

POTENTIA: AN INTEGRATED SURVEY OF A ROMAN COLONY ON THE ADRIATIC COAST

INTRODUCTION

This paper presents the results of intensive archaeological field survey, carried out between 2002 and 2005, at the Roman colonial city of *Potentia*, in the central part of Adriatic Italy (in the Marche region). This survey is part of the long-term Potenza Valley Survey Project (PVS) of Ghent University (Department of Archaeology), with an important part of the field activities at *Potentia* being undertaken in collaboration with the Archaeological Prospection Services of the University of Southampton (APSS) and the British School at Rome.

The main aim of the Potenza Valley Survey Project is the study of urban and rural occupation patterns in this central part of the Marche region, from prehistoric times to the Middle Ages. The intensive surveys of the Potenza valley include full-coverage aerial photography of the whole *c.* 400 km² valley area between the Apennine hills and the Adriatic coastline, as well as systematic field walking and detailed geo-archaeological studies in three carefully selected sample zones, spread between the upper valley and the coast (Fig. 1). Apart from these rural surveys, which were the main focus of the first phase of the project (2000–3),¹ intensive intra-site fieldwork is now being carried out also on the main protohistoric (Picene culture) centres in the valley, as well as on the Roman cities of the Potenza corridor, from west to east: *Septempeda* (San Severino Marche), *Trea* (Treia), *Ricina* (Villa Potenza) and *Potentia* (Porto Recanati). All of these sites have reasonable to excellent potential for surface survey and, because of the small scale of excavation work previous to our investigation of the area, much can be learned from an integrated approach. Our surveys are designed to improve general understanding of the topography of proto-urban and urban settlement in this part of Italy and to deepen our knowledge of the processes of early (mostly Roman) urbanization in the Marche. They are intended to integrate the results of non-destructive survey methods, such as oblique aerial photography and air photograph interpretation, geophysical surveys, geomorphological surveys, detailed topographic measurements and intensive field walking. The results of small-scale, previous or on-going, excavation work on these cities and of artefact studies of survey materials and excavation finds are being integrated into this picture, as they become available.

As the results of the intra-site survey of *Potentia*, situated in the sample area of the lower valley, have now reached a good level of detail and precision, this coastal

¹ The aims and methods of this long-term project, together with the preliminary results of the first phase of the field campaigns (2000–3), have been published in the journal *BABesch* (Vermeulen and Boullart, 2001; Vermeulen, Monsieur and Boullart, 2002; Vermeulen *et al.*, 2003; Vermeulen *et al.*, 2005).

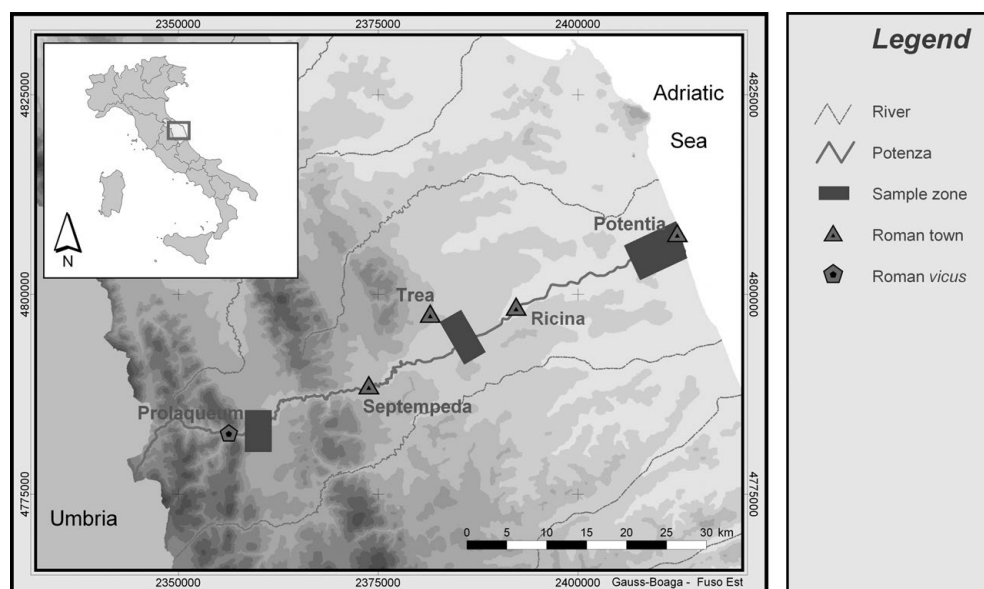


FIG. 1. The location of the Potenza valley, indicating the areas of intensive survey and Roman cities.

city is the first to be presented in a more comprehensive manner. Like almost half of all Roman cities in the Marche region, from late antiquity onwards *Potentia* became ‘unsuccessful’ in some way and was completely abandoned (Alfieri, 1981; 1985). As almost no present-day habitation covers the former urban area and because agriculture still dominates the zones where its ruins lie buried, the ancient topography of the city can be studied effectively by means of our survey methodology.² For the Potenza Valley Survey Project the site presented here acts as a test-case to evaluate the potential of our integrated approach. We will concentrate on the all-important intramural part of this Roman city, where the conditions for such an integrated analysis are fulfilled.

HISTORICAL SETTING

Although the immediate consequences of the Roman military victory over the central Adriatic region (completed in 268 BC) were drastic, with the deportation of part of the Picene population, this did not provoke a clean break from the pre-Roman Iron Age. The majority of the population was soon incorporated in the Roman state, at first with incomplete citizenship and then, from 241 or 233/232 BC onwards, with full citizen rights. The establishment of the Latin colony at *Firmum*

² Excellent recent attempts to refine integrated techniques of survey on classical cities are the ones at *Tanagra* in Boeotia (Bintliff *et al.*, 2001) and at *Falerii Novi* in Lazio (Keay *et al.*, 2000). Our approach is similar but incorporates a more extensive use of aerial photography.

in 264 BC was a major stimulus towards the Romanization of a region that, apart maybe from the centre at *Asculum*, knew no real urbanized society before the Romans.³ This progression was violently interrupted in the last decades of the third century BC by the incursions of the Carthaginian armies, who used the region of *Picenum* as a base for their attacks on the Roman State. The foundation in maritime central Marche of a series of colonies (for example, *Pisaurum*) during the first half of the second century BC gave, however, a new impetus to the process of Romanization. In the lower Potenza valley the impact of Rome thus became very visible from 184 BC onwards. With the foundation of the colony for Roman citizens at *Potentia* in that same year (Livy 39.44.10) a whole series of colonial foundations on the Adriatic coast, which started shortly after the battle of *Sentinum*, was completed. For the area of central Marche, these foundations meant a first phase of real urbanization. Although for a while these cities and their respective territories only functioned as ‘Roman islands’ in an otherwise still very traditional society, they were fully developed urban centres.

According to literary sources (Livy 41.27.1, 10–13), which are particularly relevant for our topographic work, the colony probably soon had, in 174 BC, a circuit wall with three arched gates, a street network with sewers, an aqueduct, a temple to Jupiter and a portico with shops enclosing the forum.⁴ Although the ‘military or civil’ character of this first Roman colony, and the number of its initial colonists — only some 300, or approximately 2,000 people —, are still subject to scholarly debate (Paci, 2001: 22–3), the urban pattern of this coastal settlement was fully developed only ten years after its foundation. Written sources for the later history of the city are minimal. Around the middle of the first century BC, probably in 56 BC (Cicero, *De Haruspicum Responso* 28.62), a major earthquake destroyed part of the city. Epigraphic evidence, however, testifies to the flourishing development of the city from the Augustan age onwards far into the second century (Paci, 1995; 2002). The absence of significant numbers of inscriptions from the third century AD onwards could point to a decline in the city’s prosperity. By the end of the fourth/early fifth century AD the city had become the seat of a bishop, but there is no reference to *Potentia* in the work of Procopius, who discussed the devastation caused by the Gothic-Byzantine war (AD 535–53) in *Picenum*. Under Lombard dominance (after AD 580) the coastal cities suffered greatly from the collapse of the maritime economy, and although *Potentia* was still mentioned at the beginning of the seventh century AD in the *Cosmographia Ravennatis Anonymi* and in the *Geographia* of Guido, the city clearly did not survive the early Middle Ages (Alfieri, 1977; 1981).

³ For the general historical setting see, for example: Alfieri, 1977; Moscatelli, 1985; Paci, 1991; Delplace, 1993: 24.

⁴ We are aware that some problems remain with the interpretation of Livy’s text, as it is not absolutely clear exactly which buildings were built in *Potentia*. See Gabba (1976: 316, n. 3).

