

## **Magnetometry at Grumentum in Ancient Lucania**

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From 2005 the University of Verona carries out archaeological researches on the Roman Forum of Grumentum<sup>1</sup>. Since 2006 prospections with different methodologies have been done thanks to dr. Ermanno Finzi, Marcello Ciminale, Maurizio Gualtieri and Tommaso Mattioli. We present now only the results of measurements in the latest two years with a Geoscan FM256 Fluxgate Gradiometer. They have been done by Attilio Mastrocinque and Fabio Saggiaro, of the University of Verona<sup>2</sup>. These surveys have been presented with those by Hans-Jörg Thaler during a recent conference of the Stadtarchäologie in Vienne. Thaler investigated the area of the Roman baths, NW of the Forum, using a geo-radar. His results will be published in the proceeding of this conference.

The surface has been scanned every 50 cm, with grids of different extent, with single traverses, using a medium sensibility (1 nT). Only the Forum's main square has been scanned at 0,10 nT. The area covered with our surveys is about 2 hectares. After measurement, data have been corrected for common surveying problems and for a clearer viewing, using Geoplot 3.0, Arc GIS 9.3 and Adobe Photoshop CS2.

Last year we have also begun to process aerial photos from the 50's to today: so it was possible to identify additional marks on the area of the city<sup>3</sup>. Fig. 1 shows the city plan with prospections in b/w. Fig. 2 shows with red lines the hypothesized underground structures, and with red lines the structures detected by interpretation of aerial photograph.

In this paper we describe the most noticeable grids. The survey no.1 shows traces of small rooms, but the presence of underground electric wires disturbed the measurements.

South-West of the square and of the the survey no.2 shows a series of rooms, corridors, and perhaps small square courtyards which are supposedly parts of two or three Roman *domus*. An impressive anomaly close to the end of our prospections has the form of an irregular line, ca. 50 m long. It has a strong polarization, whose direction does not coincide with the earthly North. Only an excavation can show the exact nature of this magnetic anomaly, but we may put forward the hypothesis that it is a lead pipe, or *fistula*.

Closer to the Caesareum the survey no.3 shows a series of square rooms; they could be a series of shops aligned to one NE-SW street, and perpendicular to the so-called *decumanus*. Their doors appears to be open to NE.

The measurements on the Roman square (survey no.4) show a rectangular structure, perhaps a monumental base, in front of the Caesareum, on its eastern part. A clear long line runs at 6 m from the porch, with the same alignment. An excavation is necessary to understand its nature. As a provisory hypothesis we can suppose that it is a more ancient base of a columnated aisle of the eastern porch. If this hypothesis could prove true, the first Forum should be smaller than the extant one.

The field which lays eastwards of the Forum has been investigated with many methodologies, but magnetometry has proved the most suitable. Measurements by M. Ciminale and M. Finzi<sup>4</sup> showed a series of rooms of the same form, aligned with the long side of the Forum. An excavation has been done in the Southern part of the investigated area and several rooms appeared, aligned with a long wall, which runs parallel to the Forum. Our survey no.5 (fig. 3) shows a series of rooms and other structures, among which also the dug wall appears. This wall

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<sup>1</sup> MASTROCINQUE 2006; MASTROCINQUE 2009.

<sup>2</sup> We mention also Dr. Enrico Cirelli of the University of Bologna and the students who cooperated in the measurements during the surveys, namely Andrea Antonuzzo, Loredana De Nichilo, Matteo Marangoni, Chiara Marchetti.

<sup>3</sup> About aerial photographs and Grumentum: SCHMIEDT 1970: pl. CXI.

<sup>4</sup> FINZI 2009.

