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IN-ROME – THE INSCRIBED CITY: URBAN STRUCTURES AND INTERACTION IN IMPERIAL ROME

Cities are not just a sum of buildings, but especially a set of social relations that their inhabitants develop

Almusaed, Almssad 2020

1. Introduction

The exceptionality of the city of Rome in terms of its size is hard to overestimate. Its population is variously estimated at between 750,000 and 1 million around the time of Augustus when it had long outgrown its 4th c. city walls ('Servian Wall'; cf. e.g. Wilson 2011; de Ligt 2012; Hanson 2016). Already Dionysius of Halicarnassus (IV, 13, 3-5; 1st c. BCE) famously observed that it was impossible to tell where the city actually ended. Such a large city and its immediate surroundings were obviously structured in some way. Various boundaries, reinforced by rituals and sacred law, were important to the city's identity. Its more densely inhabited area was divided into 14 regions and 265 *vici* (neighbourhoods) while the surrounding area was organised in *pagi* (districts). Beyond key infrastructure and public buildings, the degree of urban planning is considered to have been quite low, and regions, *vici* and *pagi* primarily served administrative and census purposes (Lott 2004, 2013; Tarpin 2003; Wallace-Hadrill 2008). Yet they also had their representatives and shrines acting as foci of local identity and neighbourhood support (Flower 2017; Goodman 2020). Some *vici* were named after businesses that clustered there: carpenters, harness-makers, ironworkers, perfumers, etc. (Tarpin 2003; Haselberger 2007; Holleran 2012; Goodman 2016; regions: Palombi 1999).

Empirical research has shown that self-organising mechanisms exist even where no state authority engages in active urban planning (Wallace-Hadrill 2008; self-organising: Allen, Sanglier 1981; Allen 1997; Opalach 1997; Thrift 1999; and much discussed recently, e.g. Rauws *et al.* 2016; Moroni *et al.* 2020. For the clustering of traders and craftsmen in the modern and ancient world, see Goodman 2016, with bibl.; organising principles behind seemingly maze-like urban layouts e.g. in Islamic cities: Kostof 1991). The natural environment also impacts on the use of land. Even though literary sources talk rarely about Rome's peri-urban areas, we can still expect that the space outside the inner city be structured in various ways, even if not necessarily along administrative boundaries.

Yet despite the recent surge in urban studies of the ancient world, our understanding of these structures is still limited. Besides thousands of

publications on individual structures and excavations, some areas have received a more holistic treatment (e.g. Cima, La Rocca 1998; Liverani 2003; Manacorda, Santangeli Valenzani 2010; Albers 2013; Jacobs, Conlin 2015; Mignone 2016; on the city centre esp. numerous publications by D. Palombi), but work covering the entire project area is either limited chronologically (Haselberger 2002, 2007; the *Digital Augustan Rome* project: https://www.digitalaugustanrome.org), disjointed due to its lexicon format (Steinby 1993-2006), or focused on monumental buildings (Haselberger 2002, 2007; Carandini, Carafa, Campbell Halavais 2017).

Several important, large-scale, long-term projects are currently underway in Rome that aim at a fuller documentation of the archaeological remains both within and outside the Aurelian Walls[1]. Yet so far, they focus on documentation rather than analysis and do not systematically integrate inscriptions. Considering that the built environment in any city both shapes and is being shaped by the everyday lives of those inhabiting and using it, we are missing out on some crucial evidence for understanding how Rome's society worked (e.g. Laurence 1994; Kaiser 2000; Laurence, Newsome 2011; Stöger 2011; Haug, Kreuz 2016: all address Rome in passing at best).