PREVIOUS ARCHAEOLOGICAL WORK

The urban site of *Potentia* (Fig. 2) was first located by Alfieri on a beach ridge a few hundred metres south of the river Potenza (ancient *Flosis*), immediately south of the present-day coastal town of Porto Recanati (Alfieri, 1947; 1970). Following this discovery in the 1940s, important archaeological work was undertaken on the site. Rescue excavations in the 1960s and 1970s revealed parts of its northern cemetery and elements of a housing sector in the northeastern corner of the city (Mercando, Sorda and Capitanio, 1974; Mercado, 1979). A study by Moscatelli (1987) of good vertical air photographs (for example, Royal Air Force (RAF) pictures from the Second World War and shortly afterwards) revealed many traces of the city's regular street-grid, while Paci (1995) produced a bibliographical synthesis and analysis of all known monuments and inscriptions. Since the mid-'80s small-scale but systematic excavation campaigns, under the direction of Edvige Percossi Serenelli, have been undertaken on a regular basis in the monumental centre of the city. These stratigraphical excavations by the Soprintendenza per i Beni Archeologici delle Marche revealed that the site of the later city in fact was occupied in the Early Bronze Age, although the nature of this occupation is not yet clear:⁵ nothing so far contradicts the idea that the Roman colony was founded here *ex nihilo*. Excavations in an area just south of the geographical centre of the Roman city were particularly notable for the discovery of a late Republican temple (second century BC), surrounded by a portico and other buildings of Republican and Imperial date (Percossi Serenelli, 1990; 1995; 2001). Given the date of the portico surrounding the original temple and a possible *macellum* to the north and of a luxurious building to the east of the sanctuary, it appears that the city centre was further monumentalized during the reign of Augustus. A period of flourishing under Trajan and the Antonines was followed, however, by a third-century crisis. During the economic revival of the late third and fourth centuries the central area of the city was reorganized and most of the finds (for example the coins) suggest a positive atmosphere until the beginning of the fifth century, which was then followed by a clear decline. The most recent archaeological finds in this area date to the seventh century, but it remains unclear what exactly the nature of this late human presence in *Potentia* was.

Of some relevance for our topographic work in and around the city area was a 290 m long 'clean-up' operation, by the archaeological group ANAS in 2000, of a ditch that crosses the whole southern part of the city area (Budini and Rossini, 2001). During this investigation several walls and floors of buildings were located *in situ*, as were several sections of roads and the circuit wall, which was cut by the ditch in its western segment (see below).

⁵ We thank Dott.ssa Edvige Percossi Serenelli for this most recent (October 2005) unpublished field information.

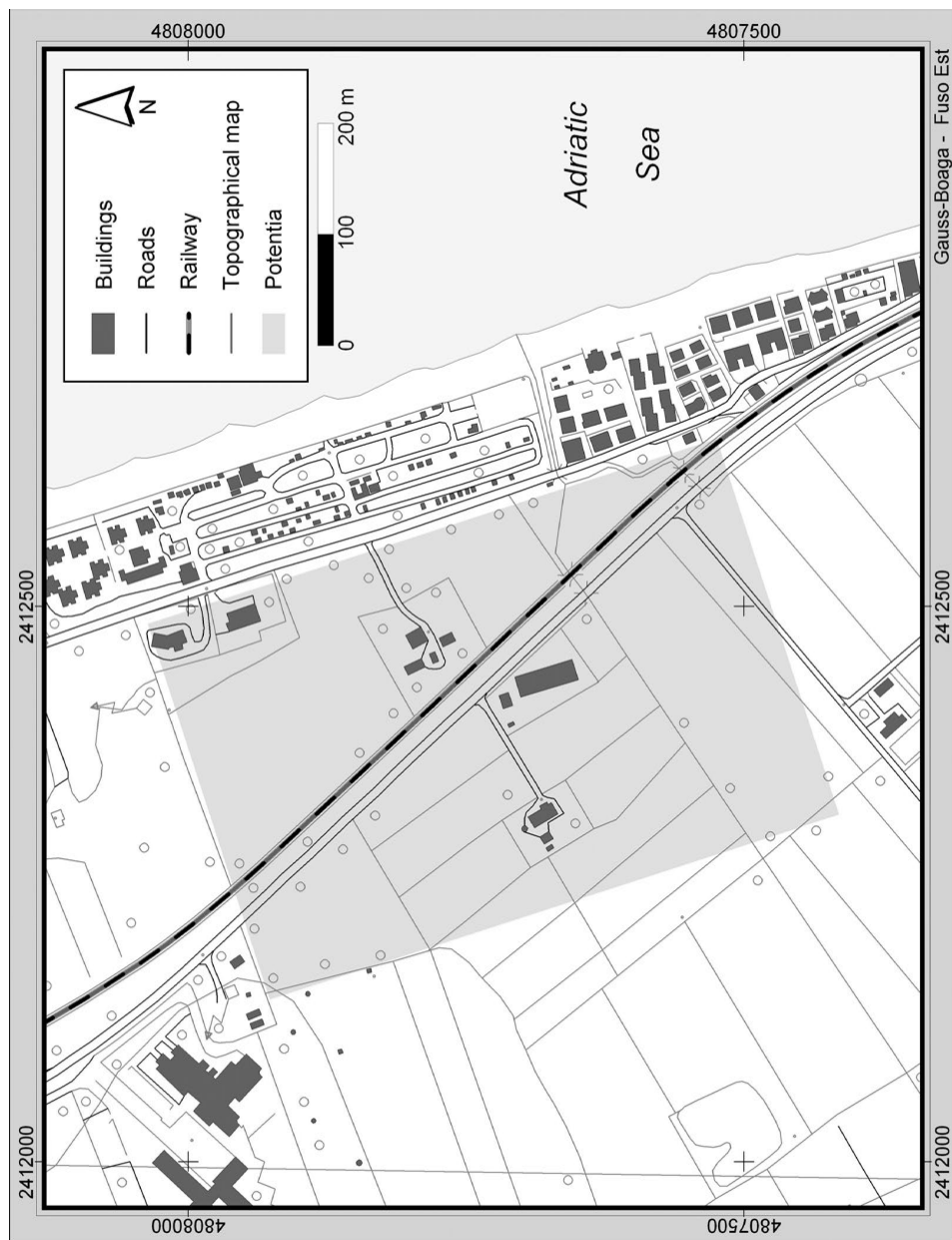


FIG. 2. The intramural area of *Potentia*.

LANDSCAPE BACKGROUND

The terrain of the urban site of *Potentia* is generally flat and raised on average 3 m above sea level. It is possible that the Romans adapted the local topography slightly for the purpose of building the city. The geology of the area consists of a sandy beach ridge with local gravel beds lying under a thin layer of alluvial clay. This ridge is cut to the south by what can now be identified as the main bed of the river in Roman times.⁶ Detailed mapping of the ancient coastal plain by means of augering and geo-electrical measurements, currently in progress under the direction of Morgan De Dapper of Ghent University, should elucidate further the nature of the landscape in the immediate surroundings of *Potentia* throughout its long history.⁷ It should also clarify what the precise roles of river flooding, alluvial activity and sea-level change were in the gradual abandonment of the city during late antiquity.

The site is currently crossed from its northwestern edge to the southeastern limit by the wide coastal road and adjoining railway. A few modern houses and gardens occupy small parts of the former city area, but almost 70 per cent of the former urban site is today under agriculture. The vegetation of the central part, west of the Strada Statale 16 and near the excavated temple area, is largely grass, as this segment is now an archaeological zone protected by law. Most other fields on and near the urban site are arable land. The archaeological site is separated from the coastline and beach by a strip of land devoted to recreational purposes, being used primarily for camp-sites.

SURVEY METHODS AND STRATEGY

AERIAL PHOTOGRAPHY

From the beginning of the project in 2000 a programme of intensive oblique air photography throughout the Potenza region has been developed, with systematic recording between the months of April and October each year. Although the methodology applied here has been explained elsewhere (Vermeulen, 2004; Vermeulen, Verhoeven and Semey, 2005), a few practical aspects of our use of this survey method should be highlighted. Flying with a small aircraft, piloted by members of the Aeroclub of Ancona, is undertaken from several airbases in the area. Most photographs are taken by one of the present authors (FV), using a standard reflex camera (35 mm) for colour slides and (since August 2004) a digital camera. Since 2002 flying has concentrated on the three valley transects as well as on the urban areas of the Potenza valley city sites and their immediate surroundings.

