



McDONALD INSTITUTE MONOGRAPHS

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Ostia, Portus and the port system of Imperial Rome

Edited by Simon Keay, Martin Millett,
Kristian Strutt and Paola Germoni



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With contributions by

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CONTENTS

Contributors	vi
Figures	vii
Tables	ix
Preface by Carlo Pavolini	xi
Acknowledgements	xxi
<i>Chapter 1</i> Introduction	1
SIMON KEAY, MARTIN MILLETT, KRISTIAN STRUTT AND PAOLA GERMONI	
<i>Chapter 2</i> Background to the Isola Sacra	11
SIMON KEAY, MARTIN MILLETT AND KRISTIAN STRUTT	
<i>Chapter 3</i> The Survey Methodology	25
SIMON KEAY, MARTIN MILLETT AND KRISTIAN STRUTT	
<i>Chapter 4</i> Results of the Survey	33
SIMON KEAY, MARTIN MILLETT AND KRISTIAN STRUTT	
<i>Chapter 5</i> The Portus to Ostia Canal	123
<i>A multi-proxy analysis of the evolution of the Portus to Ostia canal</i>	
FERRÉOL SALOMON, LUDMILLA LEBRUN-NESTEROFF, JEAN-PHILIPPE GOIRAN,	
GIULIA BOETTO, ANTONIA ARNOLDUS-HUYZENDVELDT†, PAOLA GERMONI,	
ALESSANDRA GHELLI, ILLARIA MAZZINI, CÉCILE VITTORI, SABRINA ZAMPINI	
AND CARLO ROSA	
<i>The Isola Sacra shipwrecks</i>	
GIULIA BOETTO, ALESSANDRA GHELLI AND PAOLA GERMONI	
<i>General Conclusions</i>	
SIMON KEAY	
<i>Chapter 6</i> Chronological Synthesis	147
SIMON KEAY, MARTIN MILLETT AND KRISTIAN STRUTT	
<i>Chapter 7</i> The Isola Sacra and the Port System of Imperial Rome	167
SIMON KEAY, MARTIN MILLETT AND KRISTIAN STRUTT	
Gazetteer of sites (PAOLA GERMONI)	173
References	187
Index	197

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Figures

1.1	<i>The location of the Isola Sacra in Italy in relation to Portus and Ostia</i>	2
1.2	<i>Map of Portus, Ostia, and the Isola Sacra in the Roman period</i>	3
1.3	<i>Aerial view of the northern part of the Isola Sacra</i>	4
1.4	<i>Aerial view looking south-west across the Isola Sacra</i>	5
1.5	<i>The Basilica di S. Ippolito as excavated and on display</i>	6
1.6	<i>Aerial view of the Necropoli di Porto</i>	7
1.7	<i>Mausolea (tombs nos 78, 79 and 80) in the Necropoli di Porto</i>	7
1.8	<i>Marble blocks from the site of the statio marmorum</i>	8
2.1	<i>Maps showing phases in the development of the Tiber delta</i>	12
2.2	<i>Extract from the map entitled Il paese di Roma by Eufrosino della Volpaia (1547)</i>	13
2.3	<i>Extract from an anonymous map (1557)</i>	14
2.4	<i>Extract from an anonymous map (1557)</i>	15
2.5	<i>Antonio Danti's fresco map (1581–82) in the Vatican Gallery of the Maps</i>	15
2.6	<i>Extract from the map by Orazino Torriani (1603)</i>	16
2.7	<i>Extract from the map entitled Topografia geometrica dell'agro romano by G.B. Cingolani (1692)</i>	17
2.8	<i>Map of the Tiber delta entitled Planimenta Generale della Paga Litoranea by Giovanni Amenduni (1884)</i>	18
2.9	<i>Extract from Rodolfo Lanciani's Carta Archeologica dei Dintorni di Roma (1894–1906)</i>	19
2.10	<i>Map of the Isola Sacra showing the location of the sites of previous finds listed in the Gazetteer</i>	21
2.11	<i>Map showing the Roman structures recorded in the area of the Fiume Morto</i>	22
3.1	<i>Total station survey in progress by the Terme di Matidia</i>	27
3.2	<i>GPS survey in progress</i>	28
3.3	<i>Gradiometry survey in progress</i>	28
3.4	<i>The LEA MAX fluxgate gradiometer array</i>	29
3.5	<i>The GSSI Ground-Penetrating Radar array in use</i>	30
4.1	<i>Key to symbols used in the gradiometer interpretation images in this chapter</i>	34
4.2	<i>Map showing the layout of the gradiometer survey Areas</i>	35
4.3	<i>Plan of Area 1 showing the gradiometer survey results</i>	38
4.4	<i>Plan of Area 1 showing the interpretation of the gradiometer survey results</i>	39
4.5	<i>Plan of Area 2 showing the gradiometer survey results</i>	40
4.6	<i>Plan of Area 2 showing the interpretation of the gradiometer survey results</i>	41
4.7	<i>Plan of Area 3 showing the gradiometer survey results</i>	42
4.8	<i>Plan of Area 3 showing the interpretation of the gradiometer survey results</i>	43
4.9	<i>Plan of Area 4 showing the gradiometer survey results</i>	44
4.10	<i>Plan of Area 4 showing the interpretation of the gradiometer survey results</i>	45
4.11	<i>Plan of Area 5 showing the gradiometer survey results</i>	46
4.12	<i>Plan of Area 5 showing the interpretation of the gradiometer survey results</i>	47
4.13	<i>Plan of Area 6 showing the gradiometer survey results</i>	48
4.14	<i>Plan of Area 6 showing the interpretation of the gradiometer survey results</i>	49
4.15	<i>Plan of Area 7 showing the gradiometer survey results</i>	52
4.16	<i>Plan of Area 7 showing the interpretation of the gradiometer survey results</i>	53
4.17	<i>Plan of Area 8 showing the gradiometer survey results</i>	54
4.18	<i>Plan of Area 8 showing the interpretation of the gradiometer survey results</i>	55
4.19	<i>Plan of Area 9 showing the gradiometer survey results</i>	56
4.20	<i>Plan of Area 9 showing the interpretation of the gradiometer survey results</i>	57
4.21	<i>Plan of Area 10 showing the gradiometer survey results</i>	58
4.22	<i>Plan of Area 10 showing the interpretation of the gradiometer survey results</i>	59
4.23	<i>Plan of Area 11 showing the gradiometer survey results</i>	60
4.24	<i>Plan of Area 11 showing the interpretation of the gradiometer survey results</i>	61
4.25	<i>Plan of Area 12 showing the gradiometer survey results</i>	64
4.26	<i>Plan of Area 12 showing the interpretation of the gradiometer survey results</i>	65
4.27	<i>Plan of Area 13 showing the gradiometer survey results</i>	66

4.28	<i>Plan of Area 13 showing the interpretation of the gradiometer survey results</i>	67
4.29	<i>Plan of Area 14 showing the gradiometer survey results</i>	68
4.30	<i>Plan of Area 14 showing the interpretation of the gradiometer survey results</i>	69
4.31	<i>Plan of Area 15 showing the gradiometer survey results</i>	70
4.32	<i>Plan of Area 15 showing the interpretation of the gradiometer survey results</i>	71
4.33	<i>Plan of Area 16 showing the gradiometer survey results</i>	72
4.34	<i>Plan of Area 16 showing the interpretation of the gradiometer survey results</i>	73
4.35	<i>Plan of Area 17 showing the gradiometer survey results</i>	74
4.36	<i>Plan of Area 17 showing the interpretation of the gradiometer survey results</i>	75
4.37	<i>Plan of Area 18 showing the gradiometer survey results</i>	76
4.38	<i>Plan of Area 18 showing the interpretation of the gradiometer survey results</i>	77
4.39	<i>Plan of Area 19 showing the gradiometer survey results</i>	78
4.40	<i>Plan of Area 19 showing the interpretation of the gradiometer survey results</i>	79
4.41	<i>Plan of Area 20 showing the gradiometer survey results</i>	82
4.42	<i>Plan of Area 20 showing the interpretation of the gradiometer survey results</i>	83
4.43	<i>Plan of Area 21 showing the gradiometer survey results</i>	84
4.44	<i>Plan of Area 21 showing the interpretation of the gradiometer survey results</i>	85
4.45	<i>Plan of Area 22 showing the gradiometer survey results</i>	86
4.46	<i>Plan of Area 22 showing the interpretation of the gradiometer survey results</i>	87
4.47	<i>Plan of Area 23 showing the gradiometer survey results</i>	88
4.48	<i>Plan of Area 23 showing the interpretation of the gradiometer survey results</i>	89
4.49	<i>Plan of Area 24 showing the gradiometer survey results</i>	90
4.50	<i>Plan of Area 24 showing the interpretation of the gradiometer survey results</i>	91
4.51	<i>Plan of Area 25 showing the gradiometer survey results</i>	92
4.52	<i>Plan of Area 25 showing the interpretation of the gradiometer survey results</i>	93
4.53	<i>Plan of Area 26 showing the gradiometer survey results</i>	94
4.54	<i>Plan of Area 26 showing the interpretation of the gradiometer survey results</i>	95
4.55	<i>Plan of Area 27 showing the gradiometer survey results</i>	96
4.56	<i>Plan of Area 27 showing the interpretation of the gradiometer survey results</i>	97
4.57	<i>Plan of Area 28 showing the gradiometer survey results</i>	98
4.58	<i>Plan of Area 28 showing the interpretation of the gradiometer survey results</i>	99
4.59	<i>Plan of Area 29 showing the gradiometer survey results</i>	102
4.60	<i>Plan of Area 29 showing the interpretation of the gradiometer survey results</i>	103
4.61	<i>Plan of Area 30 showing the gradiometer survey results</i>	104
4.62	<i>Plan of Area 30 showing the interpretation of the gradiometer survey results</i>	105
4.63	<i>Plan of Area 31 showing the gradiometer survey results</i>	106
4.64	<i>Plan of Area 31 showing the interpretation of the gradiometer survey results</i>	107
4.65	<i>Plan of Area 32 showing the gradiometer survey results</i>	108
4.66	<i>Plan of Area 32 showing the interpretation of the gradiometer survey results</i>	109
4.67	<i>Plan of Area 33 showing the gradiometer survey results</i>	110
4.68	<i>Plan of Area 33 showing the interpretation of the gradiometer survey results</i>	111
4.69	<i>Plan showing the location and the results of the Ground-Penetrating Radar survey in the via Valle Sacra</i>	112
4.70	<i>Plan showing the interpretation of the results of the Ground-Penetrating Radar survey in the via Valle Sacra</i>	113
4.71	<i>Photo mosaic of the vertical Aeronautica Militare aerial photographs of the Isola Sacra</i>	116
4.72	<i>Photo mosaic of the vertical Royal Air Force aerial photographs of the Isola Sacra</i>	117
4.73	<i>LiDAR image of the Isola Sacra showing features mentioned in the text</i>	118
4.74	<i>Satellite image of the Isola Sacra</i>	119
4.75	<i>Plan showing the features plotted from aerial photography, LiDAR and satellite imagery</i>	120
5.1	<i>General location of the Ostia-Portus system and the Isola Sacra in the Tiber delta</i>	124
5.2	<i>Detailed map of the two areas studied: north and south of the Isola Sacra</i>	125
5.3	<i>Detailed map of the area investigated in 2017</i>	126
5.4	<i>Cross-section of sedimentary cores from the boreholes drilled in the northern part of the Portus to Ostia Canal</i>	130