'IN-ROME – The INscribed city: urban structures and interaction in imperial ROME' (https://inrome.sns.it/) aims to fill this gap. It will offer the first holistic description and analysis of the urban development and use of space of the Roman territory outside the Servian Wall and within of c. 13 km surrounding it (the area covered by the *Corpus Inscriptionum Latinarum*, *CIL* VI) from the late Republic to the 3rd c. CE. The timeframe is suggested by the start of an extensive epigraphic habit in the 1st c. BCE and the end of the 3rd c. CE, after which the huge corpus of Christian inscriptions, collected separately in *ICUR* and the Epigraphic Database Bari (EDB: https://www.edb.uniba.it), would need to be included in any historical enquiry, which is impossible to deliver in this project. Bridging the divide between research on the area within and outside of the 3rd c. Aurelian Wall, it will illustrate how different parts of the population (ethnicities, status groups, families, genders) and their activities map onto the city's surroundings via military stations, association seats, sanctuaries, production sites, mines, agriculture, markets

[1] Esp. the webGIS system 'SITAR', provided fully open access by the Soprintendenza Speciale di Roma. Archeologia, Belle Arti e Paesaggio, with M. Serlorenzi as responsible, which is continuously updated with new excavation results: https://repositar.archeositarproject.it/ui/map?_cx=1389755.7486645882&_cy=5144621.911151068&_xz=14.500000000000002; 'Forma Romae? by the Sovrintendenza Capitolina ai Beni Culturali: https://formaromae.comune.roma.it/content/home; 'The Roman Hinterland Project': https://www.universiteitleiden.nl/en/research/research-projects/archaeology/the-rome-hinterland-project and 'Lazio Antico', both co-directed by P. Carafa and M.T. D'Alessio; Atlante Dinamico di Roma e della sua Area Metropolitana directed by A. Pugliano: https://actus.uniroma3.it. We are enormously grateful to the projects Principal Investigators for their willingness to collaborate with IN-ROME.

and shops, baths, guesthouses, tombs and villas. The aim of this synthesis is not a more comprehensive description of an archaeological landscape than has been published to date. As noted above, this project is well under way. The project intends to infer from 'topographical facts' and the spatial distribution of activities, organising principles (intended or unintended) as well as the likely interactions and relationships between different sectors of society.

The underlying idea was tested in Borg's project 'Mapping the Social History of Rome: a topographical approach to action and interaction in an ancient mega-city', funded by a three-year Leverhulme Major Research Fellowship, which serves as a proof-of-concept study for key aspects of IN-ROME. By exploring the varied, closely interconnected, and changing uses of land in a small, key area of Rome's *suburbium*, it was aimed at reaching a better understanding of the changing activities and interactions between different social, economic, ethnic, and religious groups, not only in this area but in Roman society more generally. It was based on the observation that reconstructing the epigraphic profile of a specific area and comparing it with the archaeological record often allows us to identify the agency behind (some of) the activities attested by archaeology. More importantly, reconnecting agents with the locations of their activities makes visible relationships between members of different social groups that acted in close proximity to each other and may have interacted.

Regarding the relationship between different ethnic and religious groups, the research cuts through some seemingly unsolvable problems. Studying the important cult site for the apostles Peter and Paul underneath the present church of S. Sebastiano diachronically within its local context, it throws new light on the relationship between Christians and non-Christians during the first four centuries CE by demonstrating that the apostles' cult developed there already from the earlier 2nd century onwards, and how it did so in the middle of a particularly busy part of the *suburbium* dominated by staff of the imperial household and members of élite military guards (cf. Borg 2019, 2022, 2024).

The Appia project has inspired the application of the 'mapping social history' approach to the wider area of Rome and its *suburbium* and has also demonstrated that inscriptions are an indispensable source of information for this approach. Yet the *Corpus Inscriptionum Latinarum* (*CIL* VI), the main corpus of Latin inscriptions from Rome, and the databases based on it, typically record the provenance of inscriptions with reference to historical toponyms and names of estate owners, which are often difficult to locate. The recontextualization of inscriptions is therefore a time-consuming activity even for a small area, and impossible to achieve for the entire research area. A key component of IN-ROME is therefore the development of a tool through which it is possible to re-locate larger numbers of inscriptions or assembling

the full record of inscriptions from a specific area with a mouse click. To achieve this, we have taken the following steps.