⁶ The present-day position of the Potenza river, more than 1 km north of the Roman channel, is a result of late and post-medieval human interference with its course (Alfieri, 1947).

⁷ A first synthesis of this work will be published shortly. See also: Vermeulen *et al.*, 2003; Vermeulen, Verhoeven and Semey, 2005.



FIG. 3. Oblique air photograph (PVS, April 2003) of the city of *Potentia*, seen from the west. Note the excavated area of the Hellenistic temple in the centre, the neat soil-marks of urban streets on the right and the crop-marks of urban streets on the left.

The area of *Potentia* has been monitored continuously from the air, with regular flights during different seasons and in varying weather conditions. Especially intense flying during the dry spring of 2003 produced remarkable images, locating and showing very clearly many aspects of the urban topography (Figs 3 and 4) and of the suburban landscape, including the discovery of two cemeteries, four roads connected to the city and several extramural settlement areas. Some flights also made it possible to monitor the many geomorphological features connected with the changing course of the river and the precise location of the beach ridges and lagoons. The flights over the original intramural area of *Potentia*, of particular importance in this paper, resulted in some excellent aerial views of crop- and soil-marks. The latter are mostly the result of the ploughing up of larger stone structures, such as the city streets and remains of the circuit wall, but also of a combination of this ploughing up of occupation layers, zones with different quantities of organic material in the upper layers and variations in humidity caused by the differential drying of the soil in some parts of the city. The crop-marks are particularly effective in showing the colony's street-grid and circuit wall, but in several areas also reveal parts of building structures, especially in the southern sector of the city.

The recording and further manipulation of the air photographic data has been done systematically, using an Access database linked to a Geographical Information System (GIS) that was developed as part of the project. One of the present authors (GV) is working on the enhancement, rectification and mapping of the most relevant



FIG. 4. Oblique air photograph (PVS, April 2003) of the city of *Potentia*, seen from the east. Note many traces of the street grid (including different types of streets), the city defences (three phases) and several buildings.



FIG. 5. Resistivity survey being undertaken in the area of the western gate of *Potentia*.

archaeological features. For this mapping and interpretation the team also makes use of some existing vertical photographs of the area, such as pictures from a 1947 RAF flight over the area and good Italian vertical imagery (taken by the Istituto Geografico Militare) of 1972 and 1974.⁸ The integrated GIS mapping of all the air photography data is facilitated by the use of *Airphoto 3.x*, software specifically developed to rectify images taken for archaeological purposes, with hand-held non-calibrated cameras (Scollar, 2002: 167).

GEOPHYSICAL SURVEY

The geophysical survey was begun with the aim of locating and mapping the remains of subsurface archaeological features in the central (protected) part of the colony, near the recent excavations of its monumental centre (Fig. 5).⁹ At a later stage an area in the south of the city was surveyed, to compare and contrast the results with data obtained by two other methods, air photography and field walking

⁸ More recent vertical photographs, such as those from a 1992 flight organized by the Regione Marche, provide much less information, because of obvious recent changes in the landscape, topography and land use.

⁹ The geophysical survey was undertaken by S. Hay, E. Baldwin and R. Ferraby, with the help of G. Verhoeven and L. Verdonck. It involved three weeks' fieldwork (between 22 and 28 September 2004 and between 23 September and 6 October 2005).

(see further below). The magnetometer survey aimed to clarify the layout of the Roman colony, the location of the city walls and the position of the western gate, particularly in an area where the grass cover prevented good data collection by both air photography and field walking. It was also intended to test the capability of resistivity survey on a targeted area of the site.

Although a number of different geophysical survey techniques could have been used at *Potentia*, magnetometer survey was chosen as a relatively time-saving and efficient survey technique (Gaffney, Gater and Ovendon, 1991: 6), suitable for detecting kilns, hearths, ovens, ditches and walls (particularly where ceramic materials have been used in construction). The results of this method are, however, severely limited in areas of modern disturbance and by the presence of ferrous material (Geoscan Research, 1996a; Scollar *et al.*, 1990: 362). Resistivity is most suitable for detecting walls, pavements, roads, ditches and voids (Geoscan Research, 1996b).

For the geophysical survey, grids of 30 × 30 m were set out using a Leica TC 805 total station. The grids were oriented to ensure that the survey traverses crossed the line of potential archaeological features at an angle of approximately 30°. The magnetometer survey was undertaken using a Geoscan Research FM36 fluxgate gradiometer. Readings were taken at 0.5 m intervals along traverses every 1.0 m. An automatic encoder trigger was used to take the readings, allowing the survey to be conducted rapidly, as the area was relatively free of obstructions. The depth to which the Geoscan Research FM36 fluxgate gradiometer can take readings varies with the geology, but is usually up to 1 m. The magnetometer survey covered in total an area of approximately 7.2 ha (Figs 6 and 7).

In addition, a small area covered by magnetometry (near the western gate) was chosen to test the response to resistivity survey techniques in order to compare the clarity of results and implement an integrated approach. The resistivity survey was carried out using a Geoscan Research RM15 multiplexer set up with a double twin probe array in order to speed up the data collection process and therefore cover more ground (Fig. 5). Readings were recorded at 1.0 m intervals along 1.0 m traverses.

TOPOGRAPHICAL SURVEY

Using the Leica TC 805 total station, during the 2005 field season we started to take detailed topographic measurements of the former urban site.¹⁰ At a low level of precision (1 m contours), this allows a secure macrotopographic model to be produced, taking into account also the data available from the topographic map of the area, the so-called *Carta Tecnica* of the Regione Marche, on a scale 1:10,000. This allows a better understanding of the overall topography of the site and enables us to rectify more accurately the oblique air photographs and to position the results

¹⁰ This work, undertaken by S. de Seranno and G. Verhoeven, will be continued in 2006, so only preliminary results are available for this paper.

of the geophysical surveys within a GIS-mapping environment. Moreover, at a higher level of precision (down to 5 or 10 cm contours), this total station survey can characterize the complexity of features, seen with the magnetometer or from the air but not always readily comprehensible to the naked eye. Thus, such contour survey records the slight surface irregularities that are recorded by the surveyors on site, making them more understandable and enabling them to be related to subsurface features. So far detailed mapping has been completed only of parts of the central and southern areas of the city.

FIELD WALKING AND ARTEFACT STUDIES

In 2002 and 2003 the PVS team undertook two short campaigns of intensive and systematic field walking in and around the city of *Potentia*. The part of the overall urban area, inside as well as outside the hypothetical wall-circuit, which is currently used as arable land, was subdivided into regular units and large samples of datable ceramics, building materials and other artefacts were collected in a systematic way. Generally blocks of c. 40 × 40 m were walked, although during the second season, in 2003, we used a system based on 19 × 19 m blocks on a freshly-ploughed plot in the protected western part of city. For this timed grid walk, each square of the 40 × 40 m grid was walked by three or four people in a maximum of twenty minutes. The smaller 19 × 19 m grid was walked in somewhat shorter time-spans and with only two people per block, to allow reasonable comparison with the other blocks. The collected material is, therefore, only a small but representative sample of the potential surface finds. The results are fairly homogeneous over the whole (intramural) area of the city, as conditions of visibility were almost the same in all fields surveyed¹¹ and all walkers had more or less the same level of survey experience.

Once collected, the ceramics were sorted by class (fine-wares, coarse-wares and amphorae) and production (black gloss, *terra sigillata*, African red slip ware, for example), and the building materials by category (mosaic *tesserae*, bricks, for example).¹² Their relative densities across the site were then mapped within the GIS-environment (Figs 8–10). This detailed field survey is necessary not only for the control and confirmation of remote sensing images, such as our air photographs and the results of the magnetometer survey, but also for a more detailed appreciation of such aspects as the chronology, functional zoning and spatial development of

¹¹ The gridded area in the protected central part of *Potentia*, which is normally grassland but in 2003 was subjected to shallow ploughing, had somewhat different visibility, but this was taken into account during the field-walking exercise. Still, a complete correlation between this area of smaller blocks and the other gridded zones is not possible, and comparisons between these areas should be treated with caution.

¹² The artefact data are still being processed by the PVS team, under the direction of P. Monsieur and H. Verreyke. For preliminary reports see: Monsieur, Verreyke and Boullart, 2003; Vermeulen *et al.*, 2005. More detailed publication of their analysis is forthcoming.

