GEOPUNTO
SELECTED ARTICLES 2004-2010

Roma caput mundi mensores *by* **Hyginus Maior***

Allow me to introduce myself, I am a very old *"mensor"*, a professional of imperial Rome, who lived around the year 100 A.D.
I can well imagine that the regular readers of this journal might be hoping for an explanation about why in this issue the feature article is written by a Latin, and why there is a supplement all written in a language of the British isles.
The reasons are actually to be found in the very title of this article. For a few days in May the city of Rome will be the capital of our world of surveyors, as it will be hosting for the first time in over forty years the General Assembly of the International Federation of Surveyors. This is a unique opportunity to remind our colleagues from all over the world of the great influence of the host city regarding the ancient origins of our profession.
I must remind you of the complexity of ancient Roman society and of the difficulties associated with the Empire's expansion during both the colonisation phase and when maintaining control and dominion over conquered territories.
After the conquests we proceeded with centuriation (large-scale division of farmland), allocating the land of whole regions to former soldiers who, becoming farmers, were able to guarantee political control of the territory, consolidating Rome's traditions and institutions. In this phase moreover conquered territories often had to be deforested or reclaimed, aqueducts had to be built to irrigate land and roads built to connect them to Rome.
I was, with all modesty, at the centre of this complex organisational machine, the *"mensor"*.
My older colleagues came from the military and then, as civilians, specialised in farming or in the construction of buildings and infrastructures.
As time moved on and the Empire's boundaries expanded further, we would be called upon by administrators and consuls to use our skills for the performance of 'freelance' activities.
Other figures assisted us with our activities, namely *"metatores"*, who planted or moved the pegs, *"decempedators"*, who used a staff to measure distances, and *"gromatici"*, who were responsible for the grid alignments of town streets and buildings.
Living during Trajan's reign, I was a well established professional, and wrote a treatise on the art of measuring which, in the opinion of posterity, was perhaps among the most important on the subject, covering all aspects of the surveyor's art at that time. If you read that treatise you will learn that to do our job we naturally had to know about mathematics, geometry and astronomy since, without a compass or GPS technology, in order to align the axes of the centuriation plot and adapt to local morphological conditions we had to use such knowledge, and we had to know about agriculture in order to choose the correct crops. We also had to know about law in order to allocate land and settle boundary disputes.
It is certainly true that we did not invent a lot. The Egyptian and Greek civilisations already had similar "measurers", but it is also true that it was only with the rise and spread of the Roman empire that the *mensor's* role in the social organisation of that time became crucial and far-reaching, also starting up an educational process that would continue right up to your days. Things would have changed very little but for the great technological and scientific progress we initiated.
Now that you have a better idea of the origins of your craft, your old colleague and friend Hyginus wishes to take a moment of your time to invite all the modern-day surveyors of Rome to join him in welcoming delegation members attending this meeting to the capital of the world, with the words: ***"ave mensores!"***.

(*) little-used pseudonym of Giorgio Maria de Grisogono, *mensor*

ROME FROM THE BAROQUE PERIOD TO THE LAND REGISTERS

Mario Bevilacqua

Introduction to the Report for the International Conference on "The Maps of Rome from the Baroque to Land Registers" held in Rome at the end of 2010 with scientific coordination by Professor Mario Bevilacqua (University of Florence) and Professor Marcello Fagiolo (University of Rome).