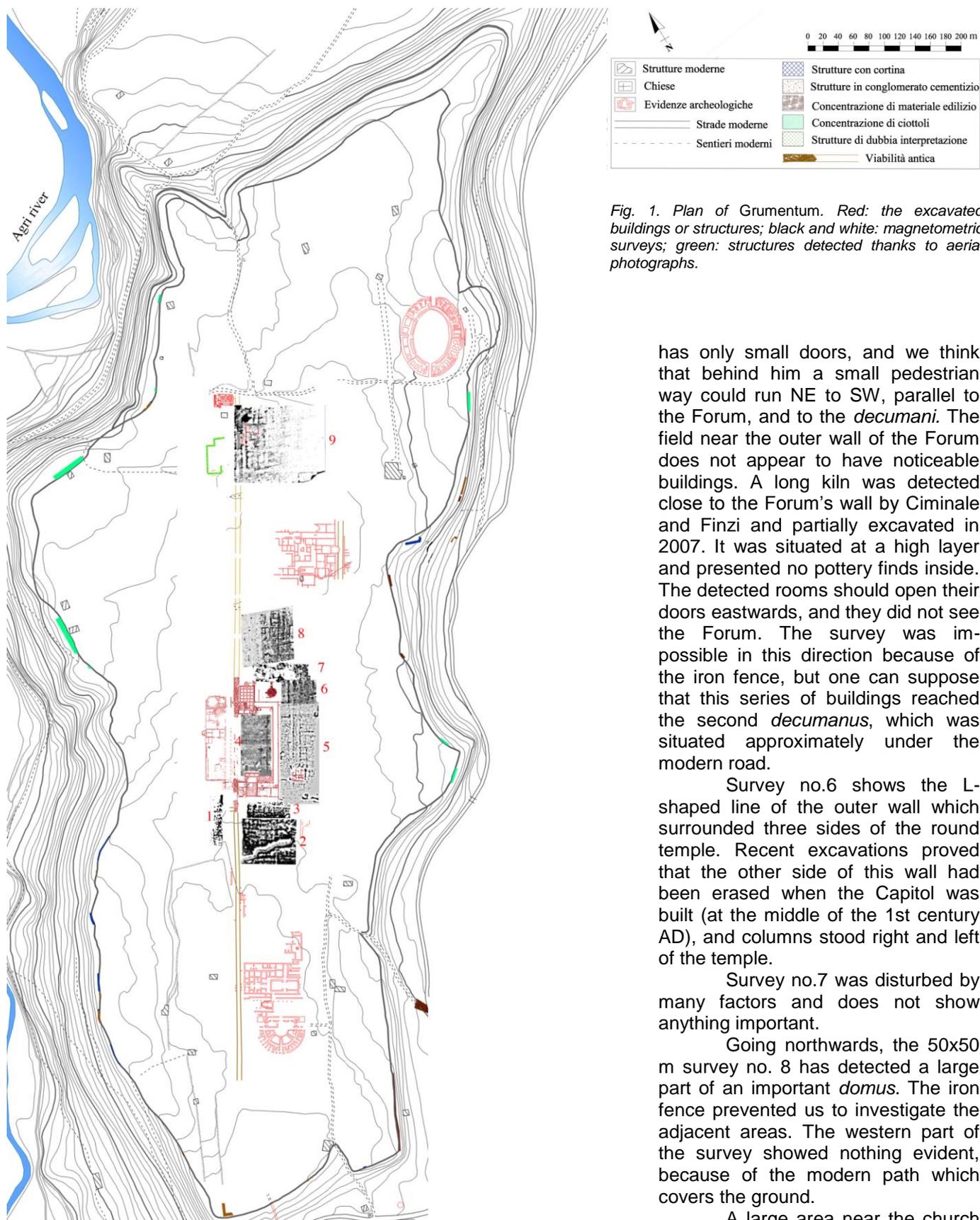


Fig. 1. Plan of Grumentum. Red: the excavated buildings or structures; black and white: magnetometric surveys; green: structures detected thanks to aerial photographs.

has only small doors, and we think that behind him a small pedestrian way could run NE to SW, parallel to the Forum, and to the *decumani*. The field near the outer wall of the Forum does not appear to have noticeable buildings. A long kiln was detected close to the Forum's wall by Ciminale and Finzi and partially excavated in 2007. It was situated at a high layer and presented no pottery finds inside. The detected rooms should open their doors eastwards, and they did not see the Forum. The survey was impossible in this direction because of the iron fence, but one can suppose that this series of buildings reached the second *decumanus*, which was situated approximately under the modern road.

