ROME TRANSFORMED: INTERDISCIPLINARY ANALYSIS OF THE EASTERN CAELIAN (ROME)

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Fundamental to the aspirations of ROMETRANS, the ERC-funded research project 'Rome Transformed: interdisciplinary analysis of political, military, and religious regenerations of the city's forgotten quarter C1-C8 CE' is an ambitious programme of fieldwork (https://cordis.europa.eu/project/id/835271).[1] Our last report (Haynes et al., 2020) recognised the impact of COVID-19 on this programme, but also explained how the project's overall research momentum had nevertheless been maintained. The ongoing off-site analysis of data captured in the field prior to early March 2020 and a range of equally essential work on archival sources and database development kept team members fully occupied.

Even though COVID-19 continues to present significant challenges, team members have combined to undertake and support a broad array of fieldwork tasks. Close observation of evolving health and safety measures and exploitation of the fact that many outdoor tasks can be effectively delivered while respecting social distancing regulations have allowed us to pursue many of our core objectives.

Project fieldwork in 2020–1 falls largely into two areas of activity: geophysical survey, coordinated through Francesca Carboni, and structural analysis, coordinated by Thea Ravasi. Both colleagues were also instrumental in a range of vital non-fieldwork tasks, such as archival analysis, website development, colloquium planning, and the adaptation of the project's provocation/visualisation system, the ROMETRANS SCIEDOC. In reality, the particular circumstances of the year meant, as shown below, that work was sometimes reconfigured depending on where colleagues were based during national lockdowns. If anything, the need for flexibility only further enhanced across the team the integrated understanding of the project's aims, objectives, and methods.

To characterise more accurately the archaeology of its 13.7 km^2 study area, the project's geophysical survey strategy brings together three teams of specialists. The British School at Rome team, led by Stephen Kay, used two Ground-Penetrating Radar (GPR) antennas, a 400 MHz and 200 MHz; the Consiglio Nazionale delle Ricerche team, led by Salvatore Piro, deployed GPR with a 70 MHz monostatic antenna and a GSSI 300/800 MHz dual-frequency digital antenna; and Geostudi Astier, led by Gianfranco Morelli, operated GPR with the IDS Stream multi-channel system, surveying between them a wide-ranging set of targets. In addition, the British School at Rome and Geostudi Astier conducted Electrical Resistivity Tomography (ERT) surveys. Coordination of this work required not only the generous help of many key Roman stakeholders, more fully acknowledged below, but also a good understanding of the history of investigation at each location, something being further developed through archival research and data sharing with SITAR (https://www.archeositarproject.it/), the latter project led by Mirella Serlorenzi, and the Archivio Centrale dello Stato where,

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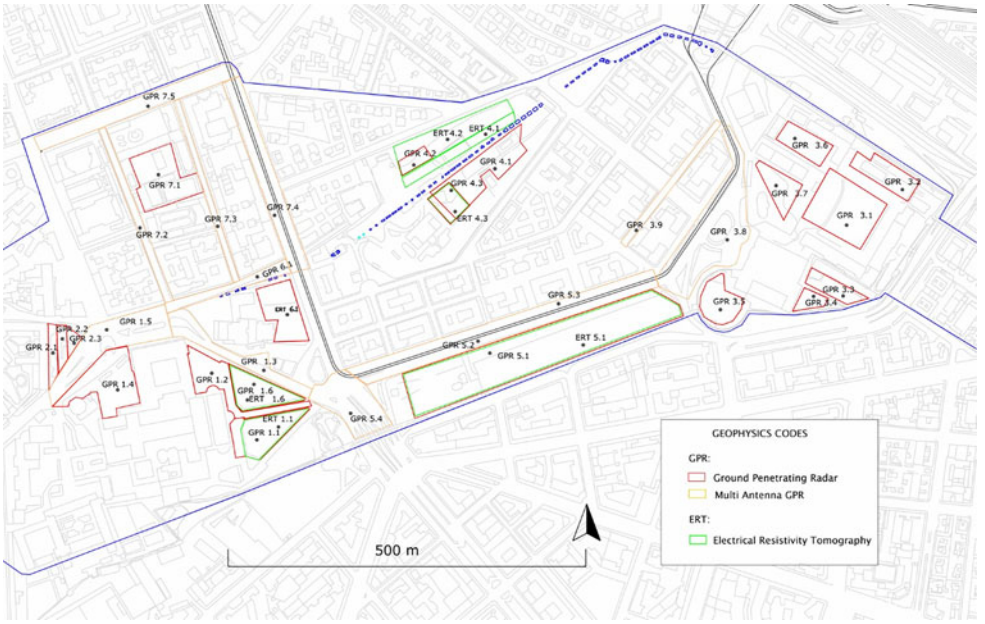

Fig. 1. Rome Transformed Project Geophysics Targets (Francesca Carboni and Thea Ravasi, Rome Transformed Project).

thanks to Mirco Modolo, we got the opportunity to work on the important documents that form part of Edoardo and Guglielmo Gatti's archive.