5.5	<i>Detailed palaeoenvironmental analyses of Cores ISF-1 and ISN-1</i>	132
5.6	<i>Palaeoenvironmental Age-Depth Model (PADM Chart) of Cores ISF-1 and ISN-1</i>	133
5.7	<i>Main phases in the formation of the Isola Sacra</i>	136
5.8	<i>The excavation area with the position of the Isola Sacra 1 and 2 shipwrecks, and the timber</i>	140
5.9	<i>The Isola Sacra 1 shipwreck</i>	141
5.10	<i>View from the south-west of Isola Sacra 1</i>	142
5.11	<i>The pieces of the strakes on the stainless supports within the storage facility at Ostia</i>	142
5.12	<i>Plan of Isola Sacra 1</i>	143
5.13	<i>The port side of Isola Sacra 1 preserved up to the gunwale</i>	143
6.1	<i>Plan of Isola Sacra in the Claudian period/early first century AD</i>	148
6.2	<i>Plan of Isola Sacra in the late first century AD</i>	150
6.3	<i>Plan of Isola Sacra under Trajan/early second century AD</i>	152
6.4	<i>Interpretation of the layout of the field-systems on the Isola Sacra in the early second century AD</i>	154
6.5	<i>Plan of Isola Sacra in the High Empire</i>	158
6.6	<i>Detailed plan of the southern area showing the principal buildings</i>	161
6.7	<i>Reconstruction image showing the canals on the south side of Portus and the north side of the Isola Sacra with the Tiber in flood</i>	164
7.1	<i>Plan showing the Isola Sacra in relation to Portus and Ostia</i>	170

Tables

1.1	<i>Isola Sacra geophysics: Summary of fieldwork seasons and areas covered</i>	9
4.1	<i>Principal air photographs consulted in this study</i>	115
4.2	<i>Multispectral bands in the Worldview 2 satellite imagery</i>	115
5.1	<i>Location and heights of the cores drilled</i>	127
5.2	<i>Radiocarbon dates</i>	128
5.3	<i>Archaeological dates</i>	129
6.1	<i>Buildings within the southern settlement</i>	160

Preface

Carlo Pavolini

The survey that is published in this volume forms part of the Portus Project which is directed by Simon Keay. This initiative followed on from the overall 1998–2004 survey of Portus (Keay *et al.* 2005) and, since 2007, has produced several benchmark publications (eg. Keay and Paroli 2011).¹ It is an initiative conducted in close collaboration with the *Soprintendenza Archeologica di Ostia*, now the *Parco Archeologico di Ostia Antica*. The contribution of the latter to the publication is recognized by the presence of its archaeologist Paola Germoni, who is one of the four editors of the book, and who also co-signed the introduction, oversaw the preparation of other parts of the book, and took part in the drafting of its text (see below), along with Simon Keay, Martin Millett and Kristian Strutt.

In the first years of its activity, the Italian-British research programme was focused upon the imperial harbour basins to the north of the Tiber delta at the site of Portus and in its hinterland. They produced extraordinary results, for an idea of which one only needs to refer to the essential works mentioned in the previous paragraph. But in turning specifically to the Isola Sacra – where the results of the research are no less exceptional, as we shall see – the greater part of the work was undertaken between 2008 and 2012, with the collaboration (apart from the *Soprintendenza*, now the *Parco Archeologico di Ostia Antica* by virtue of its responsibilities to protect its cultural heritage) of such scientific institutions as the British School at Rome, the Universities of Southampton and Cambridge, and many other institutions and scholars of diverse origins and specialisms.

The difference between the survey of 1998–2004 (Keay *et al.* 2005) and that published here is fairly clear. The objective of the former was to study an area that had been built-up in antiquity, in some areas densely, while the latter is a landscape survey that has as its setting an area of c. 98 ha that we could define as ‘free’ of structures. However, this was only ‘free’ in a certain

sense: the authors of the introduction make it clear that while the lands of the Isola Sacra are largely used for agricultural purposes today, there is also a large presence of houses, warehouses and other structures, as well as drainage channels relating to the *Bonifica* (drainage programme) of the early twentieth century and trenches for electric cables etc, all of which have inevitably conditioned a survey based upon geo-detection methodologies. While undertaking the survey, the archaeologists also had to take into account periods of time when fields were fallow or used for pasture.

A separate debate concerns the serious problem of illegal building. Nowadays, this is less prevalent and more controlled across the land area of the ancient Isola Sacra on account of various land protection measures; unfortunately, however, it is still widespread across the land which extends as far as the present-day coast of Fiumicino, and which corresponded to the sea in antiquity. It is also responsible for the current state of the banks of the watercourses which define the Isola to the north-east and to the north-west (in other words the Fiumicino Canal, or ‘*Fossa Traiana*’, and the Tiber itself), which are cluttered with workshops for boat repairs and other often illegal installations. It is a situation that is lamented by the authors and which only leaves free the area of the Capo Due Rami, which corresponds to the north-eastern angle of the Isola.²

I will not detain myself on the numerous details provided in the text. This is the case of the ‘traditional’ sources discussed in Chapter 2, in which are included, for example, maps before and after the flood of 1557,³ and aerial photographs from 1911 (Shepherd 2006) down to the Second World War (R.A.F. and *Aeronautica Militare Italiana*) and subsequently (S.A.R.A.-*Nis-tri*). Amongst these sources, those that derived from archaeological research undertaken before the start of the Portus Project stand out, and the description of them by the authors of this book forms a cohesive whole in the context of a review of the topography of

the Isola as traditionally understood. Some of these are very well-known sites, such as the *Ponte di Matidia*, the *Basilica di S. Ippolito*, and the building identified as the *Isaeum* of Portus, a hypothesis which the authors support, to my mind correctly. Above all, the famous *Necropoli di Porto*, otherwise known as the Isola Sacra necropolis, which has been the object of excavations since the time of Guido Calza,⁴ and which was given this name at a time before other burial areas, often of a similar size, had been uncovered in the vicinity. At this point, it is useful to mention the important Gazetteer of Sites, an appendix to the volume prepared by Paola Germoni, which lists discoveries of every kind from the Isola Sacra, collated not only from earlier publications, but also from official archives, including the old *Giornali di Scavo*, accounts sent to the *Ministero*, unpublished notes produced by members of the *Soprintendenza* etc. It consists of 52 sites that are distinguished with the symbol G (G1, G2, etc) that are located on the map Fig. 2.11.

I do not wish to reflect upon the methodologies used in the survey (Chapter 3, which like Chapters 6 and 7, was written by Keay, Millett and Strutt), not least because I do not feel sufficiently competent to do so. Correctly, this is a very technical account which will surely be of great value to experts who specialize in the application of non-destructive techniques to the study of ancient landscapes, an area of expertise which is going through a period of continual development. In the case of the Isola Sacra, therefore, the use of aerial photographs was accompanied by the study of satellite images and LiDAR data, the latter being a form of aerial laser scanning. I have already referred to the topographic survey undertaken between 2008 and 2012, and in Chapter 3 it is mentioned again, providing numerous technical details; the same is the case for the approach taken by the main form of geophysical survey undertaken in the Isola Sacra, namely magnetometry.

Up until this point, I have reflected upon the methods used in the survey. The following chapter, however, examines the results, which are presented on a method-by method basis: the results obtained from the gradiometry - effectively the interpretation of the geophysical anomalies, those from Ground-Penetrating Radar (G.P.R.), aerial photographic evidence and LiDAR coverage. The outcome of all of this fieldwork is provided by the splendid set of images, all of a high quality and definition, that are amongst the greatest merits of the book. It is logical that within its broader iconographic repertoire, and over and above the many photographs provided, the drawings should be of overall importance, particularly the plans. To give just one example to illustrate my point, the plan in Fig. 4.2

reproduces the general 'mosaic' of the 33 rectangular areas in which the area covered by the Roman Isola Sacra was divided in order to present the results of the survey. Area by area, the successive figures present the results obtained by means of the different (and integrated) techniques that I briefly describe above. Thus, for instance, Fig. 4.4 (which corresponds to Area 1, which represents the northern sector of the Isola Sacra between the *Basilica di S. Ippolito*, the '*Fossa Traiana*', and the *Ponte* and *Terme di Matidia*) synthesizes the results from the gradiometry and the discoveries made before the survey, which are superimposed upon the layout of the modern landscape, which is represented in a lighter colour.