Survey no.6 shows the L-shaped line of the outer wall which surrounded three sides of the round temple. Recent excavations proved that the other side of this wall had been erased when the Capitol was built (at the middle of the 1st century AD), and columns stood right and left of the temple.

Survey no.7 was disturbed by many factors and does not show anything important.

Going northwards, the 50x50 m survey no. 8 has detected a large part of an important *domus*. The iron fence prevented us to investigate the adjacent areas. The western part of the survey showed nothing evident, because of the modern path which covers the ground.

A large area near the church

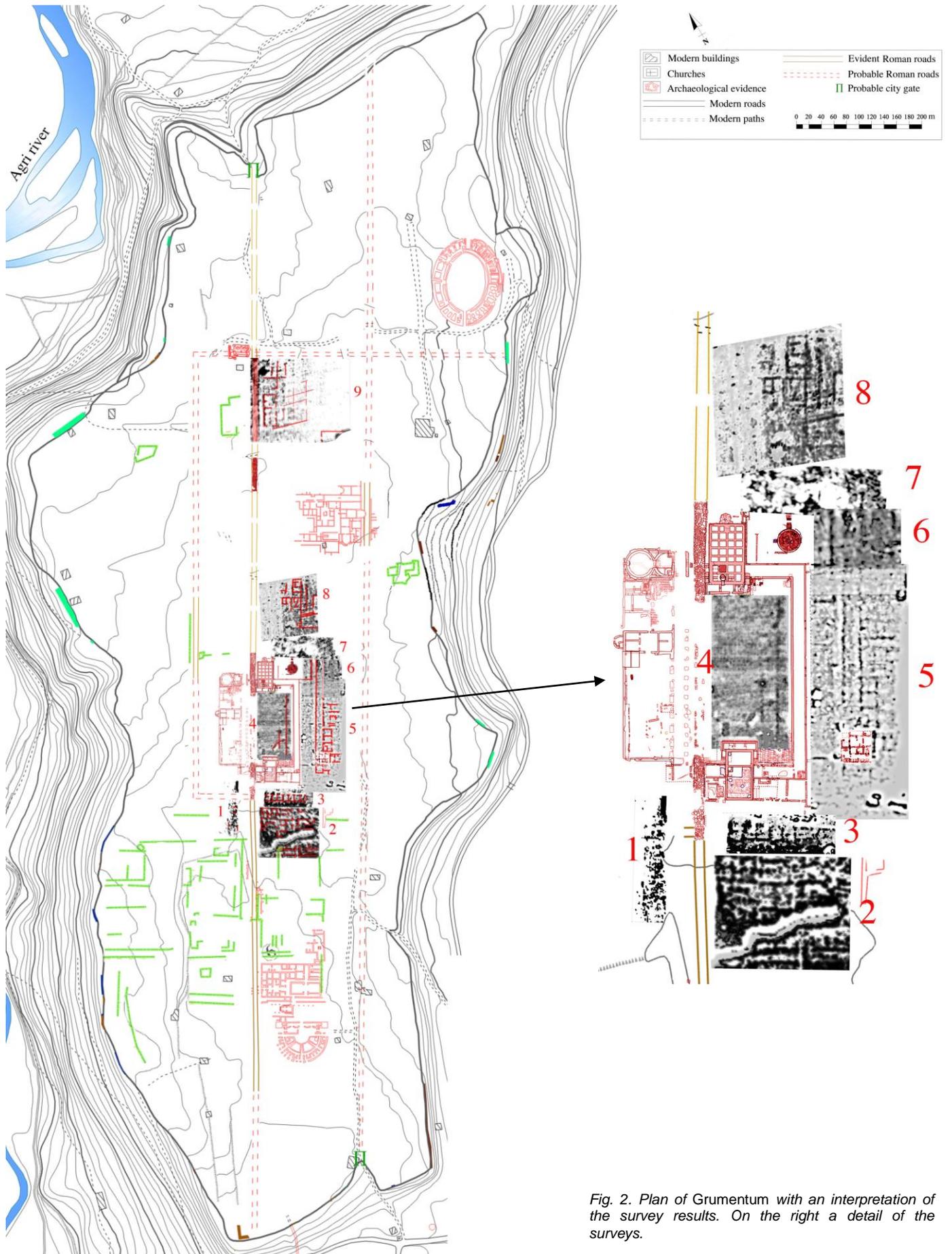


Fig. 2. Plan of Grumentum with an interpretation of the survey results. On the right a detail of the surveys.



Fig. 3. Grumentum. Detail of the survey no.5.

of S. Maria Assunta has been investigated by survey no. 9. At NW (left in the image) one can see the main street (or “*decumanus*”) and two large building close to the street. They are divided inside by internal walls. Several walls of one of those buildings have been brought to light in 1978 by Liliana Giardino<sup>5</sup>.

Another rectangular building is visible at the southern corner of the prospection, which could not go forth in this direction because of a concrete base and a mound. A series of lines is visible at the centre of the survey. Their direction does not correspond to the main orientation of the city ways and *insulae*.

Coming from South, at about 20,70 m. before the Forum gate, the ruts of carriages follow a curved line westwards and turn left<sup>6</sup>. At this point the sidewalk is interrupted and excavations directed by Maria Luisa Nava uncovered a small part of the *cardo* which was paved by pebbles (*via glareata*). On the other side the sidewalk runs without interruption and therefore this *cardo* did not continue eastwards, behind the Caesareum, where only a way for pedestrians can be hypothesized.