2. Enhancing the EDR database and linking all inscriptions with provenance to a webGIS system

Under the leadership of Silvia Orlandi, Chantal Gabrielli is significantly enhancing the 'Epigraphic Database Roma' (EDR: http://www.edr-edr.it/default/index.php?lang=en) by including large numbers of inscriptions from *CIL* VI with a known find spot or likely provenance, resulting in a total of c. 40-50,000 inscriptions. These will include, for the first time, lost inscriptions only known from manuscripts, all inscriptions referring to religious cults, all inscriptions referring to occupations, trade and commerce, and a large number of epitaphs that, on their own, do not provide any significant information to the historian, and which have therefore not been prioritised in previous work on the database. The database will distinguish clearly between secure and likely find spots and locations highly likely to be secondary contexts.

3. Creating a webGIS map and Gazetteer Database of historic toponyms

The primary locations identified in EDR will be linked to a Gazetteer Database, allowing them to be related to topographical, archaeological, geological, and other maps. The chosen map base is the Catasto Gregoriano dell'Agro Romano. The digitised map sheets of the Catasto and the *brogliardi* (land registers), which have been scanned through project funds, are already available on the Archivio di Stato's IMAGO website (https://imagoarchivio distatoroma.cultura.gov.it/agro/sfoglia_agro.php?Path=Agro&r=&lar=1707&alt=960). Geo-referenced versions of the map sheets will be stored in GeoTIFF format on Zenodo. Created between 1816 and 1835 in the wake of a papal census, the Catasto consists of maps (scale: 1:2000; Fig. 1) and land registers (*brogliardi*, Fig. 2) of the Agro Romano of unprecedented detail and precision but still reflecting the situation before the building booms of the later 19th and 20th centuries. The property parcels are often easy to identify in later maps and even in Google Earth today, thus allowing for the Gazetteer Database to be enhanced by property owner names and toponyms found in earlier maps, in the cadastre's later updates, and in the maps of the Istituto Geografico Militare (IGM). Descriptions in the *brogliardi* of the character and use of land at the time aid the reconstruction of the agricultural potential of the landscape (studied by Antonio Campus).

During the first project year, priority objectives included the creation of the gazetteer and the geolocation of inscriptions in EDR, by cross-referencing

Fig. 1 – Mapsheet AGRO-161 of the Catasto Gregoriano dell'Agro Romano showing «Vigne poste fuori le Porte di San Sebastiano, Latina e San Giovanni con le tenute di Caffarella ed Arcotravertino».

the information about the place of discovery with a toponymic database. These needs were the basis for building the relational logic of the web-based database, for which open-source technologies were used, integrating rich functionalities with user-friendly interfaces to achieve both objectives. Michael Seidl and Michela Vignoli from the Austrian Institute of Technology experimented with automated methods of vectorising the ca. 75 maps of the project area. Yet, among other issues, the algorithms have not been able to distinguish sufficiently well between relevant lines such as parcel boundaries