In any event, the author of the preface to a book does not need to describe the results point by point, as this would be both repetitive and boring. For a book as rich and complex as this one, it was necessary to try and understand its overall structure and to focus upon specific issues. Now that I have done this, I would like to concentrate upon several specific points about which it seems to me possible to put forward some personal reflections, in some cases. There are also the issues relating to the most 'revolutionary' discoveries provided by the Portus Project in relation to the historical and archaeological study of the Isola Sacra in recent years.

Pride of place amongst these goes to the discovery of the canal which crossed the whole of the island from north-west to south-east: this had already been reported in previous years,⁵ but is only described in detail and with the benefit of full documentation in this volume. Thus, the Portus to Ostia Canal not only occupies the whole of Chapter 5 in this book, but also acts as one of the key factors underlying the new interpretation of the topography of the ancient island. In the conclusions, the authors define it as the most ambitious work of infrastructure and engineering documented on the Isola Sacra, with evident implications for the history of the entire port and urban system that had the mouth of the Tiber as its fulcrum. And it is right that the editors refer to it as the Portus to Ostia Canal, and not *vice versa*; this might seem to be purely a question of terminology but for them, however, it confirms the absolute centrality of the creation of the Claudian and Trajanic basins (and the settlement which developed around them) within the context of the transformations of the entire coastline which they brought about during the first and second centuries AD.

The mouth of the northern end of the canal was cut into the southern quay of the '*Fossa Traiana*'. Significantly, this point lay opposite the mouth of the *Canale Romano* on the northern side, a canal which

ran eastwards in an arc in the direction of the Tiber (see the topography of this in Fig. 1.2). The Portus to Ostia Canal was the widest⁶ of all those that have been located so far at Portus and in its vicinity since the publication of the 1998–2004 geophysical survey. It is not worth going into detail here about the geological and geoarchaeological research that has defined its characteristics, and which has been the result of work of experts on the prehistoric and protohistoric phases of the fluvial and coastal phases of the Tiber delta, such as F. Salomon, J.-Ph. Goiran, A. Arnoldus-Huyzendveld† amongst others. The boreholes, already published in part and now interpreted as part of a stratigraphic sequence in their broader context, were drilled in part between 2011 and 2013, and completed in 2017.

Turning attention to the historical aspects, and in particular hypotheses about ship draught and navigability, it is very interesting to learn that the canal could have been used at least in part by commercial ships of considerable tonnage equivalent to, for example, the 150-ton vessel on display in the splendid museum of the *Bourse* at Marseille. While it is true that this water route seems to have been crossed by a road and thus a bridge at a certain point, it is possible that this may have been a mobile installation. Moreover, the question as to whether the Portus to Ostia Canal was used for navigation alone or whether it also served to relieve Tiber flood waters, remains open.⁷ Another major problem to confront us concerns the southern end of the canal. One cannot state with certainty that it flowed into the Tiber opposite Ostia, or directly into the sea; the various possibilities can be seen in Figs 5.1, 5.2 and 5.7. The writers would seem to favour the first possibility, not unreasonably. This issue is so important that it recurs several times, as well as in Chapters 6 and 7, where it is noted that in all the hypotheses noted above, the interplay of currents and the silt transported by the canal would have created difficulties for manoeuvring ships and made it difficult to establish a river port in this sector.

Nevertheless, a first conclusion concerning such a new and unexpected feature of the topography of the Isola is its chronology. In the volume it is argued that the watercourse was created between the end of the first and the beginning of the second century AD, an obvious coincidence with the grandiose Trajanic engineering enterprise at Portus; in the conclusions of the book, the dating is further refined to a date of somewhere between AD 110–120, with a final completion during the reign of Hadrian. Its disuse, however, would have begun between the late second and the beginning of the third century AD: this is an interesting suggestion which could be taken to support those

arguments which have suggested that the first signs of the decline of the port system at the mouth of the Tiber – referring to Ostia, however, and not Portus – were already becoming manifest in the Severan period (see below). This therefore means that the canal would have been in full use for a relatively short period of time, perhaps a century or so; in the conclusions, it is argued that after this, the authorities were clearly not able to manage dredging operations, and the canal silted up, perhaps in the course of the fourth century AD, as the 1998–2004 survey has shown to have been the case with other watercourses around Portus.

There are several indicators that help us to better define this chronology, such as the function of the watercourse as interpreted from another sensational discovery. This concerns two shipwrecks from the Isola Sacra (Figs 5.9–13), whose relationship to the canal is stated as probable rather than certain.⁸ The section of text that discusses these benefitted from an expert in the archaeology of ships, Giulia Boetto, as well as Alexandra Ghelli and Paola Germoni. Wreck no. 1 was discovered in 2011, c. 300m to the north of the north bank of the Tiber, in the course of works for the new *Ponte della Scafa*; Wreck no. 2 (arranged perpendicularly to Wreck 1) was found a little later, but while the remains of the former were completely recovered,⁹ the latter has not yet been completely excavated (the known section is 14m long). Apart from presenting very interesting details about process of excavation, restoration and conservation, and the types of wood used in Wreck no. 1, there is a discussion of its chronology, with a *terminus ante quem* of the third century AD proposed on the basis of stratigraphic evidence.¹⁰ On the other hand, the relatively small size of the boats supports the idea – proposed by the writers in the preceding pages – that this watercourse may have also been used by boats of small and medium capacity, with a draught of 2.5m: in other words, *naves caudicariae* or boats of a similar typology used for local commercial cabotage and, above all else, in connecting Portus with Ostia.

Overall, therefore, the Isola Sacra canal would not have constituted port infrastructure in the strict sense, as was indeed the case of the *Canale Romano* or the '*Fossa Traiana*' itself; nor were warehouses or analogous installations documented along its banks. It must, therefore, have served more for transit (and occasionally for mooring¹¹) than for the unloading and storage of merchandise.

In the final part of the book (Chapters 6 and 7), Keay, Millett and Strutt present a holistic synthesis of everything presented up to this point. For ease of reference, I have alluded to many of their conclusions in my preceding pages. For what remains, I will omit

much information that was known prior to the survey. However, it is important to note that the writers take a stand on the respective roles of Claudius and Trajan in the complex process of the port system as we understand it today. The impact of the interventions undertaken under the first of the two emperors is reinforced: while the Fiumicino Canal was thought to have been excavated in the Trajanic period until recently, the 1998–2005 survey has confirmed that it must have already existed under Claudius.¹² A not unimportant consequence of this was that the Isola Sacra could be considered to have been an island by the middle of the first century AD,¹³ even though it did not have the epithet ‘Sacra’; the chapter also discusses the Late Antique name for this strip of land and its possible explanation, an issue upon which I will not dwell.

The frequent floods which would have affected the Isola, also explain the rarity of ancient rural settlements, a fact confirmed by the survey. The excavation of canals clearly improved the situation, as we have seen, but the impression that the Isola had a limited population is also true of subsequent periods, with one exception. It is at this point that a highly relevant issue, that of the so-called *Trastevere Ostiense*, makes its first appearance in the book. It has only been in the last decades that it has begun to receive the attention that it deserves, owing to discoveries on the ground and numerous publications. One should not forget that the Isola Sacra in the Roman period was very different to what it is today, not only because it was ‘narrower’ on the coastal side, but also because to the east, the ancient course of the Tiber incorporated the extensive meander that was subsequently cut and isolated by the sixteenth century flood mentioned earlier. They are very well-known issues, but not everyone realizes that the part of the Isola which corresponded to the spur of land within the meander was relatively heavily urbanized down to at least the first century AD.¹⁴

In terms of terrestrial communications, the principal ancient road on the Isola was the via Flavia, as is well known; but also of importance here, was its connection with Portus (and thus its crossing of the ‘*Fossa Traiana*’). The authors argue in favour of a Flavian date for the origin of the *Ponte di Matidia*, which would have then been repaired – by Matidia – in the Trajanic period. In short, the Flavian interventions in the Isola would have been considerable, and are also attested (as is discussed in another part of the text) by both the building of the first *mausolea* at the *Necropoli di Porto* at the end of the first century AD, and the fact – noted by P. Pensabene – that 15 percent of the documented marble blocks from the *statio marmorum* on the south side of the ‘*Fossa Traiana*’ are also attributable to the Flavian period.

The line of the via Flavia in the southern part of our territory is uncertain, and its relationship to that of the Portus to Ostia Canal cannot be defined with certainty; neither are we in a position to document in detail and with certainty the route by which, in the opposite sense, it entered Ostia from the south and left it again by the north in order to reach the river, and in the end to cross the Isola itself and arrive at Portus.¹⁵ As for the means by which the road crossed the Tiber, the location and configuration of the bridge whose piers were seen in 1879, are not precisely known (Site G50 of the Gazetteer). Several suggestions, however, are possible. The text provides reasons for thinking that in origin, the via Flavia would have followed a straight line, from its origin in the north-west down to the right bank of the river. This would support an argument in favour of a bridge at the position of site G50 (Fig. 2.10), and thus a road access into Ostia at a point at or near Tor Boacciana. The creation of the canal on the Isola under Trajan would have thus led to a change in the line of the via Flavia and the creation of a bridge on the canal itself (see above), which should not be confused with the archaeologically attested structure crossing the Tiber to the south. All of these topographic details are illustrated on Figs 5.1, 5.7 and various others.