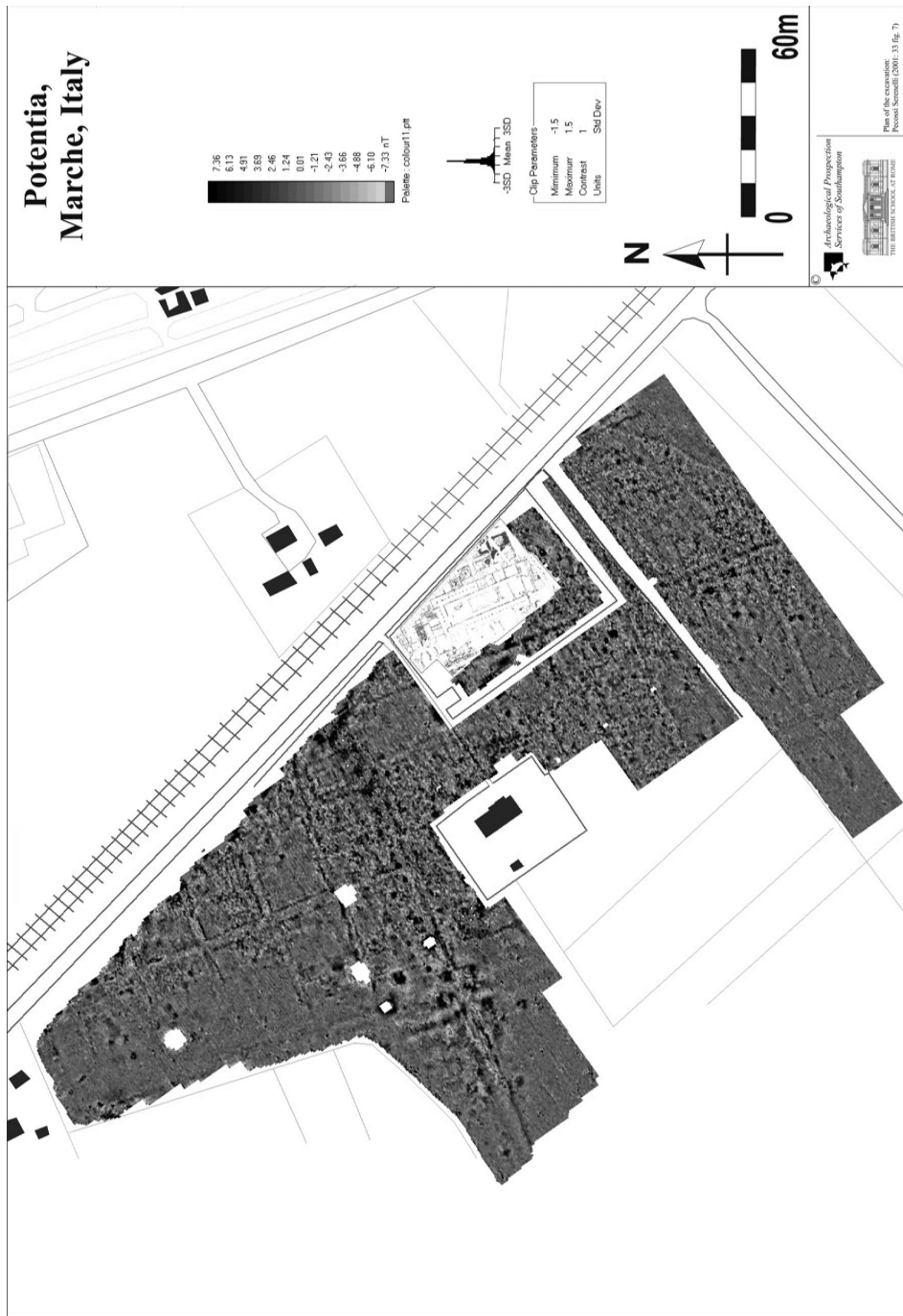


FIG. 6. The magnetometer survey results after the 2004–5 campaigns.



FIG. 7. Interpretation of the results shown in Figure 6.



FIG. 8. Density pattern of black-gloss ware found during the field walking.

FIG. 9. Density pattern of *terra sigillata* found during the field walking.



FIG. 10. Density pattern of late Roman fine-ware found during the field walking.

the urban centre. The intensive field survey of *Potentia* was carried out in close collaboration with a geomorphological team, in order to take into account biases caused by physical processes at the site, such as erosion and river sedimentation, these latter being present predominantly on the southern and eastern sides of the city (see below).

The first available distribution maps, showing artefact density in and around the presumed habitation centre, reveal the differences in occupation density in several sectors of the city. Although their chronological and functional significance needs to be analysed further, once the pottery studies are completed, they generally confirm the chronological span of the occupation at the city as deduced from the recent excavations in the monumental centre (Percossi Serenelli, 2001): from the early second century BC to the sixth or early seventh century AD.

RE-EXAMINATION AND INTEGRATION OF THE EXCAVATED DATA

Comparison of the excavated and the survey data is essential not only for identification and dating purposes, but also for the interpretation of the survey results and their topographical and functional analysis. Thanks to close collaboration with the Soprintendenza per i Beni Archeologici delle Marche, we can not only use the published material from the old excavations in the northeastern quarter of the city, but we can also integrate as yet unpublished structural data and information about finds from the on-going excavations in and near the Republican sanctuary situated at the heart of the city. When the northeastern quarter of the city was studied by Mercado, the site was first interpreted as a *villa rustica*. Later, the buildings found here were assigned to two insulae of the Roman city of *Potentia*, with a street separating them (Percossi Serenelli, 2001). These data also can now be fully integrated.

INTEGRATED RESULTS FROM THE DIFFERENT AREAS OF THE CITY

To present the results of our survey work we will proceed by sector within the intramural area of the Roman city. To do this in a comprehensive way and to avoid being too repetitive, the data derived from several approaches and sources of information (air photography, magnetometer survey, excavation, for example) will be integrated (Fig. 11). After this we shall discuss the topography of *Potentia* as a whole.

THE NORTHEASTERN AND EASTERN AREAS

The area of the city now lying east of the railway and coastal road SS 16 has not yet been the subject of geophysical survey, but some excellent air photographic data