The city map by Giulio Schmiedt<sup>7</sup>, based on the aerial photograph (he was a pioneer in this field), marks an ascertained road running at about 20-21 m. from the Roman *basilica*. Our interpretation of aerial photographs induces as well to place approximately to the same place a rectilinear segment. The inhabitants of *Grumentum* clearly did not want to ear the noise of carriages in the main square and preferred to have a zone for pedestrians only, where all the public activities were carried out. In this way the argument about the number of Grumentine *decumani* can be settled. Liliana Giardino<sup>8</sup> hypothesized three *decumani* running at the same distance from each other from the SE to the NW edge of the city. Schmiedt and Hans J. Thaler<sup>9</sup>, on the other hand, recognized only two *decumani*, denying the existence of the North-western one. The combined evidence of aerial photograph and the traces of carriages traffic turning left proves that a third *decumanus* was located only at the centre of the city, and that the two intervals between those three roads were different, for the third and shorter one was closer to the central way. We can only hypothesize where this third road turned right to reach the main central *decumanus*, which allowed the carriages to leave the city. This assertion concerns only the carriageways, and it is possible that the third *decumanus* continued both NE and SW as a pedestrian *via glareata*.

<sup>5</sup> GIARDINO 1990: 126-7, pl. III-V.

<sup>6</sup> NAVA 2009: 263-4.

<sup>7</sup> SCHMIEDT 1970: pl. CXI.

<sup>8</sup> GIARDINO 1990: 126, pl. II.

<sup>9</sup> THALER, ZSCHÄTZSCH 2004: 241-262.

An excavation is previewed in the eighth campaign at the centre of the square, in order to clarify the nature of the line detected with the gradiometer. Also buildings detected at SE of the Forum will be investigated by new excavations, while excavations and fieldwork will continue at the round temple area and the remains of the SE porch will be investigated as well. Researches on the road network must be reserved for the future as well as the nature of the big anomaly located at SO of the Forum. On the other hand other surveys will be done on the field NE of the curia and at the centre of the city going towards SW. Our program is to go ahead in order to complete the map of buried structures of the city centre.

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