The scale and variety of activity is best conveyed with reference to Fig. 1. The team returned to the area of the Archbasilica of St John Lateran, to determine if further survey might yield more information on the structural sequence there. Earlier work as part of the then Lateran Project had raised the possibility that elements of the Lateran Patriarchium might be detectable (Haynes et al., 2013). Further GPR survey (GPR 1.1; 1.2; 1.4 and 1.6) with a 70 MHz antenna was undertaken by CNR colleagues, while the BSR team's ERT survey (ERT 1.1; 1.6) enabled still deeper readings to be taken. Amongst other important findings the survey's results allow for a substantially enhanced reading of the dramatic change in ground surface in the area immediately to the south-east of the Basilica.

Work in the garden of the Scala Santa (GPR 6.1/ERT 6.1) presents particular technical problems, and the quest to better understand buried archaeology here had to navigate the particular shape of the garden and its furnishings. Accordingly, all three teams converged to take a combined approach to GPR and ERT. Lessons hard won by Geostudi Astier in the application of ERT in complex urban environments were shared to our common benefit.

Different challenges again presented themselves to the team during their work in the north of the study area. The Villa Giustiniani-Massimo, which once occupied this area, is richly documented, but very little is known about the ancient and late antique topography of the area. Despite some tantalising notes by Lanciani, all too little was surveyed and recorded during its rapid development in the late nineteenth century. Francesca Carboni's comprehensive reappraisal of archival evidence and of the archaeological observations logged in SITAR have helped team members to navigate the

challenges of survey here and have demonstrated that traces of buried structures of an Imperial date lie close to the modern ground surface. The problem, however, is detecting these in such a dense urban environment. The BSR team led the first attempt to conduct geophysical survey here (GPR 7.1) in the grounds of the Istituto Santa Maria (Viale Manzoni).

Running alongside these surveys was a further tranche of work undertaken on the courses of the modern roads by Geostudi Astier using an IDS Stream multi-channel system GPR. This marked the start of a programme of road survey that should, when complete, cover 6.2 km^2 of the study area. The first phase of the work raised several important methodological issues, amongst them the proverbial challenge of the depth penetration of different GPR systems. In general, in these conditions, the IDS Stream multi-channel system allowed us to reach depths of about 2.5 m, more than enough to reveal significant archaeological anomalies in some areas, but, given the major changes in ground surfaces in the western end of the study area, insufficient to reach deposits laid down before the ninth century. The volume of data produced by such surveys is, of course, massive, and its analysis is ongoing.

In the central zone of the study area, work has continued on the northern side of the Aurelian Wall with a programme of ERT led by the BSR team (ERT 5.1) again helping to illuminate the topography of the area. Here as elsewhere the ERT programme is also organised to help the project's borehole strategy. Our aim is to refine the optimal locations for drilling next season, and ERT, alongside the archival work undertaken by Francesca Carboni, is integral to this process. All of this data will be set alongside the historic borehole data provided by Carlo Rosa, and the Metro C line cores, generously made available to the project through Simona Morretta, as part of programmes of environmental and topographic reconstruction.

At Santa Croce, our colleagues Anna de Santis, Laura Bottiglieri, Donato Colli, and Marco Solvi also shared the results of bore hole data and the fruits of their long-term study of the site of the Sessorian Palace, with project members. Their generous collaboration is vital in the ongoing analysis and interpretation of geophysical survey results in the area. Our survey here took the form of GPR analysis by the BSR team (GPR 3.3; 3.4; 3.5; 3.7 and ERT 3.7), CNR team (GPR 3.1, 3.2, 3.6) and Geostudi Astier team (GPR 3.8: 3.9). Highlights include, but are not limited to, evidence for major remodelling of the ground surface, glimpses of reconfiguration of spaces inside the arena of the Amphitheatrum Castrenese, and traces of complex foundations that may, subject to further verification, prove to be linked to the Circus Varianus.