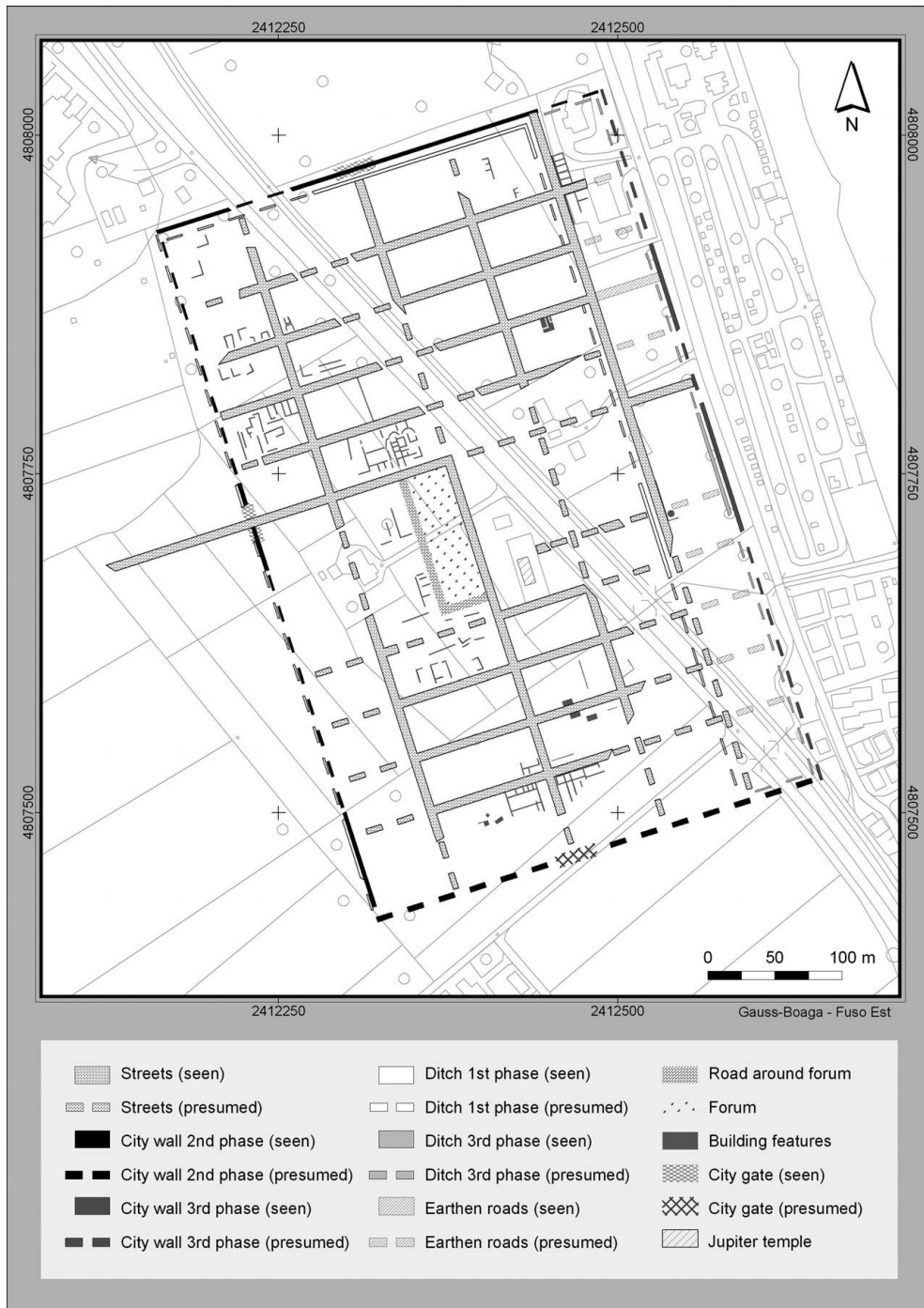


FIG. 11. Detailed interpretation map of the intramural area of *Potentia*, integrating traces from excavations, remote sensing operations and geophysical surveys.

and information from earlier rescue digs (Mercando, 1979) provide us with some crucial information. As already identified by Moscatelli (1987), on the basis of several vertical air photographs, we can distinguish clearly the northern limit of the city's defences. Close re-examination of these images in comparison with our excellent 2003 oblique air photographs, by means of the GIS, demonstrates that the situation is quite complex (Figs 3 and 4).

The presence of a city wall is suggested clearly by a quite sharp although pale crop-mark, only some 2 m wide, visible from the railway side onwards; it can be followed for about 90 m to the east. The trace is interrupted only slightly at a distance of some 45 m from the edge of the railway, precisely where it cuts a trace of the *cardo maximus*, the main north-south street that was partly excavated in the vicinity of the Republican temple. In this area of interruption of the probable city wall we found a dense concentration (15 × 10 m wide) of building materials, consisting of many tiles, some pieces of white limestone and several large river pebbles, probably indicating the position of the northern gate of the city.

Some 40 m east of the gate area the sharply-defined and rather narrow trace of the city wall suddenly changes into a much wider, less clear-cut, pale crop-mark, varying in width between 6 and 10 m, which continues up to the modern villa now covering the northeastern corner of the city area. This wider trace probably represents the remains of the dismantled city walls, as it generally coincides with a surface zone of more stony materials (pebbles and sandstone fragments, for example) observed during field walking. A thin pale feature parallel to these wall remains, situated a few metres within the wall, could point to the presence of a small road following the circuit wall on its inner side.

The eastern wall of the city is suggested by a pale crop-mark near the edge of the fields closest to the sea, thus almost coinciding with the modern land division. The proximity of a modern secondary road along the coastal tourist and residential area prevents a more detailed understanding of this part of the city. There was, however, no sign of a clear concentration of stony material on the surface, which might indicate the presence of a marine gate. The air photography, and particularly a broad pale crop-mark, does, however, suggest that here too the wall was flanked on its inner side by a road that followed the fortification.

This image of the city defences, mostly deduced from our oblique photography and field survey, is further complicated by the identification on the earlier vertical photographs of a very dark and sharply-defined crop-mark, lying parallel to the probable northern city wall, but again positioned on the inside of it. A corner where this trace turns is visible in the plot that is now occupied by the modern villa and it continues almost directly southwards, where we also encountered it on our recent oblique images. This feature can be explained as the presence of a clearly-cut ditch of a maximum width of 2 m, the chronology of which need not necessarily be contemporary with the identified wall structure (see the discussion below, p. 230).

Several traces of the regular street pattern, mostly seen on our air photographs as some 5 to 6 m wide pale and linear crop-marks (and also soil-marks), could be

identified clearly on the ground (Figs 3 and 4). Most are characterized as well-defined concentrations of river pebbles mixed with artefacts, mostly pottery and tile. These traces of the street network, dividing the city into regular *insulae*, generally lie a few centimetres lower than the surrounding areas, indicating the presence in these *insulae* of many subsurface building remains. Other traces of streets, all located between the presumed eastern circuit wall and the nearby first parallel city street,¹³ appears differently on our aerial imagery. They are characterized by a darker, 5–6 m wide, trace, bordered by a pale narrow line. It seems likely that these connecting east–west streets, each the length of one housing block, were laid out differently, possibly consisting only of a surface of battered earth bordered by a lining of regularly-placed stones.

Because we have not yet undertaken geophysical research in this eastern sector of the city, structural indications of the presence of housing and possible monumental buildings are still limited. The rescue excavations undertaken by Mercado between 1967 and 1971 have revealed the presence near the northeast corner of parts of two *insulae*, with a full battery of house walls, floors, sewers and other features, mostly dating to the first four centuries AD, and a series of late antique graves whose proposed date is the fourth–sixth centuries (Percossi Serenelli, 2001: 64–5). They demonstrate that parts of the area, and at least the outer northeastern edges near the city walls, were most likely not inhabited from the beginning of the colony's life, and were also abandoned earlier than some other parts of the city, giving way to funerary activities. Our oblique air photographs of this eastern sector do not display many remains of buildings. Although vague linear traces pertaining to buildings are visible over almost all the area, it is not possible to map more than a very limited selection of them. As far as we can make out, most of these features neatly coincide with the orientation of the city street-grid. In one case, a circular structure inside a building indicates the possible presence of a large well or cistern.

The surface finds picked up in the ploughed fields — mostly building materials (tiles, different building stones, mosaic *tesserae*, pieces of wall-plaster, for example), pottery and glass — were abundant throughout the whole intramural area of this eastern sector of *Potentia*. Deeper ploughing and the presence nearer to the surface of some buried structures are, however, responsible for some remarkable concentrations of building materials. This is the case, for instance, with a dense group of limestone building blocks, roof-tiles, fragments of Roman mortar, pieces of wall-plaster and fragments of amphorae (which were reused as building materials), found in the outer *insula* near the *decumanus maximus* and not far from the possible (but still highly uncertain) marine gate.

Among the pottery finds in this eastern part of the city we find the full chronological range of late Republican, Imperial and late antique imported and

¹³ This street manifests itself as somewhat broader (7–8 m) than the other traces of streets in the city.

regional fine- and coarse-wares. A clear drop in the density of surface materials in the southernmost and southeasternmost blocks of our survey grid coincides well with the likely effects in this area of post-Roman flooding and erosion by the original Potenza river-bed (Vermeulen *et al.*, 2005). Elsewhere some interesting peaks in density can be observed. While the black-gloss wares, good indicators for late Republican settlement activity, show a regular (low) presence almost everywhere (Fig. 8),¹⁴ more differentiation can be observed for the Imperial period and afterwards. Some strong concentrations of fine *terra sigillata* wares in different parts of the sector (Fig. 9) can be seen as indications of the uneven spread of rich housing during the first three centuries AD, while the remarkable and consistent concentration of the abundant late Roman fine-wares in the central-northern part of city (Fig. 10) seems to suggest a clear regrouping of the urban population in some areas of the city.¹⁵

Of particular importance for the pre-Roman use of the beach ridge, where the city of *Potentia* was established, are some finds of pottery sherds that clearly pre-date the foundation of the Roman colony. A small group of mostly handmade pottery (less than twenty sherds) probably belongs to unspecified phases of the Bronze and Iron Age. Most of them were found in a limited area near the northern city wall. Another small group (not more than ten sherds), of mostly imported wares in Greek style (black-glazed ware, a transport amphora, for example) and generally to be dated between the sixth and third centuries BC, was found near the coastal sector of the city wall.

THE NORTHWESTERN AND CENTRAL-WESTERN AREAS

The northwestern and central-western sectors of the site of the Roman city now lie under grassland, where the possibilities for effective air photography and field walking are very limited. The best information available here comes from the systematic magnetometer surveys that were undertaken in 2004–5. In what follows we shall discuss primarily the results of these surveys (Figs 6 and 7), where possible complemented with data from our air photo interpretation and field walking in a limited part of the central zone.

The geophysical survey was very successful in locating and mapping a large number of the archaeological features associated with the buried remains of the Roman colony of *Potentia*. The layout of this northwestern part of the city clearly emerges from the survey results, and a number of buildings, streets and open areas can be identified that complement the data from the excavated area of the monumental centre.

