Fig. 12 - The poorly preserved present day ruins of the northern wall of Mariana.

Crossing all these data, finally leads to the proposal of a model for the exact localisation of the extent of the formerly walled city, in association with such topographic elements as suburban roads and cemeteries (fig. 13). This can now be used for future fieldwork on the urban space of Mariana, and act as a base for heritage management.

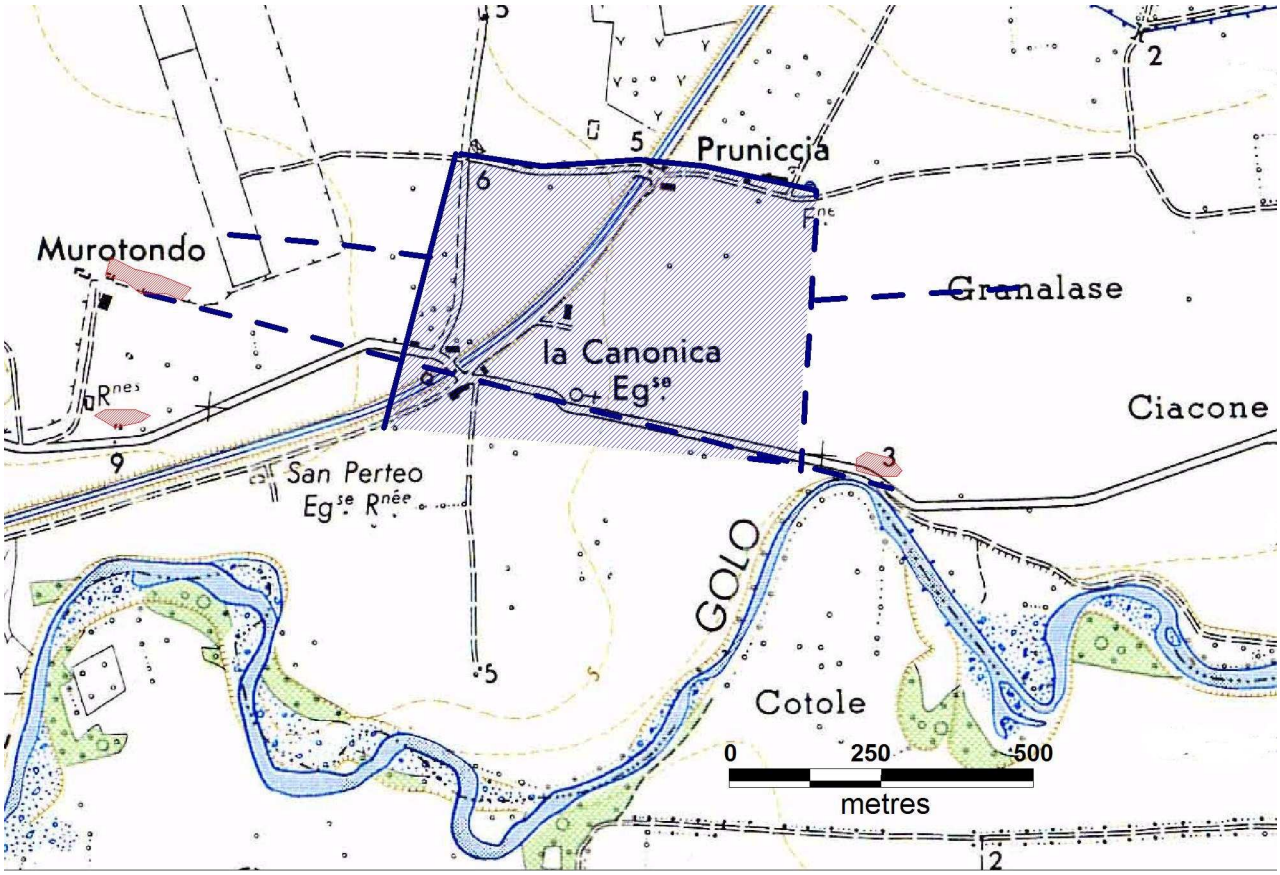


Fig. 13 - Hypothetical reconstruction of the wall circuit of the Roman town, and the major road network, on the base of the IGN F. 5-6 (Vescovato) 1954, scale 1/20.000.