The survey has also documented – and this is another significant novelty – the division of the land on the Isola into lots (Fig. 6.4), by ditches of substantial width that could also have been navigated by small boats, as well as being used for drainage. Leaving details of them aside, there are several important aspects worth noting. In some parts of the Isola one glimpses the existence of rectangular allotments oriented east–west, following a modular length equivalent to 50m or multiples of 50m (100m, 150m) that are difficult to relate to the customary system of Roman land divisions; nor are the productive uses of the allotments easy to identify. As regards their chronology, there are reasons for thinking that the sub-divisions of the land into allotments occurred after the establishment of the via Flavia, which then came to constitute the western, or rather the north-western, margin of the land scheme, and was subsequently cut by the Portus to Ostia Canal. Did this belong to a formal *limitatio*? The authors leave this question open, while recalling that in one passage (222.6) the *Liber Coloniarius* speaks of lands around Portus being assigned to *coloni* by Vespasian, Trajan and Hadrian, and to single individuals by Lucius Verus, Marcus Aurelius and Commodus. Certainly, none of these sources explicitly mention the Isola Sacra, although in theory, the term *strigae* could correspond to these lots.

In terms of the areas of burial, the survey confirms the existence of a burial area along the via

Redipuglia (G17–G19) that largely represented a continuation of the *Necropoli di Porto* par excellence, which is situated along the via Flavia, and its offshoots (viz. the burials of the *Opera Nazionale Combattenti*, site G20). There were also other groups of tombs, and for an overall evaluation of this phenomenon and the observations that follow, the general plans on Figs 6.4–6.5 prove useful.

It is interesting to note that, amongst other things, the tombs located to the north-east of the via Flavia, which are difficult to identify from geophysical evidence alone, do not seem to have included standing *mausolea*, with a few exceptions. Moreover, the strange structures identified along the west bank of the Tiber on the eastern side of the Isola, could also be evidence of *mausolea*, although this would need to be confirmed with excavation.

With good reason, the authors pose the question: since fairly large cemeteries have been documented on the Isola, where did the people reside when they were alive? There was a settlement near the southern bridgehead of the *Ponte di Matidia*, to be sure, but this was not very dense and was for the most part occupied by public buildings.¹⁶ There is a lack of evidence for *domus*, *insulae* and similar buildings on the Isola, and this is also in large measure the situation at Portus. This is at least what is understood from the current state of research.

This is a major issue that is not easily interpreted. As the geophysical survey proceeded and subsequent open area excavations of certain areas were undertaken, it has intrigued members of the Portus Project and caused them to pose questions about the ‘urban’ character of Portus. In his publications and in conference presentations, Simon Keay has put forward the suggestive hypothesis that there existed a substantial degree of commuting between Ostia and Portus: that is that many individuals involved in the loading and unloading of merchandise at the imperial harbour basins, and in storing it in the warehouses etc, would have lived in the old *colonia* and travelled to their ‘place of work’ daily, either by road (along the via Flavia), or by boat – in which case they would have used the Isola Sacra canal, or directly by sea. Boats for local cabotage, such as the *caudicariae* or the *lyntres*, would have also been used for this. This is what is left to be guessed at in another passage of the text, where it is argued that thanks to the transport infrastructure that we now understand better, Portus could be reached from Ostia (and *vice versa*) in as little as an hour on foot or by boat. Another hypothesis that is suggested in addition, or as an alternative, is that some of the port workers could have resided in lodgings situated on the now lost upper storeys of the *horrea* at Portus.

Returning to the funerary landscape of the Isola Sacra, the authors suggest, if I understand them correctly, that the *mausolea* on the north side of the Isola were destined for the inhabitants along the southern bank of the ‘*Fossa Traiana*’ and the *Portuenses*, and that the tombs along the via Flavia (including the so-called *Necropoli di Porto*), as well as those situated along the banks of the Tiber, would have served the needs of the *Ostienses*. This is an interpretation about which I would be cautious, and indeed the conclusions warn against overly simplistic hypotheses about ‘spatial segregation’ and instead suggest the existence of ‘mixed’ funerary situations; in relation to this, they cite inscriptions from the *Necropoli di Porto* recording individuals who were active in both port cities,¹⁷ both of which were characterised by having societies that were both complex and mobile. All of this is true, although in my opinion, the main argument is a topographic one: in fact, if one examines plans like Figs 6.4–5 (and others), one cannot not help but notice the fact that the tombs along the via Flavia only become dense along the northern stretch of the route, suggesting or confirming the idea that this cemetery had mainly comprised just one of the ‘*necropolis di Porto*’.¹⁸ When (and if) the funerary panorama of the north-east bank of the Isola along the Tiber are better known, it will perhaps be possible to know whether this sector really was a burial space shared by the residents of Ostia and Portus.

The settlement which, thanks to the survey, has been identified along the southern bank of the Isola Sacra, and thus the right bank of the Tiber, constitutes a reality that is so new and important, as well as having so many implications, that it is justly assigned ample space in the concluding chapters of the book, and inevitably I will do the same here. The discovery, even if only by means of geophysical survey and without verification by means of excavation, had already caused a major sensation (and not just in the scientific community) at the time when Simon Keay made it the object of a press conference held in Rome in April of 2014, that was broadly taken up by the mass media. Following that public presentation, the coordinators of the survey published a report on the discovery that was synthetic, but also exhaustive (Germoni *et al.* 2019). I also attempted to formulate some personal reflections on the matter that were published in the same collection of papers (Pavolini 2019).

The settlement of which we are speaking covers c. 4 ha, and is comprised – overall or in large part – by a group of warehouses that were aligned along the southern bank of the Isola. This excluded the area lying between the presumed course of the canal and the route of the via Flavia to the west, which is

understandable because between both of these only a narrow tongue of land would have remained available, and it would have been unsuitable for these kinds of construction. On the eastern side, the complex of buildings that have been identified could be seen to represent a continuation of the collection of buildings that had already been identified in the spur of land within the ancient meander of the Tiber (see in particular, Fig. 6.2). However, it is unclear whether or not there was a gap between both groups of buildings at its narrowest point.

In summary, therefore, five buildings have been revealed to date by the geophysics (the essential details are summarized in Table 6.1 of the book), of which four were definitely warehouses,¹⁹ while the interpretation of the fifth remains more uncertain. In terms of the typology, three of the *horrea* belong to the courtyard type,²⁰ for which the authors cite Ostian parallels. The fourth is also a probable warehouse although it may perhaps have had a different function and is without any strict parallels on the other side of the river. The fifth building is decisively different, as it seems to consist of a large enclosed quadrangular area and subdivided by lines of internal pilasters²¹ (a space for unloading cargoes prior to their storage in warehouses?). In terms of the chronology of this quarter, settlement evidence prior to the late first century AD is rare, perhaps on account of the frequent Tiber floods, while the excavations of the last century indicate that the earliest structures were built from *opus reticulatum* (see Note 21), which can be generically dated to the first–second century AD.

An equally relevant structure that has been revealed by the non-destructive survey in this southern sector of the Isola, is the probable defensive wall that shuts off the ‘warehouse quarter’ to the north (Fig. 6.6), whose chronology is far from clear. It is significant that, as its discoverers note, it respects the orientation of the system of landscape division that has been discovered to the north: but does that mean that we ought to necessarily attribute it to the same period, that is the late first century AD, or ought we think instead of a more recent date which is not in itself identifiable? To answer this is challenging: as we will see, the authors incline towards the second hypothesis, but in the meantime discount the idea that this defensive circuit could be considered to have been some kind of continuation, on the other side of the river, of the walls of Ostia that are dated by Fausto Zevi on the basis of epigraphic evidence to 63–58 BC. They do this because it is logical to do so (the Isola defensive circuit was clearly destined to protect a complex of vital importance such as the series of *horrea*, and these are much later than the Ciceronian period,

as we know), as well as for a whole series of issues. In effect, the defensive wall has a width of 3–5m and has square external towers (not on the angles) of c. 6–8m: these are characteristics that – without going into too much detail – differ significantly from those of the late Republican wall circuit of Ostia.

In terms of its circuit, once the Isola Sacra wall reached its western limit, it turned sharply south in the direction of the northern wall of Building 1. The relative chronology of both structures will only be resolved by excavation; however, there are indications from the magnetometry to make one think that the defences were later than the outer wall of the warehouse and that this was incorporated into them in order to consolidate the defensive system. Towards the east, albeit without proof, the authors argue that the wall continued in a straight line as far as the inner (west) bank of the meander (as the above cited plans might be taken to suggest). If this is the case, it would have ensured that the southern and eastern arms of the Tiber would have been provided with an adequate degree of protection against any assailants.

Turning now to the crucial question of its chronology, one point of great importance is the fact that if on the one hand the Isola Sacra wall circuit is significantly different from that of Ostia, on the other it has characteristics that are remarkably similar to those of late antique date that were built at Portus,²² as the authors argue. Fundamental to understanding the chronology of these are the results of the sondage, albeit of limited scope, undertaken at the so-called ‘*Antemurale*’ of Portus. The stratigraphic sequence here has made it possible to push the date of the fortifications of Portus back from both the traditional Constantinian period, and the late fourth to early fifth century AD date that had been attributed to them at one stage. It is now argued that the fortification could have been completed around AD 470–80, and that it could have been undertaken by a *praefectus Urbi* of Odovacar (Keay and Paroli 2011, 7, notes 22, 82 and 141).

It is clear, then, that if the fortification running along the northern side of the *horrea* on the southern side of the Isola Sacra should also be attributed to a late date on the grounds of similarity, and that if a future stratigraphic excavation should confirm this, then it would raise interesting questions about the last stages of the history of Ostia. These are issues that I have raised in the article mentioned above (Pavolini 2019), which is also cited by the authors of this volume who tend to agree with the hypotheses formulated there. They thus espouse the vision of an Ostia in which the underlying rationale for its earlier floruit had already begun to fade from the third century AD onwards, and which in the middle of the fifth century AD was

heading towards its definitive crisis as an urban institution. There is far too much to say about this issue, but it has already been done on numerous occasions and not only by me.