¹⁴ These low numbers are related no doubt to the deeper stratigraphic position of the earliest occupation phases. The abundance of late Roman wares in the surface record is explained by the same phenomenon.

¹⁵ We thank the pottery team, and especially P. Monsieur and H. Verreyke, for these preliminary data, which will be published fully in 2006 and 2007.

The visible anomalies in the magnetic record clearly demonstrate the road network of the colony and complement the findings of the air photography. A clear grid system aligned north-northwest–south-southeast is apparent, although the nature of the buried remains does differ: in some cases distinct negative anomalies bordered by linear positive anomalies appear and in others just the edges are visible. This phenomenon is likely to be caused by the presence or absence of a road surface. The principal *decumanus maximus* can be traced and a sequence of other *decumani* and *cardines* was also detected, dividing the colony into a series of insulae. Interestingly, not all the roads can be identified clearly and there are examples of roads without obvious continuations: the *cardo* immediately to the west of the *cardo maximus* appears to run from the north of the survey area and end at the junction with the *decumanus maximus*. These results tally with the interpretation of the air photographs, where a continuous road is not visible. The magnetometer survey did, however, reveal the presence of a road, immediately within the city wall, in the extreme western part of the colony that was not visible in the air photographs. Whether this road continued south of the *decumanus maximus* is unclear, although there does appear to be a division between the built-up area and the open area.

Over much of this part of the colony the layout of the road network conforms to what one might expect. However, the geophysical results reveal one important feature not previously demonstrated in the air photograph survey. The *decumani* leading off to the west continue to divide the land into insulae right up to the city's circuit wall. The vertical as well as the oblique aerial photographs did not reveal this phenomenon, although the possibility was never discounted (Vermeulen and Verhoeven, 2004: 65–6). Faint though the traces of these *decumani* are, they are, nevertheless, crucial in demonstrating the importance of an integrated survey approach using various techniques to enhance our understanding of a site. It was, however, noted that in this area the results became fainter towards the western edge of the city. It is our opinion that the ancient topography is the cause of this effect and that the beach ridge on which the city of *Potentia* was constructed must slope sharply down to the west, a fact confirmed by geomorphological research by M. De Dapper and his team around *Potentia* (Vermeulen *et al.*, 2005). The depth of the mostly clayey material now covering the Roman city masks the archaeology to such a degree that the scope for detecting buried remains using magnetometry is very limited. This phenomenon could also account for the fact that the roads immediately near the city wall were not identified from the air. The most deeply buried remains cease to affect the growth pattern of the grass, which is the fundamental element in distinguishing features in air photographs.

Flanking the grid pattern of city streets in the northwestern area, faint rectilinear positive features can be discerned. Few are clear in form but their alignment and position indicate that they are structures within the insulae. Although one can assume that most of these traces relate to the walls of buildings, it is not possible to detect clear and complete plans of such compounds. As the overall form and plan of these features is not clear, an interpretation of their function cannot be

put forward. In some other areas, especially towards the south of this sector, the quantity of material close to the surface obscures the detection of buried features and incoherent patterns result. The high 'noise' levels in these areas suggest that there were structures within the insulae, but clear forms cannot be identified. These areas are in stark contrast to those that appear very quiet in terms of background 'noise' levels and seem to have a dearth of strongly positive and negative magnetic responses. The lack of evidence for structures or even building material in some of them is intriguing, and suggests that parts of the area within the city walls remained unoccupied. Important, however, is the fact that in spite of the covering clay deck towards the west, building structures seem to be present up to the very edge of the city.

In the area extending along the extreme western perimeter of the field surveyed, fragmented traces of a stronger linear positive anomaly that runs north-northwest–south-southeast and then turns at its northern extremity towards the east at a right angle can be seen. This response is likely to be caused by the presence of a large structure, and when its position is compared to the air photographs it can be deduced that this feature probably represents the circuit of the city wall. This structure is perfectly aligned with the observation point in the modern ditch in the southern part of the city, which was cleaned and studied in 2000 by Budini and Rossini (2001), indicating the presence of a 1.5 to 2 m wide ashlar city wall, constructed with large blocks of sandstone. Locally the linear magnetometer anomaly of the city defences is subdivided into a positive linear anomaly flanked by two parallel negative anomalies. The positive anomaly is about 7 m wide and 30 m long; after comparison with the air photographs it seems most likely that this feature represents a section of the city's circuit wall, with the possibility of two ditches on either side. As we noted for the northern and eastern periphery of *Potentia*, we cannot exclude that this is an indication of the existence of several phases of city defences.

This is also the case for the area of the supposed western gate, which air photographs and the presence of a *decumanus maximus* leading out of city in a westerly direction, along the still standing core of a Roman funerary monument ('il Toraccio'), had more or less located (Vermeulen and Verhoeven, 2004). Indeed, this western extremity of the survey area is littered with both negative and positive magnetic anomalies. Amorphous in form and ranging in size from a few metres across to 15 m long, these anomalies would seem to indicate the presence of dense concentrations of building material. Although there is no recognizable form it can reasonably be presumed that this cluster of features represents the remains of a gate. The complex of anomalies at this point may suggest that there have been successive phases for the western gate. The clear linear anomaly of the *decumanus maximus* appears to exit the gate and heads directly towards the standing remains of the Roman mausoleum. As this whole area of the western gate remained elusive in the 2004 magnetometer survey results, a small resistivity survey was conducted over an area of 0.3 ha in order to test the method on this site and potentially to help clarify the nature of the buried remains. The survey method worked well and the results

clearly demonstrate the presence of two high resistance linear anomalies, perpendicular to one another. The *cardo maximus* runs on a decisively north-northeast–south-southwest alignment, interrupted only by a short break. Curiously the feature branching off to the north appears slightly curvilinear in form, but judging from its position, this feature probably does represent the course of the city wall. It is apparent that it does not continue to the south of the line of the *cardo maximus*, which could suggest that the feature has been robbed out at this point. Clear from the resistivity results are the lack of disturbance and clarity of the responses. This bodes well for future targeted use of the technique on site and again highlights the importance of implementing an integrated approach. Combining both the magnetometer and resistivity results in one image, the nature of the buried archaeology in this area becomes apparent.

Beyond the limits of the city wall in this central-western sector the 2005 magnetometer survey revealed possible traces of mausolea flanking the sides of the *cardo maximus*, whose route can be traced, uninterrupted, heading west. They are distinguished as a number of rectilinear and curvilinear positive anomalies. The results of the small 2003 field walking of this area confirms this image. The presence of the circuit wall, and its persistence from the late Republic to late antiquity, is suggested clearly here by the fact that the surface finds, mostly building materials, pottery and glass, were much more abundant within the walls than in the western survey section outside the city area. Furthermore, a lot of building materials (roof-tiles, pebbles, large blocks of limestone and sandstone) found in the area of the presumed gate, confirm its location. Finally, the presence of some fragments of marble and *tesserae* in the extramural area could be related to this possible funerary area along the western road out of the city.

THE CENTRAL CITY AREA

The magnetometer surveys in the central area of the city, essentially the zone adjoining the excavated temple area and a modern house and garden, were hampered somewhat by the presence of modern ferrous material. Some interference was due to the presence of the metal fence along the side of the modern road, the metal fence enclosing the excavated area, the proximity of a metal portakabin, the presence of some reinforced concrete lying on the surface of the field and of two standing pylons. Nevertheless, the results of this survey (Figs 6 and 7), integrated with the excavation data, air photography information and the results of the small field-walking effort in this area, are more than rewarding.

A series of negative linear anomalies criss-crosses the area, and is fully aligned with the majority of the excavated archaeological features. Their lengths vary, but all have a width of 4 to 6 m. Their orientation, position and dimensions all indicate that these anomalies represent the roads of *Potentia*. According to the interpretation of the other data, the *cardo maximus* is represented in the magnetometer survey by a combination of anomalies that lie on the central axis through the city. The other road

segments are not always completely distinguishable, but the general road pattern is confirmed.

Dominating the results in this sector is the discovery of the forum of *Potentia*, which is sited at the centre of the colony, the junction of the *cardo maximus* and the *decumanus maximus*. The open forum square, characterized by a dearth of structures, is clearly visible and is notable for its immense length and narrow width, measuring approximately 30×120 m on a northwest–southeast alignment. It is unfortunate, however, that the area of the forum and its immediate vicinity have been disturbed so heavily by modern interventions, which makes the precise nature of the buried remains indecipherable. The substantial quantity of marble fragments found in this general area during the field walking effectively confirms the public nature of this part of the city.