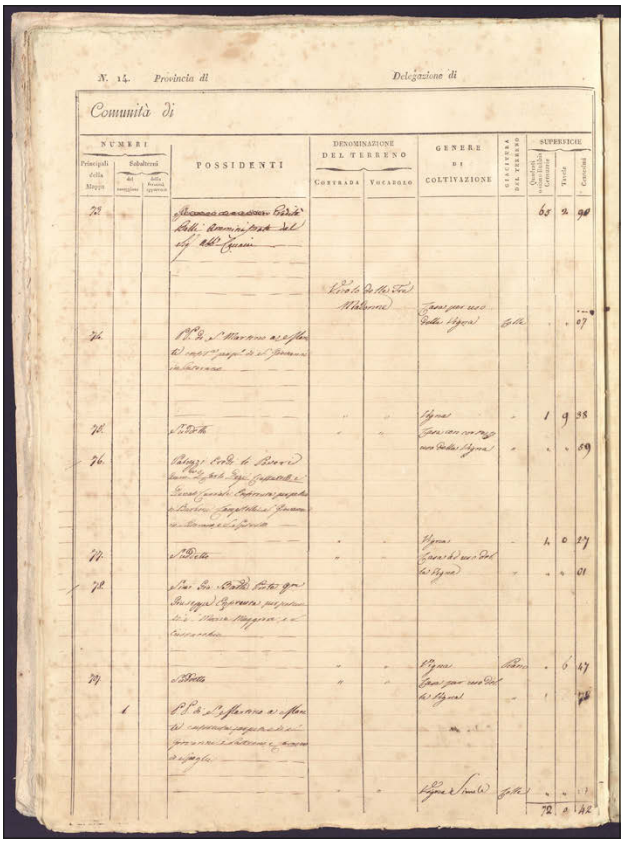

Fig. 2 – Page 14 from the land register (*brogliardo*) of Mapsheet AGRO-161 of the Catasto Gregoriano dell'Agro Romano, here Fig. 1.

and lines which served the geometer for the construction of the map, or which are the result of poor preservation. The vectorisation is therefore now completed manually.

To manage and query the vast and heterogeneous collection of data ultimately forming the base of our historical research (archaeological, epigraphic, derived from historical and modern cartographic sources, geological, toponymic, etc.), the IN-ROME project relies on the IT support of the Digital Archaeology Laboratory (LAD: https://lad.saras.uniroma1.it), directed by Julian Bogdani. He has provided the necessary technological and digital know-how for the development of both the database and the geographic information system (webGIS), leveraging the experience gained from various

national and international research projects (Bogdani 2019, 2024). Specifically, LAD handles the design and implementation of the IT infrastructure, managing both the server and client sides.

A production server was implemented for the project using a system of applications managed through Docker, which allows applications and their dependencies to be isolated within virtualized environments called containers. The implementation of Directus as a database management system and the use of PostgreSQL/PostGIS as a database represents a solid choice for the server side of the system. Directus is an open-source system that provides an intuitive and flexible interface for managing database data, allowing for easy definition of data structures, content management, and user access permissions. Additionally, Directus offers advanced features such as file management, custom workflows, and integration with other services and APIs (Application Program Interfaces). Meanwhile, using PostgreSQL with the PostGIS extension adds geospatial capabilities to the system, enabling efficient management and analysis of geographic data. This combination of technologies provides an excellent foundation for the development and management of a complex system (Iacopini 2024a) as described in the context of the IN-ROME project, enabling effective and efficient implementation of the required functionalities for georeferencing inscriptions and managing epigraphic and geospatial data.

Currently, the database contains several tables related to the gazetteer, website management, and the toponymic database. Regarding the Catasto Gregoriano, the database includes both the data from the *brogliardi* and the associated geometric primitives. For storing informational data, three interconnected tables have been created. The first table pertains to the storage of maps, containing an identification field, a title (e.g., 'Agro Romano Suburbano di Roma Porzione di mappa n. 1'), and the date of edition. Each map is linked to many parcels that make up the single map. The parcels are documented through various informational fields related to different aspects such as parcel identification, whether it is a building or a piece of land, toponymic framework, land registers's list, owners, land morphology, land use, and dimensions. In addition to containing data from the *brogliardi*, the database also allows for the management of the digitization of the geometric primitives of the Catasto, which are divided into polygons (for parcels and buildings), linear features (for roads and rivers), and points for toponymic data or points of interest. Likewise, the IGM map linked to *CIL* has been georeferenced, and around 1300 toponyms have been digitized.