And still, given the context of our discussion, we can do no less than remember a key fact which is that after the end of the Republic, let alone during Late Antiquity by which time they had largely fallen into disuse, the fortifications of Ostia were never reconstructed. At Portus, as we have just seen, matters played out differently, something which makes one think that in the last period of its use, the warehouse quarter of the *Trastevere Ostiense*²³ with its protective wall, and I would say the Isola Sacra as a whole, was by now under the administrative jurisdiction of Portus²⁴ rather than Ostia, and therefore under its economic and political control as well. The historical implications would have been evidently highly significant, and need to be further explored.

The final paragraphs of Chapter 7 are dense with final observations and important questions. For the large scale building projects undertaken at both Ostia and at Portus at different times in their histories, particularly those completed for the *annona*, should one think of them in terms of public or private initiatives, or perhaps as combined operations, and in what proportions? As regards Ostia, Janet Delaine (2002) has suggested that in many cases, the investment would have come from private sources (from members of the urban *ordo* or from *collegia*, freedmen of the *colonia* etc), but it is then worth posing the same question about land ownership, as the authors of the book do, where there are similar problems. In the case of Portus, one can probably attribute it to imperial property, which would have been acquired through inheritance: but what about the lands of the Isola Sacra? Here the question seems to be more complex: the directors of the survey tend to distinguish between the lots, which in the central and northern sectors of the Isola came to be divided up and distributed to *coloni* or those to whom it had been assigned – perhaps as a result of imperial intervention, and those along the southern strip, which at least from the second half of the first century AD when the *horrea* began to appear, could have been in private hands.

The definitive conclusions to the volume do no more than expand upon the contents of Chapters 6 and 7 (which are in themselves conclusive as we have seen), but do so in terms of a broader context. One aspect perhaps prevails above all others: for any future study of Ostia, the change in our perception of its history as a result of the survey results is, and will remain, fundamental. This is because from now on, we need to envisage Ostia as no longer being just

the settlement on the left bank of the river as we have traditionally known it, with the *Trastevere* as a poorly studied appendage, but as a great commercial river port (a ‘commercial corridor’ is the textual definition), or a port cut in two by a river (‘a port bisected by a river’ as described in the book). And here, a comparison with the Urbs itself becomes inevitable, since studies in recent decades (it is not necessary to provide references, but sufficient to think of the contributions by C. Mocchegiani Carpano, E. Rodríguez Almeida and F. De Caprariis, amongst others) have given the impression of a Rome served commercially by quays and landing stages – with their ensemble of storage buildings – not just concentrated around the *Emporium* and the northern river port of *Tor di Nona*, but spread out along the whole length of the urban stretch of the Tiber.

Consequently, our image of Ostia should also change in respect of its demographic profile. Even though calculations concerning this have always been somewhat random, for obvious reasons, and it seems appropriate to retain the same note of caution from now onwards, it is clear that we cannot still think – for this Ostia as broadly understood – of a population equivalent to the figure of 30,000–40,000 that is usually cited; there would have been many more. The text states this, as well as alluding to another element that, in the context of needing to re-examine the size of the population, is particularly relevant: I am alluding to the large urban expansion of Ostia to the south-east of the Republican walls that would have been documented by another programme of non-destructive survey, namely the geophysical survey directed years ago by Michael Heinzelmänn, which remains almost completely unpublished, as our authors lament. In any event, if there is a confirmation of this and add this possible ‘Ostia outside the walls’ to a *Trastevere* that is otherwise somewhat more densely occupied than previously thought, in schematic terms Ostia would pass from the status of a small to medium sized centre to one of a middle to large size. So many aspects of its history (its relations with Rome and Portus itself), will have to be radically reviewed, while in terms of didactic communication to the non-specialist public, someone would need to re-write the popular guides as well.

The conclusions to the volume speak of the beginnings of the first century AD as the possible initial establishment phase of the commercial infrastructure to the north of the Tiber, with everything that this implies. Without prejudice to excavation controls, this dating could be considered to be too high, since in some parts of the text, the second half of the first century AD had been suggested as the period that

marked the first appearance of the *horrea*, which would have developed above all in the course of the second century AD. In any case, even if it is admitted that a true flourishing of the 'Trastevere' had begun between AD 50 and 100, in the analysis of the authors this would suggest that the commercial and urban revitalization of the old colony of Ostia was essentially determined by the establishment of the Claudian basin at Portus, rather than as a result of the Trajanic basin, and we have already seen some possible reasons for this.

This picture is completed by the reflections that appear in the final paragraphs of the chapter, and which encompass the broader geographical context of the port system created by the Romans along the central stretch of the Tyrrhenian coast (with Trajan as the protagonist in some of the decisive interventions), and which ranged from Centumcellae in the north to Terracina to the south, if not beyond, since further south lie Pozzuoli and Naples. At the 'heart' of this system lay the Ostia/Portus conurbation, and the 'heart of the heart' was the Isola Sacra, for the understanding of which this book accomplishes a gigantic breakthrough. Notwithstanding its length and completeness and the fact that the present contribution stands out as an essential point of departure, it is not necessarily one of arrival (and I believe that the authors can agree with this). So, the wish – that can perhaps seem to be customary but which has rarely been so justified – is that the Portus Project and the Italian-British surveys of the Isola Sacra around the imperial harbour basins and in its hinterland continue, using both non-destructive and traditional archaeological methodologies, so that they can provide us with further new and unexpected discoveries for historical reflection.

Notes

- 1 In relation to this Pavolini 2013.
- 2 Many programmes of urban and landscape replanning along the modern Roman coastline have been drawn up in recent years, with few practical outcomes up until now. Nevertheless, interesting ideas relating to these – with projects in which the archaeological context based upon Ostia and Portus (with the Isola Sacra at their heart) assumes crucial importance – are to be found, for example, in two recent volumes produced by the *Dipartimento di Architettura e Progetto dell'Università di Roma La Sapienza*, with a contribution by this writer. (Pavolini 2015); see also Pavolini 2019.
- 3 This is the date which is usually attributed to the moment when the meander formed by the Tiber close to Ostia is cut, remains isolated and silts up, creating the so-called Fiume Morto, although it has been argued that this was a gradual process lasting several years and was not complete until 1562: see amongst others Pannuzi and Rosa 2017.
- 4 The book cites works down to and including the most recent contribution by Olivanti and Spanu 2019, although it omits the matching article in the same *Atti del Terzo Seminario ostiense* (Baldassarre *et al.* 2019) which integrates and replaces earlier publications by Baldassarre and her collaborators.
- 5 It was first presented publicly by Germoni *et al.* 2011: figs 1.3–4, although at this stage it was only possible to provide an illustration of the first stretch of the canal.
- 6 The writers estimate its width at c. 35m.
- 7 In effect, given the general topography, a double function would seem the most probable, and this would not only be the case with the Portus to Ostia Canal, but also those that have been identified, or better interpreted, as a result of recent fieldwork (the *Canale Romano*) mentioned above, the northern canal and the '*Fossa Traiana*' itself: see Keay and Paroli 2011: Figs 1.3–4.
- 8 Further on, the editors of the volume put forward the hypothesis that the vessels were found in what was the final stretch of the canal which, in nearing the bank of the Tiber, would have turned gently to the west, as seems to be suggested by aerial photographs, coinciding with the route taken by the via Flavia.
- 9 Length of c. 12m x width of 4.88m.
- 10 This is the rationale for suggesting that the canal was not abandoned later than the Severan period.
- 11 This may have been the context of the Isola Sacra wrecks.
- 12 This is probably one of the canals referred to in the well-known inscription (CIL XIV, 85) that records the decision of the central power to create canals that aimed to resolve at least in part the problems of the Tiber floods. It dates to AD 46, and such a chronology confirms (something implicit in the analysis of the authors) that the excavation of the first harbour basin and its canal lying to the south of it must have been planned together. However, the fact that the *statio marmorum* along the line of the '*Fossa Traiana*' was active during the final decades of the first century AD (see below), is a fact that speaks for itself.
- 13 Which implies that it is only from this point that we can speak of a Tiber delta.
- 14 All of the relevant bibliography for this, with studies by A. Arnoldus-Huyzendveld, L. Paroli, A. Pellegrino and others, is cited in the volume.
- 15 In respect to the solution adopted in this book, the question is perhaps rather more complex. I simply refer the reader to Pavolini 2018 which discusses hypotheses relating to the final stretch of the coastal *via Severiana*, which ran from southern Lazio, and after entering Ostia from the south probably, at least to my mind, coincided with the southern stretch of the Decumanus Maximus and the *Via della Foce* as far as the Tiber. There must have been, therefore, stretches of coastal roads that existed prior to the Severan re-organization of the road, and hypothetically the via Flavia could thus be considered to represent their continuation on the Isola Sacra.
- 16 I note in passing some hypotheses that appear later in the text (in other words, the conclusions), that suggest

the possibility that both here and in the *statio marmorum* further to the east were situated offices – used by imperial officials – charged with collecting customs on merchandise that being transported from the ports to Rome (and in lesser quantity to Ostia).

