S. (2012), The Port System of Imperial Rome. In S. Keay (ed.) *Rome, Portus and the Mediterranean*. Archaeological Monographs of the British School at Rome 21: 33-67. London, BSR.

Mar, R. (2002) Una ciudad modelada por el comercio. *Mélanges de l'École française de Rome* 114.1: 111-80.

Paroli, L. & Ricci, G. (2011) Scavi presso l'antemurale di Porto. In S. Keay and L. Paroli (eds) *Portis and its Hinterland*. Archaeological Monographs of the British School at Rome 18 : 127-46. London, BSR.

Rickman, G. (1971) *Roman granaries and storebuildings*. Cambridge, CUP.

Salomon, F., Keay, S., Goiran, Strutt, K., Millett, M. and Germoni, P. (2016 In Press), Connecting Portus with Ostia: preliminary results of a geoarchaeological study of the navigable canal on the Isola Sacra. In C. Sanchez (ed.) *Les ports dans l'espace méditerranéen antique. Narbonne et les systèmes portuaires fluvio-lagunaires. Narbonne 22-24 mai 2104*.

Strutt, K. (2005) The Baths of Matidia, Isola Sacra: Geophysical Survey Report March 2005 (SREP 10/2005).

Strutt, K., (2008) Richardson, G. and Millett, M. Report on the Geophysical Survey at Isola Sacra, Lazio, Italy, December 2008 (SREP 10/2008).

Strutt, K. (2009) Report on the Geophysical Survey at Isola Sacra, Lazio, Italy, December 2008 (SREP 3/2009).

Strutt, K. (2015) Report on the Geophysical Survey at Isola Sacra, Fiumicino, Lazio, Italy 2008- 2012 (SREP 7/2015).

Veloccia Rinaldi, M.L. and Testini, P. (1975) *Ricerche archeologiche nell'Isola Sacra*. Rome: Istituto Nazionale d'Archeologia e Storia dell'Arte. Monografie II: 43-151.

Zevi, F. (1972) Scoperte archeologiche effettuate casualmente nei mesi di Settembre e Ottobre 1968 nell'Isola Sacra. *Notizie degli Scavi di Antichità*: 404-31.

Zevi, F. (1998) Costruttori eccellenti per le mura di Ostia della Porta Romana. *Rivista dell'Istituto Nazionale d'Archeologia e Storia dell'Arte* III. XIX-XX 1996-1997: 61-112.

Zevi, F. (2002) Appunti per una storia di Ostia Repubblicana. *Mélanges de l'École française de Rome* 114.1: 13-58.

Figures

1. Location map of the Isola Sacra, showing Ostia Antica and Portus.
2. Map showing the Isola Sacra and the course of the Tiber, including topographic areas mentioned in the text, and the changing course of the ancient and modern Tiber caused by the 1557 inundation.

3. Map showing the principal geology and geomorphology for the area of the middle and lower Tiber and the Tiber Delta (derived from Borzi et al. 1998).
4. Map showing the areas declared *Beni di Interesse Culturale* in the sense of the articles 10, 13, 15 and 45 of the D.Lds. 42/04 and similar.
5. *Piano Regolatore Generale* of the Comune di Fiumicino, approved by the Regione Lazio on the 31-03-2006 with DGR – 162/2006, allegato A.
6. Fiumicino – Isola Sacra. Archaeological map updated to 2012. The red square indicates the location of the Roman ships.
7. Aerial view of the *Necropoli di Porto* along the *Via Flavia*, located to the south of the *Terme di Matidia* and Sant' Ippolito (S. Keay)
8. Greyscale image of the magnetometer survey results from along the Tiber, showing possible tombs and enclosures in the fields adjacent to the river, and under the dike situated alongside the river.
9. Greyscale image of the magnetometer survey results, showing ditch features traversing the Isola Sacra.

10. Greyscale image of the magnetometer survey results showing the northern portion of the newly found canal (right hand side of image) running from north to south across the Isola Sacra.
11. Greyscale image of the magnetometer survey results from the south of the Isola Sacra, indicating the warehouses and defensive wall circuit. Missing
12. Interpretative image of the magnetometry from the area of the *Via Redipuglia*.
13. Interpretation image of the survey results from the southern part of the Isola Sacra.
14. Map of the southern sector of Isola Sacra in relation to the ancient and modern courses of the Tiber and Ostia. In particular, it shows the position of the newly discovered warehouses in relation to the Portus to Ostia canal, the *Via Flavia*, the harbour basin of Ostia and the mouth of the Tiber (F. Salomon).