Regarding the interaction between the toponymic database and the one related to EDR, successful verification tests have been conducted for cross-referencing the data and georeferencing the inscriptions based on the 'Discovery location' field. The connection to the EDR API is managed through specific flows (Fig. 3) that enable customized data processing, event-based

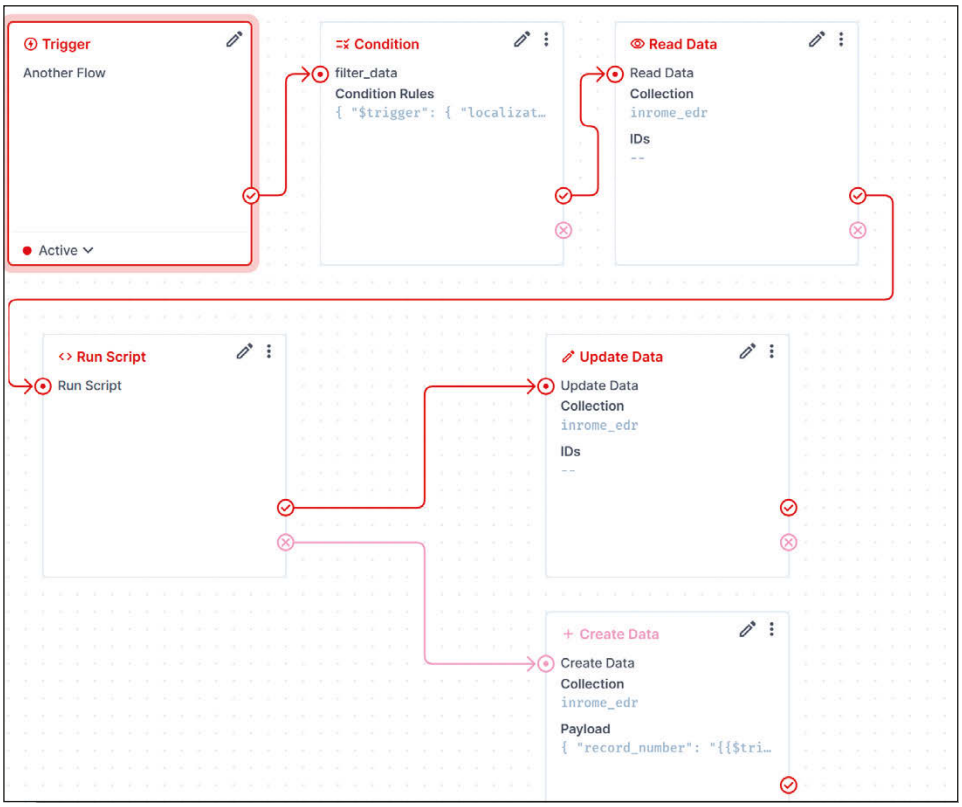

Fig. 3 – Directus Flow diagram, from EDR API to new database table.

actions, and task automation within Directus. The flow involves integrating the Webhook API with EDR, including pagination, filtering by city and discovery location, and finally creating a new table with the filtered results. Thanks to the intersection of epigraphic data containing a discovery indication (e.g., 'Ruderi dell'Acquedotto Alessandrino') and the toponymic database (Iacopini 2024b), it was possible to create a map showing the original locations of the inscriptions. Each point on the map contains the inscriptions found at the same location, which can be viewed through a list displayed on the left side of the map (Fig. 4).

It is intended to archive the results in standard formats (CSV attribute tables and GeoJSON, compliant to the Linked Places profile) and to include them as a separate layer in the webGIS system SITAR, where it is joined they will be joined with archaeological, topographical, geological and other maps and published under CC-BY-NC-SA license.