- 17 Also, in another passage which refers to epigraphic and juridical documentation, it is noted how many *navicularii* and other members of associations connected with commerce supply and port activities, would have carried out their work both in the old *colonia* and the imperial harbours.
- 18 And to my mind it is significant that the ‘decline’ of the cemetery dateable only by its *mausolea* can only be detected from *c.* the first half of the third century AD, as has always been understood. This is perhaps a confirmation of the fact that the importance of Ostia was gradually decreasing and that, as a consequence, the intensity of fluvial and terrestrial connections between Ostia and Portus was also diminishing. While all of this was occurring, Portus obviously continued to be inhabited and flourished, although its inhabitants came to be buried elsewhere. This is, therefore, a complex issue that clearly cannot be developed here.
- 19 A small part of Building 1 was discovered during an excavation in 1968 (Zevi 1972 and G41).
- 20 I would like to draw attention in this note to many issues relating to such warehouses and related problems that are all very well documented in Chapters 6 and 7 of the book. For example, the probability that the principal product stored in them was grain; the possibility that there were auctions or similar activities in their courtyards, as Janet DeLaine (2005) has suggested in relation to some Ostian buildings; finally, calculation

of storage capacity, not only that of the ‘warehouse quarter’ but also of the urban area of both Portus and Ostia as a whole, a subject about the authors themselves stress prudence.

- 21 This Building 5 had been observed in the sondages dug in the 1960s (the circumstances of the find and the publication by Zevi and others appears in the entry G44 in the Gazetteer), and to it perhaps belonged the mosaics located immediately to the east of the limits of the survey, G45-G46. This was a built-up area, the characteristics of which are for the moment less clear, which extended to the south-west of the sites listed and included structures built from *opus reticulatum* (of the first century AD) that were observed in the same sondages.
- 22 In making all of these observations, I take as read the fact they all derive from magnetometry results. I have pointed this out on various occasions, and the authors themselves also have this in mind; however, this does not prevent us from reasoning and formulating hypotheses from this kind of evidence.
- 23 The date of whose abandonment is unknown; in the conclusion, reference is made only to the existence of an undated tomb ‘a cappuccina’ which was discovered in the old excavations at G43.
- 24 As is well known, the first source that defines Portus as a *civitas* dates to AD 313. The change in its administrative status could have thus occurred earlier, we do not know when, and it could have involved the ‘annexation’ of the Isola Sacra to the new territory administered by the new *civitas*. Rather broader considerations related to the continued flourishing of Portus in Late Antiquity are discussed in Pavolini 2019.

Acknowledgements

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In addition to finance, important institutional support was provided by the University of Southampton, The British School at Rome, Soprintendenza Soprintendenza Speciale per i Beni Archeologici di Ostia, Soprintendenza per i Beni Archeologici di Roma, Soprintendenza Speciale per il Colosseo, Museo Nazionale Romano e Area Archeologica di Roma and the University of Cambridge. Collaboration continues today with the Parco Archeologico di Ostia Antica, of which Portus is a major component. Specific individuals in Italy who played an important role in supporting the project from 2007 to 2012 were Andrew Wallace-Hadrill, Christopher Smith, Anna Gallina Zevi, Fausto Zevi and Lidia Paroli, together with Giuseppe Proietti, Alessandro Bedini, Margarita Bedello, Anna Maria Sgubini Moretti and Mariarosaria Barbera, as well as Angelo Pellegrino, Renato Sebastiani, Paola Germoni, Cinzia Morelli and Patrizio Pensabene. At the University of Southampton in the UK, we were very fortunate to receive ample support from Anne Curry, Mike Kelly and Don Nutbeam.

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Note regarding the Gazetteer

Information about previously explored sites on Isola Sacra is summarized in the Gazetteer (see pp. 173–85). Throughout the text and on the illustrations, references to these sites in text uses the abbreviated form (G1), meaning Gazetteer site 1.

Note

- 1 It was directed by Simon Keay; Grant numbers AH/1004483/1 and AHE509517/1.

Chapter 1

Introduction

Simon Keay, Martin Millett, Kristian Strutt and Paola Germoni

Abstract

This chapter introduces the project presented in this volume, explaining the context of the work in relation to previous research. It outlines the topography of the Isola Sacra and places the location of the survey in relation to previous knowledge of the archaeology. It introduces the aims and methods of the work and briefly summarizes the history of the project. The chapter concludes by explaining the organization of the volume and its authorship.

The context

The construction of the Port of Claudius to the north of the Tiber below Rome, some 3km to the north of Ostia, was a prolonged process that began in AD 42 and which altered both the physical structure of the Tiber delta and its use. The creation of the harbour and the construction of a canal, the so-called ‘*Fossa Traiana*’ (the modern Fiumicino Canal) connecting the Tiber to the sea, created an artificial island, the Isola Sacra, which occupied the coastal zone between the newly established port and the city of Ostia (Fig. 1.1).¹ The city of Ostia and the port of Portus together formed the principal destination for traded goods bound for the City of Rome during most of the Imperial period, with important evidence for key elements of their associated infrastructure lying within their hinterlands.

Past archaeological research in the Tiber delta has generally focused on the urban centre of Ostia (Meiggs 1973; Pavolini 2016a) and the port complex at Portus (Lanciani 1868; Lugli and Filibeck 1935; Testaguzza 1970; Keay *et al.* 2005; Keay and Paroli 2011). However, the significance of the broader area has also been recognised, with a number of interventions during the nineteenth and twentieth centuries revealing archaeological evidence for an intensive use of the landscape between these two sites. The creation

of the drainage system during the *bonificazione* (reclamation and land division) of the delta in the 1920s, for example, led to the discovery and excavation of the early- and mid-Imperial cemetery known as the *Necropoli di Porto* (G35)² located to the south of the ‘*Fossa Traiana*’ (Calza 1940), whilst other development in the earlier twentieth century led to the uncovering of Roman structures on the southern bank of the ‘*Fossa Traiana*’ (G1–G5), as well as further structures across the northern part of the island in the 1960s and 1970s (G7–G15). An increase in the piecemeal construction of private dwellings and provision of utilities during the 1980s and 1990s led to further archaeological interventions within the context of a management strategy coordinated by the Soprintendenza per i Beni Archeologici di Ostia. With the exception of a few rescue excavations by the Soprintendenza itself, these interventions have been largely limited to assessing the archaeological potential of sites revealed during building work, to ensure their protection.

The survey work that forms the subject of this volume represents the first overall non-destructive survey of this key landscape. It was undertaken as part of the AHRC-funded Portus Project (www.portusproject.org), which has used excavation and survey to learn more about the development of the central part of the port and to explore its overall relationship to Ostia to the south. The planning and execution of the survey were undertaken in close collaboration with the directorship of the Soprintendenza per i Beni Archeologici di Ostia in the context of its responsibility for the monitoring, management and preservation of archaeological sites in the Isola Sacra. Our work at Portus and on the Isola Sacra also complements the extensive geophysical survey of Ostia undertaken between 1996 and 2001 by Michael Heinzelmänn for the Deutsches Archäologisches Institut Rom.³ The full results of this work, which also included some analysis of the aerial photos (Bauer *et al.* 1999; 2000;

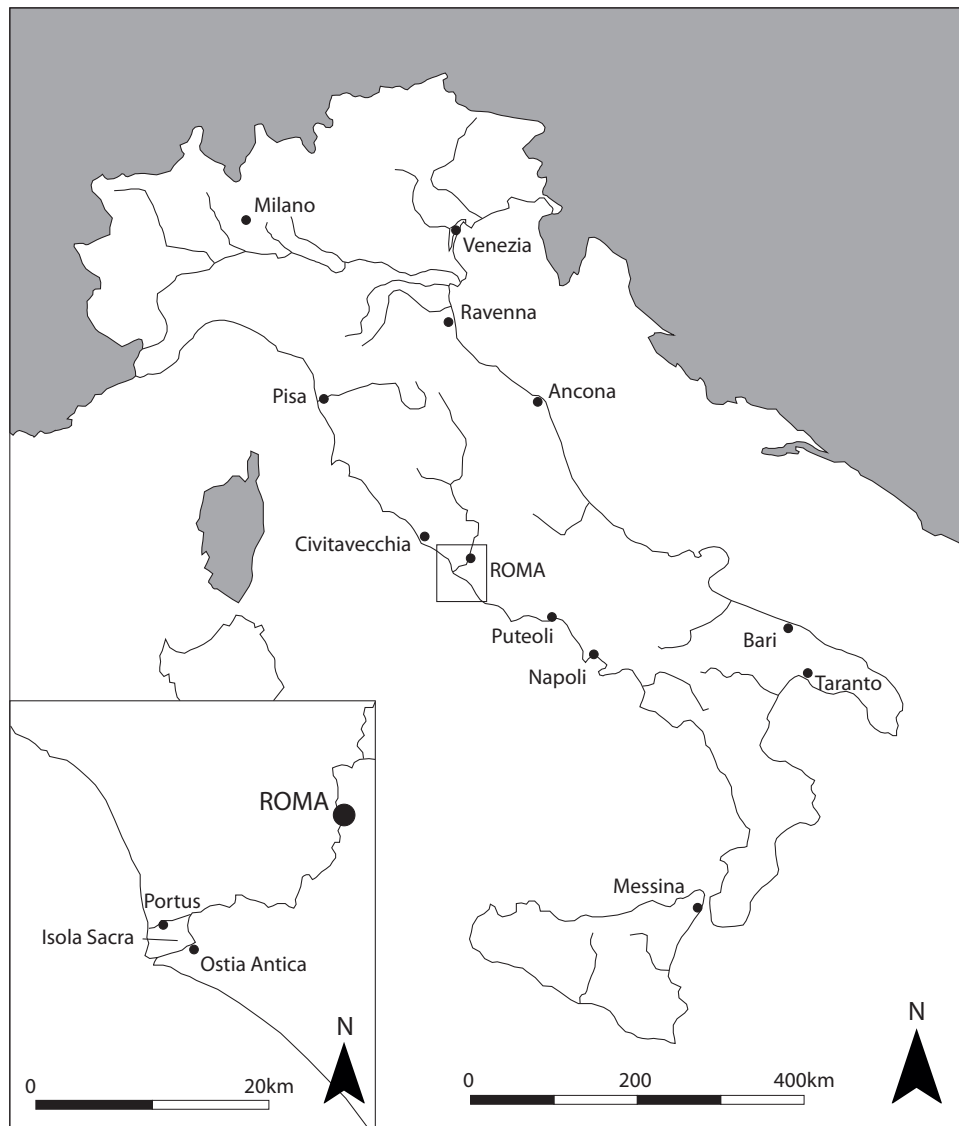


Figure 1.1. The location of the Isola Sacra in Italy in relation to Portus and Ostia. (Drawing: P. Copeland.)