Readers will recognise that our report here is very much a summary of fieldwork undertaken. The long road to fuller interpretation of results involves an ongoing series of workshops, further experimentation with GPR software, and our very own RT3D, a platform developed for ROMETRANS by Margherita Azzari and Vincenzo Bologna of the University of Florence. RT3D will play a crucial role in delivering the project's aim to model the changing contours of the eastern Caelian between the first and eighth centuries AD, by bringing together borehole, GPR, ERT, archival sources, and structural analysis results. The models generated will in turn further advance interpretation of geophysical anomalies detected by the project's teams.

ROMETRANS's programme of structural analysis brings together traditional approaches to standing building archaeology with extensive use of Laser Scanning (TLS) and Structure from Motion (SFM) modelling, with the ongoing generation of 'provocations', visualisations of structures underpinned by the ROMETRANS SCIEDOC. Despite the many difficulties posed by COVID-19, major sections of on-site

analysis took place on the Claudio-Neronian aqueduct (SA 8.3: Francesca Carboni, Elettra Santucci, Paolo Liverani), and on the Aurelian Wall (SA 9.3; 9.4; Francesca Carboni, Marianna Franco). A detailed UAV (Drone) SFM survey of the upper registers of the Claudio-Neronian aqueduct (SA 8.2) was completed by Matteo Sordini and Francesco Pericci of Siena on behalf of the project, and Ilaria Frumenti, undertaking an internship at the BSR, completed a TLS survey of the Via Statilia tombs (SA 8.1). This survey helpfully concluded a further tranche of work interrupted by the COVID-19 lockdown of March 2020. Fieldwork can never really be usefully distinguished from the essential analysis of data that derives from it, much of which is of course, undertaken off-site. A great deal of significant progress in our understanding of sites has been made through the continued interrogation of TLS data during this year, with a notable highlight being the important work by Thea Ravasi on the SGL2 fieldwork project (Haynes et al., 2019; Ravasi et al., 2020) documentation which is now also feeding into the wider ROMETRANS effort. Of great interest in its own right, this work has also played an essential role in testing and the development of the ROMETRANS SCIEDOC system.

We end this report by looking forward to returning to the field together and to seeing our new colleagues Phyllida Bailey, Roxana Montazerian, and Elettra Santucci further develop their fieldwork agenda within their own exciting doctoral research programmes, focused on environmental change, structural cost analysis, and hydrology respectively.

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THE ROMAN PORTS PROJECT FIELDWORK AT PORTUS (COMUNE DI FIUMICINO, PROVINCIA DI ROMA, REGIONE LAZIO)

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In recent years, the Portus Project has concentrated field research on the northern mole of the Claudian harbour at the Imperial port of Rome. Several seasons of geophysical prospection have been conducted in the area of Pesce Luna, to the west of Viale Coccia di Morto, in order to locate and study the western part of the northern mole (Keay and Kay, 2018). These surveys were supplemented by a series of environmental cores to investigate areas both inside and outside the manmade harbour as well as a core though the northern mole (Chapkanski et al., in press; Kay et al., 2019). In addition, in 2018 a field school was conducted to the north of the Grandi Magazzini di Settimio Severo, and to the west of the Palazzo Imperiale to investigate the relationship between later structures and the projected edge of the Claudian basin (Keay et al., 2019).

In 2020 the research was extended to the northeast corner of the Claudian harbour in order to better understand the relationship between the northern mole and the standing structures in the area of Monte Giulio. Excavations had begun in this area and at Monte Arena with the work of Lugli (Lugli and Filibeck, 1935), but later extensive clearance during construction at the airport brought to light a large section of the northern mole (Testaguzza, 1970). Throughout the following decade, excavations focused on the isolated building known as the 'Capitaneria' and the area of Monte Giulio (Scrinari, 1984; 1987). Systematic excavations brought to light a bath complex, warehouses, a ramp and a monumental cistern; however, no traces were recorded of the harbour edge which would have formed the eastern mole. Between 2007 and 2009 the Soprintendenza Archeologica di Ostia Antica undertook an extensive environmental coring campaign in the area, as well as excavating three large trenches at the southern limit of the archaeological area (Arnoldus-Huyzendveld, Turi, Morelli, 2015). The results were similarly inconclusive as to the location and construction of the mole, hypothesising that the eastern part of the Claudian harbour may have been formed by a beach rather than a harbour mole. However, further to the south a stretch of mole was excavated by the Portus Project in the area of the central isthmus dividing the Claudian and Trajanic basins (Keay, Earl, Felici, 2011).