The study of the intra-mural urban patterns, such as roads, public space, location and character of housing, is the subject of our third question. The first step to be taken has been the insertion of all data available from earlier excavations in different parts of the site. In the 1930s two local archaeologists, Leschi and Chauvel, organized several quite unsystematic digs in this general area (NUCCI 2001). They never mapped their trenches in a detailed way, as would be essential today, and the sketch of their discovery zones, could now be described as a problematic ‘historical document’, consisting of "ink stains" dripped on a sheet of the cadastre of the Comune of Lucciana of the ’30s, without any reference to the many “chantiers” opened during two summer campaigns, described in text and sometimes addressed with a number, sometimes with a letter (CORSI forthcoming). In spite of the difficulties, the GIS analysis we did, linking and overlapping all the spatial elements available (for instance, the historical aerial photography, both vertical and oblique: VERMEULEN forthcoming) and the confrontation of the partly geo-referenced and re-scaled sketch, with all in the system available topographic and cadastral maps, procured a first raw mapping. In fact, the presence in the old excavation archive of some basic drawings of structures found, and of remarkable oblique aerial photographs, gave us the possibility of identifying most trenches. With the help of recent control by our own aerial photography and further field checks, it was even possible to locate these old discoveries with much more exactitude.

Re-processing all the available data of these earlier digs within the GIS environment, finally forms a base for further studies of the urban pattern.

This research of the ancient urbanism in Mariana is of course much helped by the results of systematic excavations in the 1960s and in recent years around the church of la Canonica. Crucial is the discovery underneath the early medieval episcopal buildings connected with the church, of a Roman commercial

district (figs. 14, 15). This part of town, according to our model, located near the southern border of the city, consists of a colonnaded street, with regularly spaced shops on either side. Its orientation differs some 12 degrees from the EW.

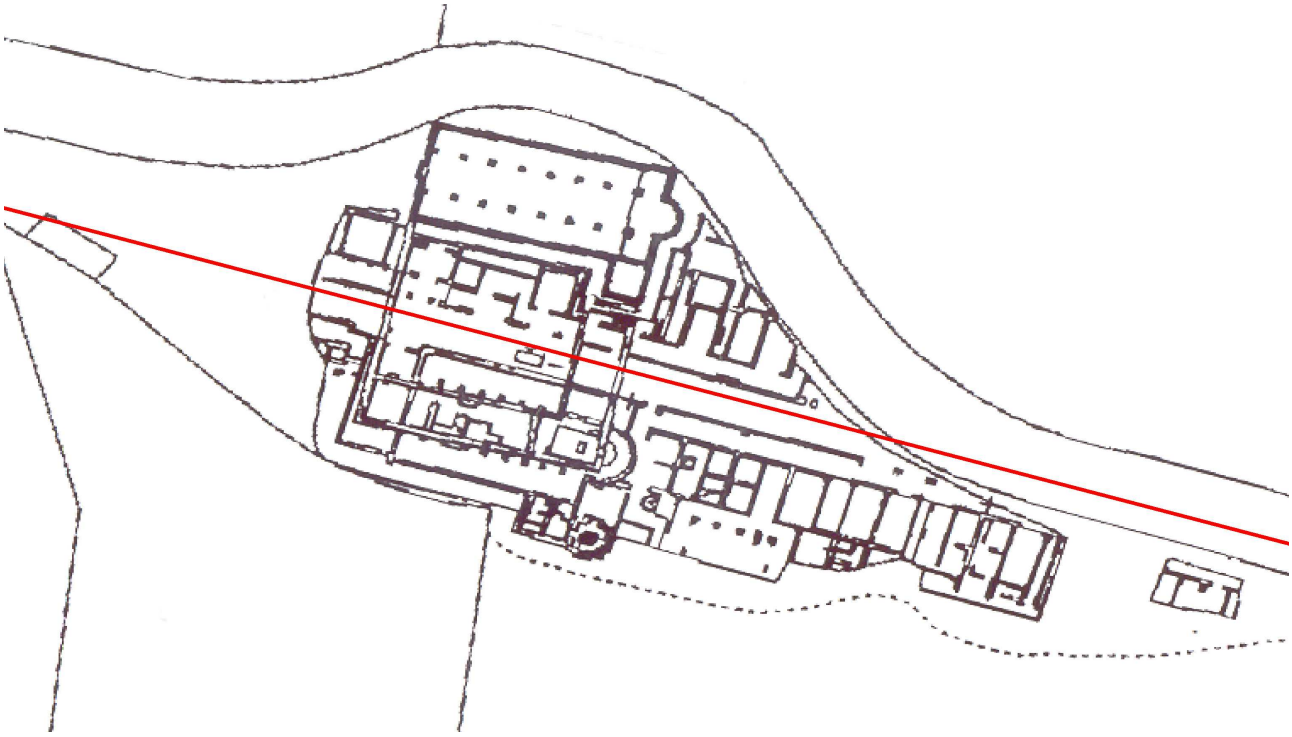

Fig. 14 - Plan of the newly excavated area south of the church of La Canonica, with a Roman colonnaded street with shops, partially re-occupied by the early Christian basilica with baptisterium, and later medieval buildings (the so called “episcopal palace”). By F. Leandri and R. Thermot, Ajaccio, 1994. Service Régional de l’Archéologie de Corse. Vestiges antiques, paléochrétiens et médiévaux: Inventaire des structures (fichier). We indicated the orientation of the Roman colonnaded road in red.