Heinzelmann 1998a; Heinzelmann *et al.* 1997; 2001; 2002), are expected to be published shortly.⁴

Large-scale non-intrusive archaeological survey and research across the Isola Sacra had been absent until the initiation of the current project. The planning of the project was informed by the earlier non-destructive survey at Portus and in its immediate hinterland (Keay *et al.* 2005), which was conducted in 1998–2004, employing geophysical and topographic survey to provide a new approach to understanding the layout and functions of the imperial port. That research encompassed the built-up areas around the Claudian and Trajanic basins and the *Darsena*, the land between them and the ‘*Fossa Traiana*’ and also that between the Trajanic basin and the Tiber. It was designed to

complement the evidence from earlier piecemeal work at Portus as well as ongoing archaeological investigations by the Soprintendenza per i Beni Archeologici di Ostia, and to provide an overall framework within which these might be better understood. The strategy of the Isola Sacra project presented in this volume was similar in its methods and approaches.

After some initial work in 2002 and 2005, the main survey on the Isola Sacra was undertaken between 2008 and 2012 as a collaboration between the Direzione Regionale per I Beni Culturali e Paesaggistici per il Lazio, the Soprintendenza per i Beni Archeologici di Ostia, the British School at Rome and the Universities of Cambridge and Southampton. The fieldwork strategy involved the predominant use of fluxgate

gradiometry to record buried archaeological features across the study area. The results of the survey, together with analyses of other data including satellite imagery and air photographic evidence, are presented in this volume, together with an evaluation of detectable archaeological remains in the Isola Sacra.

The survey was initially undertaken to learn more about the relationship between Portus and the northern part of the Isola Sacra from a research perspective, and at the same time to assist the Soprintendenza per I Beni Archeologici di Ostia in its management of the archaeological heritage by gauging the archaeological

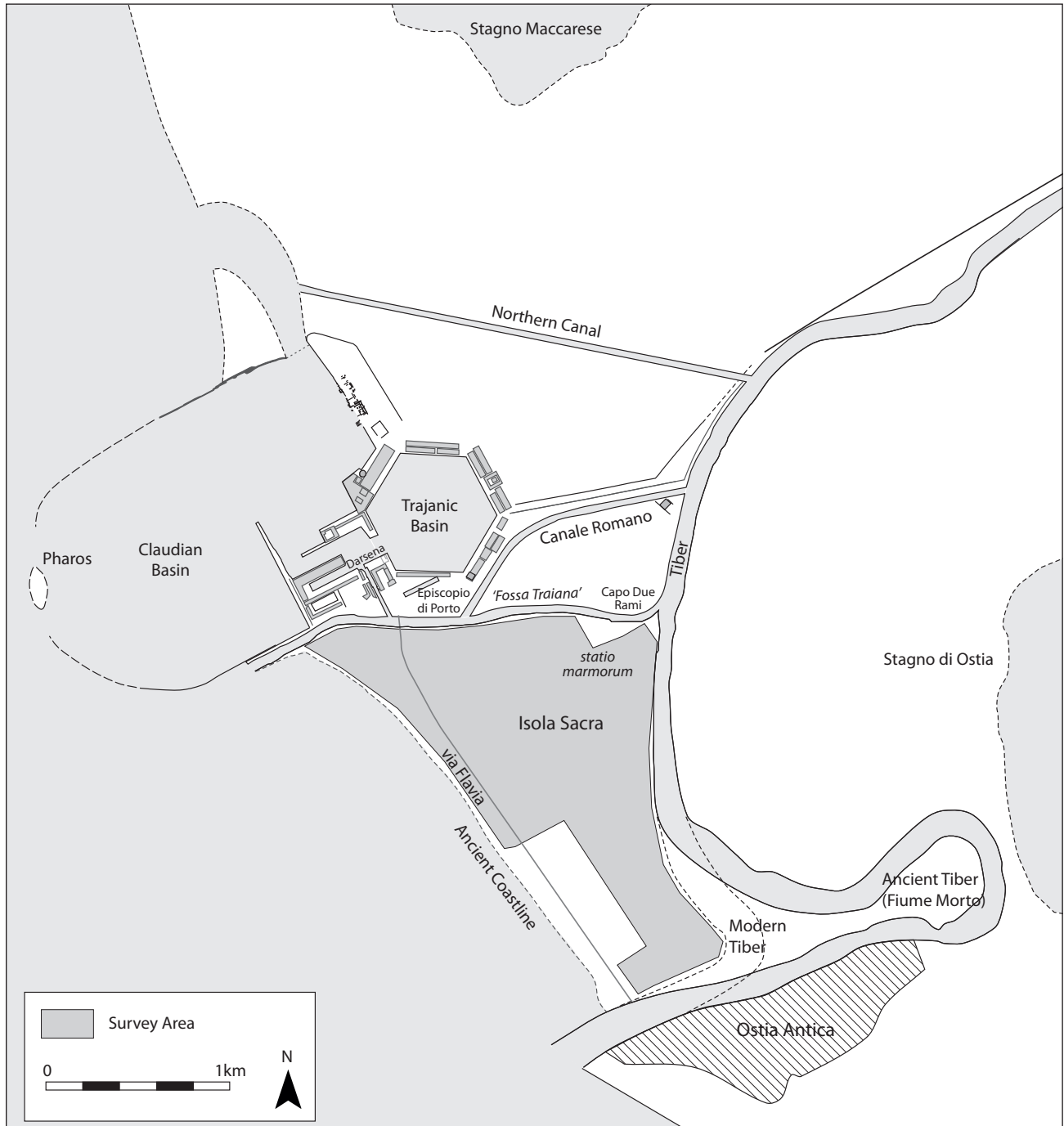


Figure 1.2. Map of Portus, Ostia, and the Isola Sacra in the Roman period showing the principal archaeological features. (Drawing: P. Copeland.)

potential of lesser known parts of the area. However, the high quality of the results encouraged the team to extend the coverage of the survey down to the southern limit of the Isola Sacra. As a result, the Isola Sacra survey results provide a context for a new understanding of Ostia and the ancient coastal area around the mouth of the Tiber in antiquity. In particular, they provide new evidence about facilities and infrastructure in the hinterlands of Portus and Ostia that were used for settlement, transport, storage and trade.

The project is different from the previous survey at Portus in that its main focus was the landscape rather than an intensively built-up area. The survey covered c. 98 ha across the ancient Isola Sacra, which together with adjacent areas in the Tiber delta covers a total area of c. 140 ha. Thus, two thirds of the ancient landscape that survives within the modern configuration of the Isola Sacra was encompassed within the geophysical survey. Inaccessible areas where the team could not collect surface data were examined using other remote sensing techniques, including air photographic images from the 1940s and 1950s, and

satellite imagery comprising both panchromatic and multispectral images from 2012. Together, these data have enabled us to assess the archaeological potential of areas not accessible by the geophysical survey.

The topography of the Isola Sacra and location of the survey area

The Isola Sacra today takes the form of a rectangle oriented north-west to south-east, and defined by the Fiumicino Canal on the line of the '*Fossa Traiana*' to the north, the Tiber to the south and east and the Tyrrhenian sea to the west (Fig. 1.1). In the Roman period the island was smaller, and measured c. 1.6km from east to west by c. 2.6km from north to south (Fig. 1.2). The progressive extension of its shoreline to the west as a result of deposition in the delta over the last 1500 years has increased the size of the island. It is also important to note that the rather different course of the Tiber in antiquity means that the topography of the southern part of the island was then also very different. An extended eastern meander in the river defined a spit



Figure 1.3. Aerial view of the northern part of the Isola Sacra looking northwards towards Portus. (Photograph: Simon Keay.)



Figure 1.4. Aerial view looking south-west across the Isola Sacra. The Capo Due Rami is in the foreground with the river Tiber just visible on the left curving to the south and the Fiumicino Canal (on the line of the 'Fossa Traiana') continuing to the west in the foreground to the right. The final stretch of the river Tiber as it approaches the sea is visible in the background. (Photograph: Simon Keay.)

of land extending the island's south-east corner (Fig. 1.2). It was only with the loss of that meander in 1557 that the modern course of the river was created, and the current topography of the Isola Sacra established (see below, p. 12).

The modern landscape of the Isola Sacra (Figs 1.3 and 1.4) largely comprises agricultural land that was subdivided into a square grid by drainage channels that were created during the *bonificazione* of the Tiber delta in the early twentieth century. These were oriented north-west to south-east and were further subdivided into smaller rectangular properties of different sizes. Earth was piled in the centre of each land parcel to allow optimal drainage from crops or pasture. This terrain is similar to the *bonifica* encountered in the area to the north of the Tiber, between the river and the *via Portuense* (Keay *et al.* 2005: 7). Rectangular open fields still survive today, particularly to the east and south, with the individual fields that have slight variations in

surface height used to cultivate a range of crops and for pasture. However, many fields have disappeared in the north and centre, particularly as a consequence of the proliferation of houses, farm buildings, warehouses and other installations built in recent years. The northern edge of the Isola that opens on to the 'Fossa Traiana' is similarly occupied by a series of properties, boatyards, and wooded areas; indeed, it is only its easternmost stretch near the Capo Due Rami, where the 'Fossa Traiana' meets the Tiber, that the landscape remains relatively undeveloped (Fig 1.4). The island is surrounded to the north, east and south by a substantial embankment created to prevent flooding. In some areas, particularly along the eastern side and in the south-eastern corner, modern boatyards, slipways and modern building occupy the narrow space between the embankment and the river itself.