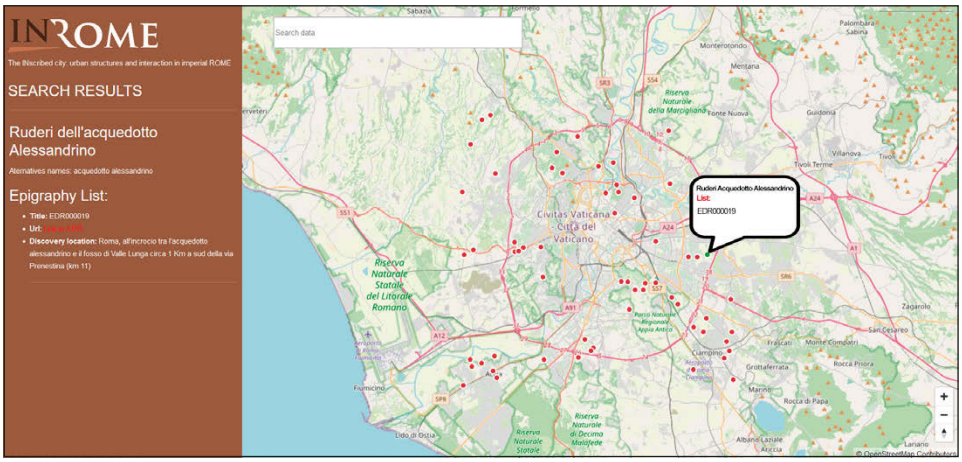

Fig. 4 – Map of inscriptions showing for each point the list of inscriptions found in the same location.

4. Contribution of the new resources

The combined new resources of the enhanced EDR, the vectorised Catasto Gregoriano dell'Agro Romano and the Gazetteer Database will benefit both, the IN-ROME project and future research. Within the project, they will allow for queries originating in the map or gazetteer. For instance, starting from the map, we will be able to compile the epigraphic inventory and profile of a specific area. Or we will be able to map areas of a specific character or used in a specific way in the 18th c. contributing to the reconstruction of potential land use in antiquity. Starting from EDR, we will be able to apply all filters already available and map the results automatically. For instance, we will be able to map cult sites for specific divinities, evidence for people with a particular occupation, *collegia*, or specific *gentilicia* which could help us to better understand whether certain families dominated identifiable parts of Rome and its *suburbium*. It will be essential, in particular with regard to smaller data sets, to assess the value of any topographical patterns obtained. Umberto Soldovieri therefore addresses potential systematic biases in interpreting patterns emerging from inscription mapping due to external circumstances such as collection histories and uneven survival, documentation or exploration etc. and advises on the reliability of provenance descriptions.

This resource will be integrated with a PostrgreSQL working database based on published and unpublished archaeological and archival materials and their interpretation that forms the basis of our topographical research and helps to contextualise the results of our automated mapping of inscriptions. It will consolidate the widest possible range of activities and their locations,

re-uniting information from 40-50,000 inscriptions with the archaeological evidence, the natural landscape and literary sources. Inscriptions will be mapped applying a wide range of filters, and interpreted in relation to topographical, archaeological, geological and environmental maps, and elevation models, thus visualising spatial structures and organisation.

Beyond the project, anyone applying a topographical approach to inscriptions from the area of *CIL* VI will benefit from the ease with which inscriptions will be mapped. In turn, individuals and institutions working with other kinds of archaeological materials (e.g. sculptures and other artefacts), whose provenance is likely indicated with the same reference to historic landowners and toponyms, will be able to link their objects to the GIS system and map them in this way.

Barbara E. Borg
Scuola Normale Superiore di Pisa
barbara.borg@sns.it

Eleonora Iacopini
Sapienza Università di Roma
eleonora.iacopini@uniroma1.it

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ABSTRACT

This paper describes the objectives and methodological approaches of the project 'IN-ROME – The INscribed city: urban structures and interaction in imperial ROME'. The project aims at mapping as comprehensively as possible a wide range of activities that shaped both the physical environment and the relationships between its inhabitants. Focussing on the time period between the 1st century BCE and the 3rd century CE, and on the area outside the 4th century BCE 'Servian' Walls up to about the 9th mile of Rome's consular roads, it draws on archaeological, literary and archival sources. In addition, and crucially, it aims to virtually re-contextualise c. 50,000 inscriptions in the Epigraphic Database Roma with a known provenance from the area, thus restoring agency to the archaeological landscape. To this end, a new webGIS is being developed that allows for the topographical visualisation of all relevant data.