The responses to the west of the forum are quite ephemeral, as the amount of material close to the ground surface obscures detection of the buried remains. However, some patterns can be identified, and flanking the western edge of the forum there is possible evidence for a series of shops fronted by a portico, mirroring the one visible in the excavations on the east side of the forum. Flanking the entire western edge of the forum are two parallel positive linear anomalies containing areas of negative magnetic responses. They are combined with a group of amorphous positive anomalies that measure a few metres in extent, and should probably be interpreted as floors of the same type as found in the excavations on the east side of the forum. The high numbers of mosaic *tesserae* found here during the field walking do not contradict this hypothesis.

There is very clear evidence of a major structure to the north of the forum, bordering the northern end of the forum square, which is characterized by a pair of parallel linear anomalies that partially enclose the area. Although modern disturbance obscures the southern part of this major building structure, its northern end is characterized by roughly apsidal forms, and small individual rooms can be traced around what appears to be a central courtyard. Given its central location and unusual plan, it is suggested that this indicates the presence of a bath-house. However, it is also acknowledged that this prime location, at one end of the forum, could also imply that it might be a major sanctuary or basilica, or that the complex situation is the result of diachronic superimposition of several building structures of major importance. The presence of substantial quantities of late Roman fine-wares in this general area north and northwest of the forum seems to attest to a long and complex history.

To the south of the forum area, the situation is very complex, as this area is much disturbed by the excavation fence. There are some parallel positive linear anomalies that are linked to the *cardo maximus*, immediately to the east. It is probable that these features represent major building structures — although there is no clear distinguishable form, their prominent location at the end of the forum would suggest that they are associated with civic or public buildings, such as a basilica.

THE SOUTHERN AREA

The survey results in the southern sector of *Potentia*, currently in use as a large plot of arable land, are quite good and have great potential for integrated interpretation. Geophysical survey was possible here, but was hampered by the unevenness of the field surface in October 2005, when this work was undertaken. Therefore, and due to constraints of time, only the higher part of this field was tackled with the magnetometer (Figs 6 and 7). The low-lying southern and southwestern part of this field is much eroded due to post-Roman flooding of the river Potenza in this area, an observation well-attested by means of geomorphological survey using electric resistivity and augering techniques (Vermeulen *et al.*, 2003: 76–9). Also dominating the magnetic results in this area is a curvilinear positive feature on a northeast–southwest orientation that cuts across the southeast corner of the survey area. To the south of this line it is evident that no trace of the city layout remains and, indeed, the clearly visible city streets (see below) also stop abruptly at precisely the point where they meet this feature. This phenomenon is also well-attested on our air photographs (Fig. 3) and on earlier vertical images, which, furthermore, were particularly important in understanding the remains of the road network and of some city buildings. The area was completely field-walked in regular blocks (2002) and we also have interesting data from the cleaning of a modern ditch (2000) that borders this arable field on its northern side.

Particularly clear in this sector are the remains of the street-grid of the city. Most of the streets are not only defined sharply on our photographs, but also in the field they were distinguishable as compact traces (4 to 6 m wide), mainly consisting of gravel, in part associated with building material (essentially *tegulae*) near their edges. An interesting consequence of extending the magnetic survey to the south was the clarification of the nature of one of these streets, the *cardo maximus*. The results allow a better analysis of the strong linear positive anomaly to be seen here, and it appears as though this road displays different characteristics compared to the other roads, which may indicate that it was paved.

Of the circuit wall only a small part, near the western edge of this field and lying outside our geophysical survey area, was observable on the air photographs. The rather thin, pale crop-mark seen here concords well with the observation in the modern ditch nearby of the remains of the at most 2 m wide city wall. The observers did not, however, identify possible traces of ditches related to the defensive system. The surface of the majority of the ploughed field is dense in surface finds, and the pieces of brightly decorated wall-plaster, sherds of fine-wares, fragments of marble and mosaic *tesserae*, together with masses of roof-tiles and amphorae, hint at a wealthy built-up area. It was, therefore, slightly disappointing that the magnetometer survey results did not show a wealth of anomalies that would have reflected such expectations. The overall background ‘noise’ evident over much of this area makes delineating features difficult, but within the insulae a number of faint positive rectilinear anomalies can be discerned that probably represent

structures. Associated with these features, but occasionally isolated on their own, is a series of small amorphous positive anomalies, each measuring only a few metres in extent. These could represent modern disturbances, but may also indicate the presence of flooring within the rooms of buildings. Again, the anomalies in this area of the survey appear to become fainter towards the western side.

The best evidence for buildings in this southern part of city can be deduced from the aerial imagery. On some of the vertical images at our disposal we can clearly distinguish remains of a large building, probably of the *domus* type, with several rooms grouped around what seems to be a central courtyard (*atrium/peristilium*?). The possible house is situated on the eastern edge of the *cardo maximus*, at the northwestern corner of one of the insulae that were cut by the erosive floods of the river Potenza. During the field walking we identified in this sector a concentration of some 15×3 m, consisting of many pieces of white limestone and a good density of late Republican and early Imperial fine-wares. The northern edge of the insula west of this shows a comparable series of dense building traces. They are essentially parallel and perpendicular linear structures bordering one of the *decumani*, as well as a series of regular patches to be interpreted as possible floors. Again this evidence coincides with the appearance of a lot of building materials (for example, large fragments of limestone) on the surface, some of which (for example, mosaic *tesserae*) indicate a certain quality of architecture. As in the northern part of city, a whole series of vague linear features on the air photographs, essentially with the same orientation as the street network, suggests the presence of many more buildings in this area.

Finally, it should be observed that a small concentration of sherds (less than twenty fragments) of protohistoric pottery was found here. Their distribution near the southeastern side of the beach ridge probably can be explained by the greater erosion and exposure of the lower stratigraphic levels in this area.

GENERAL DISCUSSION AND CONTEXT

Following its location and discovery in the 1940s, the Roman colony of *Potentia* has revealed itself piece by piece: partly as a result of rescue digs and small excavations in specific areas of the city, partly due to a rewarding analysis of the available aerial imagery and cartographic evidence. A new phase of much more integrated field surveys began in 2002. Thanks to this approach and building on the valuable earlier discoveries, a completely new and much more detailed plan of the urban pattern can be presented here, including the full street network and city defences. The forum, several monumental complexes, many elements of city housing and some funerary structures were discovered, and were carefully mapped and analysed within a GIS environment.

Despite the success of the magnetometer and resistivity surveys and of the low altitude air photography, these approaches, which complement each other well, only provide a series of images of the buried remains, and it must be stressed that they

can reveal little with regard to the chronology or function of the buildings detected (Keay *et al.*, 2000: 9; Vermeulen, Verhoeven and Semey, 2005). Although Roman urban patterns are often explicit enough to allow viable hypotheses about functions and even general chronologies to be put forward, specific characteristics remain problematic. This apparent weakness of the fieldwork has been solved at least partly by our systematic field walking, over large sectors of the city, contextualizing the imagery provided by the remote sensing. Together with further integration of the valuable stratigraphic data from the various excavations of the site, this work has proved to be of crucial importance for our understanding of the city's topography and its development.

As a result of this major step forward in the topographic study of a coastal Roman colony, a new overview of the general evidence and an assessment — albeit preliminary — of the new city plan is now possible. In this attempt to contextualize the main observations made above, we shall also put forward a new hypothesis and a series of questions for further archaeological and historical research in *Potentia*, building on the excellent recent synthesis by Percossi Serenelli (2001).

It is clear from several elements noted above that the longitudinal beach ridge, parallel with the coastline and just north of the mouth of the Potenza river, chosen by the Romans as an excellent place for establishing this new coastal colony of Roman citizens, had known human activity before. Apart from a possible settlement during the Early Bronze Age, the site was most likely in use for some activities during the centuries of Greek-Picene contacts (sixth–fourth centuries BC). One can imagine, for instance, that the Greek pottery (for example, amphorae) found in the central part of this site is to be related to certain commercial activities and exchange with the important Picene settlement studied during our earlier surveys on the nearby hill of Montarice (Boullart, 2003; Vermeulen *et al.*, 2005).

Although we must remain very careful when considering the diachronic aspects of the topography of the Roman city, we would propose that there were three major phases in the development of *Potentia*. In a first phase, coinciding with the official foundation of the colony in 184 BC as attested by Livy, the chosen city area was surrounded by a 2 m (maximum) wide ditch (*fossa*), possibly flanked by an earthen bank (*agger*) made from the dug out soil of the ditch. This ditch was seen only on aerial images of the northern periphery and in the eastern part of the city area, almost coinciding with a later north–south street lying one block west of the later wall. This very regular rectangular area, of some 525 × 300 m, with a north–northwest–south–southeast orientation, must represent the initial settlement of the first (300?) colonists.