Fig. 15 - Aerial view of the archaeological area of the Roman commercial district around the Romanesque church of La Canonica (F. Vermeulen).

To test the validity of the hypothesis that this colonnaded street indicated the main orientation of the whole street network of Mariana, we decided this year to confront these data with new fieldwork in the area north of the church, where Leschi and Chauvel had done some ill-located digging in the 1930s (fig. 16).

Fig. 16 - Geophysical work on the site in 2006.

Especially geophysical surveys seemed appropriate for this new approach, as the field nowadays is covered by short-grazed grassland, which prevents good artefact pick-ups and important aerial photography discoveries. As the expected underground structures were presumably partly made of brick, a material most suitable to be detected by magnetic resonance, we chose to concentrate on magnetic surveys and to a lesser extend on electric resistivity work.

Although the results of the magnetic surveys, over an area of some 3.5 hectares, still need further elaboration, a series of linear traces indicating walls has become visible. It is surely no coincidence that these lines of probable buildings and streets deviate again some 12 degrees from the NS and EW axes.

Overlay of all these geophysical data with the orthophotomap and the topographic evidence from the sector near the church, points out rather clearly that the main orientation of the normative city street model, can now be fixed with some confidence.

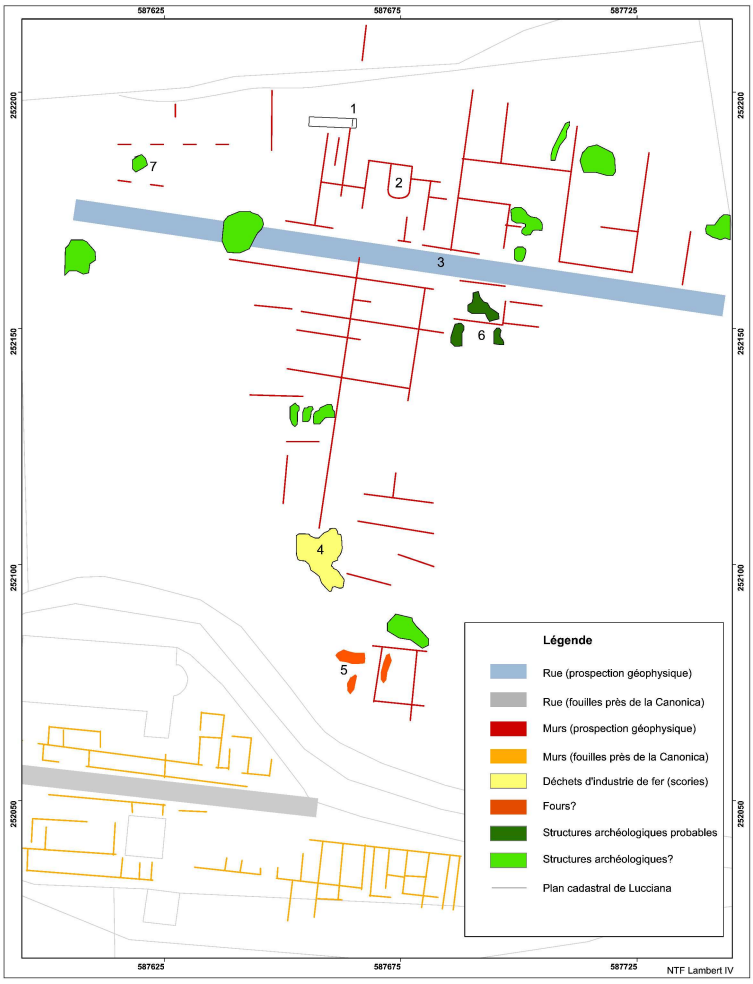


Fig. 17 - A first interpretation of the magnetic surveys on the site in 2006 confirm an orthogonal street network over large parts of the intra mural city of Mariana (mapping L. Verdonck).