The contemporary Isola Sacra, therefore, is a very fragmented landscape in which it is difficult to readily



Figure 1.5 (left).
*The Basilica di S. Ippolito
 as excavated and on display
 (G14), looking south.*
 (Photograph: Martin
 Millett.)

appreciate the ancient topography. Nevertheless, a few ancient structures are still visible, some of which have been standing since antiquity, while others have been uncovered by excavation. The excavated site of the so-called *Isaeum* (G7) lies on the southern side of the 'Fossa Traiana', a short distance to the west of the modern viaduct of the via della Scafa. Still lying close to the line of the 'Fossa Traiana' stand the open excavations of the *Terme di Matidia* (G12), and to the east of these, the Campanile and excavated remains of the *Basilica di S. Ippolito* (G14; Fig. 1.5). This cluster of sites lies almost directly opposite the *Episcopio di Porto*, a multi-period walled complex and the seat of the current bishop of Porto which is situated on the northern side of the canal. Tombs immediately to the

south of the *Basilica di S. Ippolito* along the line of the via Redipuglia are also visible to the modern visitor (G20). Further south are displayed the remains of the Roman cemetery of the *Necropoli di Porto* (G35) where excavations have uncovered a range of tombs flanking the via Flavia (Figs 1.6 and 1.7), the Roman road

Figure 1.6 (opposite above). *Aerial view of the
 Necropoli di Porto (G35) from the west.*
 (Photograph: Simon Keay.)

Figure 1.7 (opposite below). *Mausolea (tombs nos
 78, 79 and 80) in the Necropoli di Porto (G35) from
 the east.* (Photograph: Simon Keay.)





Figure 1.8. Marble blocks from the site of the *statio marmorum* on the *Isola Sacra* on display at *Ostia Antica*. (Photograph: Simon Keay.)

which ran from Portus southwards to Ostia, and tombs are also open to view alongside the *via Redipuglia*. There are a few other visible monuments, including the remains of a brick-built pier or tomb to the east of the *Basilica of S. Ippolito* (G33), and a concentration of marble blocks marking the location of the *statio marmorum* close to the *Capo Due Rami* (G28–G29; Fig. 1.8). Structures are absent, however, along the southern edge of the *Isola Sacra* opposite *Ostia Antica*. Notwithstanding the importance of these monuments, there is a general sense that archaeological sites are quite rare across the *Isola Sacra*. The accumulation of information about sites known from rescue excavations across the *Isola*, however, belies this (Chapter 2). In fact, the lack of visible remains is partly a product of the geomorphology of the Tiber delta, with the build-up of Tiber alluvium across the floodplain over centuries

masking ancient structures, whilst tombs and other Roman buildings close to the Roman-period coastline were buried beneath wind-blown coastal sand-dunes up to the level of their eaves and roofs.

The survey area covers a large part of the modern island of *Isola Sacra*. Its western extent is demarcated by the approximate line of the ancient Roman coastline, to the east of the *via della Scafa* which connects the modern town of *Fiumicino* in the north with *Ostia* to the south. Our geomorphological analysis and results of the geophysics provide a clearer indication of the possible line of the ancient coast, and its progradation in the Roman and late antique periods. However, the limit of our survey was defined by a line running south from the site of the so-called *Isaeum* beside the '*Fossa Traiana*', past the western limit of the site of the *Necropoli di Porto*, and on down to the modern

crossing of the Tiber opposite the Tor Boacciana. The survey excluded the spit of land at the south-east of the ancient Isola Sacra that was separated by the change in the course of the Tiber following the flood of 1557. Finally, the presence of the anti-flood embankment and modern boatyards prevented survey close to the modern course of the Tiber, with many features located in the survey disappearing under these flood defences.

History of the project

After the work in 2002 and 2005, the main fieldwork was completed in 2008–12. For this, the Isola Sacra was sub-divided into different areas. Work commenced in the northern part of the island, alongside the ‘*Fossa Traiana*’ (Table 1.1), and progressed southwards towards the Tiber opposite Ostia. A final season of work was conducted in September 2012 in an effort to cover further areas that had remained inaccessible during previous seasons.

The strategy of the survey was to cover as much of the open area of the Isola as possible. Practical difficulties, however, meant that some areas were excluded on account of difficulties in gaining access to land. Also, as with the 1998–2004 survey of the flat land to the east of Portus and to the north of the ‘*Fossa Traiana*’, the flood-prevention embankment precluded any form of survey in the immediate vicinity of the modern course of the Tiber. The survey largely follows the methodology of our previous field survey project at Portus (Keay *et al.* 2005), with fluxgate gradiometry providing the principal technique for mapping the survey area. Whereas a suite of techniques was easily applied to the landscape around Portus, either on account of repeated seasons of work being possible within the *Parco Archeologico del Porto di Traiano*, or because the arable land between Portus and the Tiber facilitated field-walking, most of the accessible areas

across the Isola Sacra were either fallow or under pasture during the course of the geophysical survey. Thus, a comprehensive programme of field-walking and recording of surface finds was impossible. Similarly, the nature of the terrain meant that undertaking a comprehensive contour survey with total station or GPS would have been of limited value. LiDAR data was, however, accessed for the Isola Sacra allowing for comparison between the topography and the results of the geophysical survey.

Organization of this volume

This book forms the full report on the Portus Project geophysical survey of the Isola Sacra, together with several related studies and a discussion of the overall implications of the work. It supersedes previous interim discussions of the results (Germoni *et al.* 2011; 2019). Chapter 2 provides a background and historical introduction to the Isola Sacra, including its location and geomorphology. Chapter 3 presents the project methodology, including that used during the fieldwork, and archive and online research and data interpretation. Chapter 4 presents the results of the geophysical surveys and the interpretation results for the LiDAR, air photographic evidence and satellite imagery. Chapter 5 consists of a specific study of the Portus to Ostia Canal, the broad area of the harbour at Ostia and recently discovered wrecks on the Isola Sacra. Chapter 6 provides a synthesis of the evidence from the survey, and Chapter 7 integrates the results within a broader interpretative study of the Isola Sacra and its relationship to Ostia and Portus. The volume concludes with an updated Gazetteer of known sites in the Isola Sacra down to 2016. Names of sites, finds and results of excavations mentioned in the book follow Italian conventions to ensure compatibility with previously published accounts.

Table 1.1. *Isola Sacra geophysics: Summary of fieldwork seasons and areas.*

Date	Survey area
July 2002 and February 2005	Around the <i>Terme di Matidia</i> to the north of the via Redipuglia (Strutt 2005).
March 2008	North-east area of the Isola Sacra, close to the Capo Due Rami and <i>statio marmorum</i> (Strutt, Richardson and Millett 2008).
March 2009	North-west of the Isola Sacra, around the <i>Basilica di S. Ippolito</i> and the <i>Necropoli di Porto</i> (Strutt 2009).
October 2009	Field in the centre of the Isola Sacra (Strutt 2015).
April 2010	Centre of the Isola Sacra along the line of the via Flavia (Strutt 2015).
October 2010	Fields in the centre of the Isola Sacra (Strutt 2015).
March April 2011	Southern part of the Isola Sacra up to the modern course of the Tiber (Strutt 2015).
September 2012	Final work in fields in the southern part of the Isola Sacra where previously inaccessible (Strutt 2015).

Authorship

The volume presents a collaborative effort between team members and associated colleagues. Each chapter was co-written by team members, and their names are given at the start of each chapter. Individual contributions within chapters that relied solely on particular authors are given with chapter sub-headings. Photographs are credited wherever possible to their individual creators. All figures, unless otherwise stated, were prepared by the editors of the volume.

Notes

- 1 We retain the term '*Fossa Traiana*' throughout this text since it has passed into common archaeological usage, but we place it in quotation marks to remind the reader that it is chronologically inaccurate.
- 2 Throughout the text references to past finds and excavations use Gazetteer numbers in the form (**G1**), referring to the list in the Gazetteer (pp. 173–85), where full bibliographic details are provided.
- 3 <http://www.ostia-antica.org/heinzelmann/daiproj.htm>; <https://archaeologie.uni-koeln.de/35372.html>
- 4 Recently announced as M. Heinzelmann (2020) *Forma Urbis Ostia 1. Ergebnisse der stratigraphischen Untersuchungen in den unausgegrabenen Stadtgebieten*. Wiesbaden, Reichert-Verlag.

The Isola Sacra Survey

The Isola Sacra occupies the land between Ostia and Portus at the mouth of the Tiber, and thus lies at the centre of the massive port complex that served Imperial Rome. This volume focuses on the results of a survey of the island completed as part of the Portus Project, complementing the previously published survey of Portus (2005) and the forthcoming publication of the German Archaeological Institute's survey of Ostia. The survey is framed by an analysis of the geomorphology of the delta, and integrated with information from past excavations. It is complemented by a programme of geoarchaeological coring and a short account of the ships excavated on the Isola Sacra in 2011.

The results make an important contribution to the understanding of the landscape of both Portus and Ostia, offering new information about the development of the delta, and the changing use of the Isola Sacra. They also provide evidence for the buildings along Isola Sacra's northern shore and the cemeteries that flank this settlement and the via Flavia (which runs between Portus and Ostia across the centre of the island). Most significantly, three completely new sets of features were revealed: a major canal that ran north–south across the island; a system of land divisions, which created blocks of fields; and a suburb of Ostia on the island's southern flank. These results are key for understanding the development of the Portus–Ostia complex, and hence the economy of the City of Rome itself.

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