Not long afterwards, according to Livy in 174 BC, the site of the colony was probably fully urbanized. Thanks to the financial intervention of the censor Q. Fulvius Flaccus, the new citizens were able to develop a simple defensive settlement of 'military appearance' into a real city, with a series of buildings related to such social and economic development. These urban structures probably comprised a temple for Jupiter, a circuit wall with three arched gates, a regular street network

with sewers, an aqueduct, and a portico with shops enclosing the forum. Current archaeological data seem to confirm this detailed historical account almost entirely. Let us briefly review this evidence.

The temple found during the excavations in the south-central part of city is most probably the late Republican sanctuary of Jupiter. Although good epigraphic data are still lacking, its prominent location and architectural and decorative style, as well as the dating evidence from the *favissae* found during the excavations (Percossi Serenelli, 2001: 36), place this important sanctuary at the very beginning of the life of the colony.

The circuit wall, found during the cleaning of a modern ditch and well-attested in our air photographs and geophysical surveys, delimits a very regular, rectangular city grid, measuring *c.* 525 × 350 m (this is *c.* 15 × 10 *actus*), which represents almost 18.4 ha in area, measured *intra muros*.¹⁶ Its building technique, an *opus quadratum* of dry masonry made with large blocks of regional sandstone, fits well with the chronology of the early urbanization of the city according to Livy (Percossi Serenelli, 2001: 36). Although our surveys suggest the presence of a ditch on its outer side and of a *circumvallum* road on the inner side, we cannot be sure of its precise nature. Also hypothetical is our suggestion here that the wall initially surrounded an area of the same size as the space circumscribed by the first ditch of the colony (see above), but that this intramural area was enlarged some 50 m to the east, in a later stage of the settlement's history. The initial eastern city wall was then replaced by a street — as shown by a larger and more pronounced trace in the air photographs than noted for most other streets — and the new wall was built on the edge of what is now a local coastal road bordering the beach area. This hypothesis, to be verified in the field, would certainly explain well why the sector in the northeastern corner of the city, excavated by Mercado, was only inhabited from the Augustan era onwards. It would also explain why in our aerial imagery the east–west streets of the *insulae* in the eastern periphery of the city appear different from the other city streets.¹⁷

Whatever the exact phasing of the circuit may be, it is likely that the city wall incorporated three major gates, as suggested by Livy's account.¹⁸ The northern and western gates, both more or less centrally placed on the respective sides of the city and well-connected with the extramural road network that our photographic surveys discovered, are now securely located. In particular, geophysical evidence hinted at a quite complex phasing in relation to at least the western entrance to the city.

¹⁶ When we include the walls in the total city surface area we obtain a figure of some 19 ha. It is certainly significant that this size is almost identical to the *c.* 19.3 ha presumed for the Adriatic colony of *Pisaurum* (Pesaro), founded in the same year as *Potentia* (Somella, 1988: 81).

¹⁷ Such a reorganization of the city is also suggested by the discovery of a destruction layer in the stratigraphy of the temple sector dated around the mid-first century BC, when Cicero mentions a major earthquake destroying *Potentia* (Percossi Serenelli, 2001: 39). It might indicate that the city suffered substantially as a result of this catastrophic event, and that major reorganization and rebuilding was necessary in the decades following the earthquake, as can be seen also in the temple area.

¹⁸ At the moment an eastern or marine gate is not attested.

The third gate, in the southern part of the wall, can also be identified quite clearly, despite the fact that it is located in an area that is now much eroded by river movements. This southern exit from the city links up neatly with a road leaving the urban area towards the southwest, to reach the main Roman bridge over the river (Lilli, 1999; Vermeulen and Verhoeven, 2004). Thanks to the surveys, we now know that all three roads leaving the city gates were bordered by cemeteries, with funeral monuments facing the roadway. One of these cemeteries, north of the city, was already known thanks to rescue excavations conducted by Mercado (Mercado *et al.*, 1974) and was confirmed by more systematic investigation in 2004.¹⁹

The gates identified link up well with the regular street system. This is dominated by a probably metalled *cardo maximus* and a *decumanus maximus*. All the other *cardines* and *decumani* are neatly parallel (and perpendicular) with these. According to the evidence from the surveys and the excavations they are some 5 m wide and normally consist of a surface of battered river pebbles. The excavations in the temple area confirm that at least some of them had one or two parallel footpaths and brick sewers, which lay underneath the roadway (Percossi Serenelli, 2001: 80). Only the *decumanus* segments in the (later?) peripheral eastern part of city seem to be simpler, with a road-bed of battered earth and a stone lining.

The city streets, which we can now map with some confidence, subdivide the urban space into insulae of different sizes. It is difficult to calculate the exact number of insulae at *Potentia*, as we still lack details about some areas.²⁰ It is also not clear yet whether we should interpret some streets as being part of the major grid, or just as local subdivisions of insulae. For the moment we suggest that there were 51 to 57 insulae, leaving aside the narrow space between the not yet fully understood *circumvallum* road and the circuit wall. According to our present interpretation, the city grid can be divided in three main zones: very similar northern and southern zones, and a somewhat different central zone.

The northern and southern zones seem to have respectively five and four east–west oriented rows of five insulae. The width of these city blocks, not incorporating the streets, is fairly consistent, and measures some 35 m or exactly 1 *actus*. The lengths of the insulae are less regular; we propose sizes between 2.5 *actus* (c. 87 m) and 1 *actus*.²¹ The central zone, determined by the presence of a series of large

¹⁹ Excavations carried out by the Soprintendenza per i Beni Archeologici delle Marche, following on from the results of our aerial discoveries in 2002, showed the presence here of the coastal road and of several Roman funerary monuments and tombs aligned along it (Dott.ssa. Percossi Serenelli, pers. comm.).

²⁰ We have now, however, a much more detailed picture of the city grid than we had for an earlier discussion (Vermeulen and Verhoeven, 2004), before the use of geophysical survey.

²¹ This system is less regular but broadly comparable to the street pattern, with more or less east–west oriented longitudinal blocks of 70 × 35 m, or 2 × 1 *actus*, proposed for the Republican colony of *Sena Gallica* (Senigallia), further to the north along the Adriatic coast (Dall’Aglio, De Maria and Mariotti, 1991: 154).

public complexes, seems to have six larger and north–south oriented insulae, with a length of some 3.5 *actus* (a little more than 120 m) and widths varying between 1 and 1.75 *actus*. If all or some of these insulae were subdivided by a central east–west street, then a total of twelve insulae for this central zone is also possible.

The excavations, as well as our geophysical survey and field walking, have made it particularly evident that the central insulae, around the junction of the main *cardo* and *decumanus*, represent the civic centre of *Potentia*. The magnetometer results are very explicit in situating the forum, a long rectangular and north–south oriented open area of some 120 × 30 m, immediately southwest of this junction. It seems to have been bordered on both long sides by rows of shops, each with a portico, while several large public buildings surround it. To the east the excavations have already identified a temple, and directly north of this a market (*macellum*). On the southern short side geophysical research suggests the presence of a large building, possibly a basilica. On the northern short side a complex of buildings can be distinguished from the survey results, possibly including a temple and/or bath complex, although the presence of a late Roman church and/or different civic buildings cannot be excluded. The location in this northern area of many epigraphic finds with a public character (Paci, 2001) could support this hypothesis.

Finally our surveys and a re-evaluation of all excavated evidence have also succeeded in producing some evidence for urban housing. Fragments of buildings are visible all over the city, generally neatly aligned according to the street-grid. Several partial plans of houses, most often of types with central courtyards, are now discernible, and thanks to the rescue excavations in the northeastern corner of the city some chronological information is available. The distribution of black-gloss pottery over the surface of the city seems to indicate that most intramural sectors were already inhabited or used in late Republican times, but a finer chronology is not yet possible. It is likely that the eastern fringes of the urban area were exploited fully only after the earthquake of the first century BC, perhaps as a result of later expansion of the city in the direction of the coastline. During the Principate it appears that the whole intramural area was intensely built over, and indications from our surveys suggest that some suburban areas (for example southwest of the city) were also occupied (Vermeulen and Verhoeven, 2004). In late antiquity, however, a significant contraction of the inhabited space occurred, with the general area around the forum remaining for a while the centre of activity. The changing political, economic and ecological character of the area around the mouth of the river Potenza during the turbulent period of Lombard dominance, however, would prove fatal for the once-flourishing coastal colony of *Potentia*.

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