To confirm this for the newly surveyed area north of the church, we also started a field check by digging trial trenches. Even if this work is still in progress, and will have to be continued during a second summer campaign next year, we can already mention the discovery of Early Imperial Roman walls, perfectly in line with the data of the geophysics and again with an orientation deviating some 12 degrees from NS (fig. 17).


Fig. 18 - Discovery of Roman Imperial building structures (wall in *opus latericium*) perfectly in line with the interpretation of the magnetic surveys. The wall belongs to the “red system” found during geophysical surveys and is oriented in the same directions as the “orange system” known from the excavations near La Canonica.

## Some final observations.

The potential of historical cartography for landscape archaeology is well established but further results can be obtained by processing the available documents in a GIS, thus converting archive documents into digital maps. Filtering and overlay are, in fact, extraordinary instruments to detect fossil elements of ancient landscapes, not only in the environmental reconstructions but also in the archaeological features such as ancient land divisions, roads, walls, structures, bridges, aqueducts... In the territory of *Mariana*, for instance, many results are expected from the filtering of the georeferenced Cadastre de Napoléon to individuate the traces of the Roman centuriation, as attested by ancient individualised sources, and through an overlap with the historical and active aerial photography.

This type of historical cartography can, of course, find wider applications for the reconstruction of cultural landscapes. A different use within a GIS environment of the same historical document, the “Cadastre Napoléonien”, can be seen in the work done around the small village of Barels, in the present-day municipality of Guillames (France, Alpes-Maritimes). Here the cadastral sheets of 1868 have been introduced into a database containing the information about the individual plots (surface, name of the owner, land-use, etc.), linked to digitalised maps (GHOZZI et AL. 2005). In this way, several layers of thematic maps have been produced, overlapping the historical information with different cartographic layers (topographical and geological maps, hydrography and sources maps, and so on), and different queries are possibly visualised in cartographic layers (e.g.: land-use, land-qualities, distributions of plots owned by local proprietors…).

The method applied here to process old spatial information can be considered elementary but its simplicity, due to the extraordinary characteristics of the cartographic documents concerned, made the integration with the other informative themes of the GIS even more immediate and efficient.

To summarize, we could say that in this case study the global processing was not necessary, while the local processing, based on the placing of homologous points of the source image (the 19$^{th}$ century cadastral maps) on correspondent points on the destination image (the modern cadastre), implied a deformation of the geometrical setting of the source document but allowed the translation of its "semantic" contents into the destination layer (GUERRA 2000, 339).

From the technical point of view, the raster processing of historical cadastres proved to be more suited to environmental applications and land-use reconstruction, while vector-maps are necessary to introduce chorographic maps into the system. In the *Mariana* case-study, given the topographical qualities of the document concerned, converting the historical cadastre into raster data has been relatively simple but further processing will be required by elaborating different layers of data, such as maps of land-use in the 19$^{th}$ century.

GIS and computer applications are fine tools for confrontations of historical spatial evidence and archaeological data, but they need constant steering and caution. The full potential of GIS lies in the possibility of manipulating and integrating spatial components of different layers, and filling the “gaps” in our documentations and general knowledge to answer more specific, historical questions. Firm historical criticism and detailed field checks are certainly needed for a full valorisation of such data within the archaeological questionnaire.

(F.V.)

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[1] Examples of historic map analysis and digitizing in the Burgundy project can be found on the web site: http://www.informatics.org/france/maps.html (November 2006).

[2] The new excavations and other research activities in the valley of the river Golo in Corsica started in 2000, in the framework of the "Project Collectif de Recherche" entitled "Mariana et la vallée du Golo de l'Age du Fer à la fin du Moyen Age", directed by prof. Philippe Pergola (Maison Méditerranéenne des Sciences de l'Homme, C.N.R.S., Aix-en-Provence). Since 2006, several partners of the Project Collectif are joint in the Groupement De Recherche Européen (G.D.R.E.), coordinated by the Laboratoire d'Archéologie Médiévale Méditerranéenne of the M.M.S.H. and financed by the C.N.R.S., entitled "Le monde insulaire en Méditerranée - Approche archéologique diachronique des espaces et des sociétés"**.**

[3] The Cadastre Napoléonien, also known as Ancien Cadastre, is the base of the contemporary cadastre of France. For the first time, the delineation of the plots was made according to the land-ownership instead of the land-use.

[4] The methodology of this type of work has been presented elsewhere; see e.g. ANTROP et AL. 2001, VERMEULEN et AL. 2001, and WIEDEMAN et AL. 2001.