Mattheus Greuter. Plan of Rome. Engraving (1618)

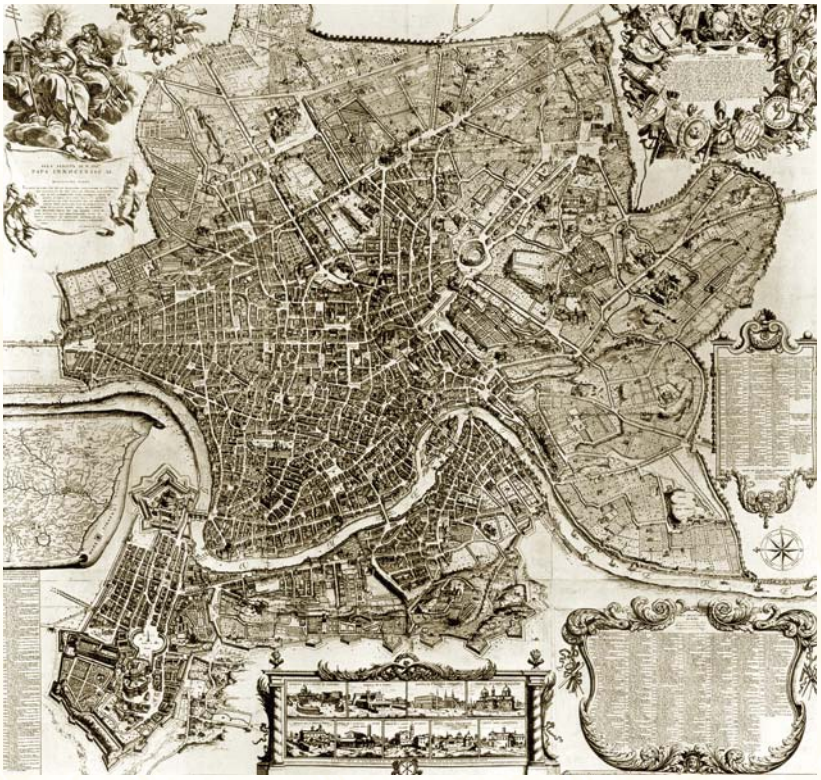
During the 1600s, the century of Baroque, Rome underwent a profound renovation of its image. The Popes promoted grandiose urban planning and architectural programmes, and artists like Bernini, Borromini, and Pietro da Cortona created the masterpieces for which the city is still renowned today. The Popes attentively promoted the printed images highlighting the city's role as the capital of Catholicism. Artists, engravers, and architects collaborated in this international diffusion process, and the plans of the city made during the century disseminated all over Europe, governed by absolute monarchies, the myth of the "Forma Urbis" of Rome as a modern capital and heir to the glory of the capital of the Empire.

In the 17th century, the representation of the city did not involve the production and dissemination of ground plans in the current sense. The first zenith-based iconographic plan of Rome (Leonardo Bufalini, 1551), was the basis for the creation of a particular "bird's eye view" representation. This is an extraordinary synthesis of topographical accuracy (utilising the Bufalini plan as a basis, with subsequent checks and updates) and artistic and perspective inventiveness, in which each block is represented by pseudo-axonometric depiction. The city is shown as if from above, in the impossible view of a hypothetical flight by Icarus, a bird's-eye view.

Developed in the last decades of the 16th century by Italian cartographers, artists and perspective experts, the bird's-eye view used for Rome resulted in maps of the city that were increasingly accurate, as well as covering an extensive area. After the large and highly detailed plan by Matteo Greuter (1618), in 1676 Giovanni Battista Falda published a large plan of Rome which acknowledged to be the cartographic masterpiece of the Baroque period.

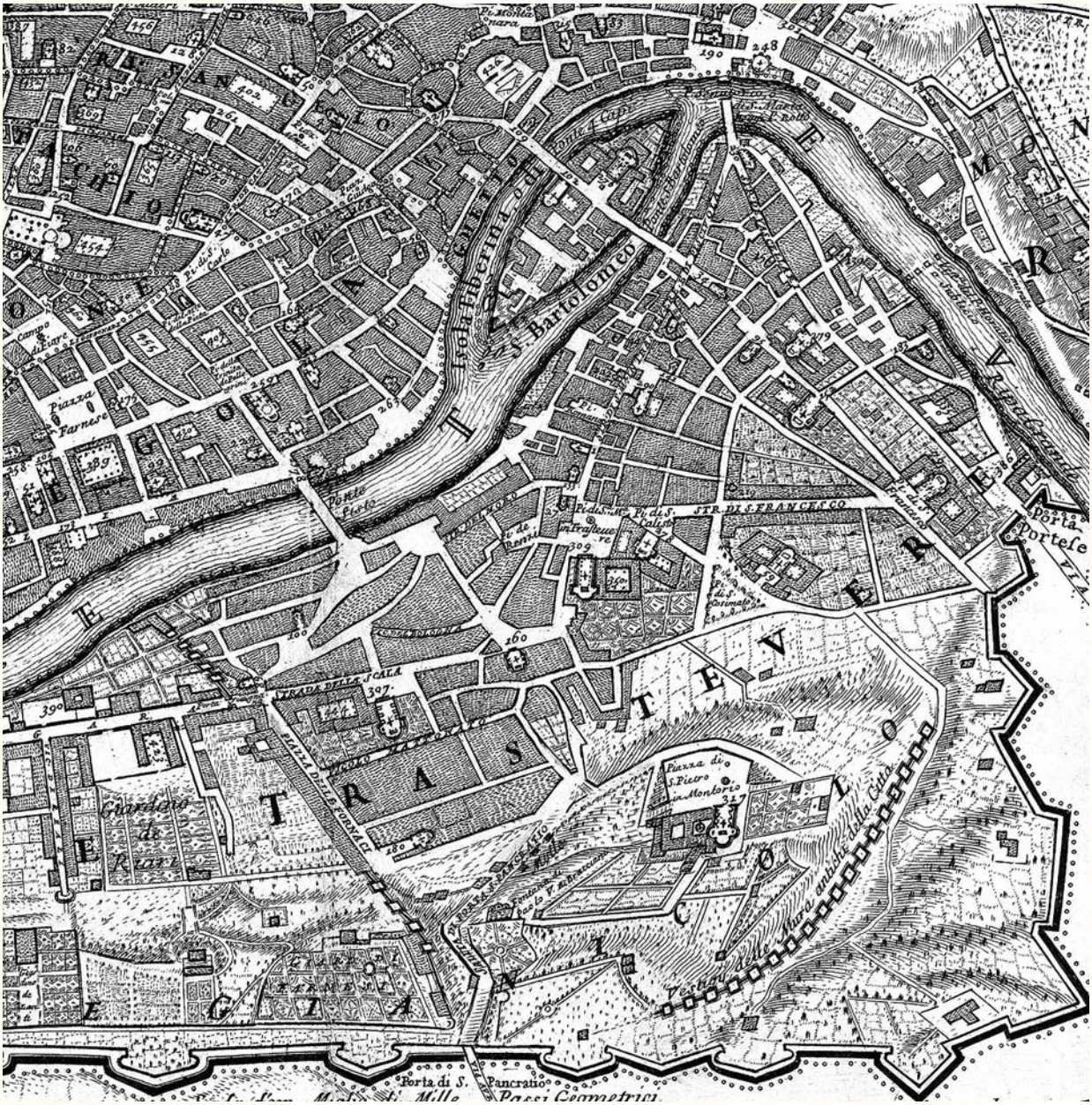
The engraver Giovanni Battista Falda arrived in Rome form Piedmont when only 14 years-old, and was employed in the workshop of the greatest Baroque artist, Gianlorenzo Bernini, who immediately perceived his capability and value. Falda, also thanks to the patronage of Giovanni Giacomo De Rossi, then one of the wealthiest and most enterprising publishers in Rome, thus became the "official" engraver of Alexander VII Chigi, the Pope from Siena responsible for a series of extraordinarily important projects for urban renewal, starting from the construction of the colonnade in St. Peter's Square.

Giovanni Battista Falda's plan rapidly spread throughout Europe as the official image of the Eternal City in its magniloquent splendour of streets, squares and monuments, all with meticulous three-dimen-



Giovanni Battista Falda. Plan of Rome. Engraving (1676)

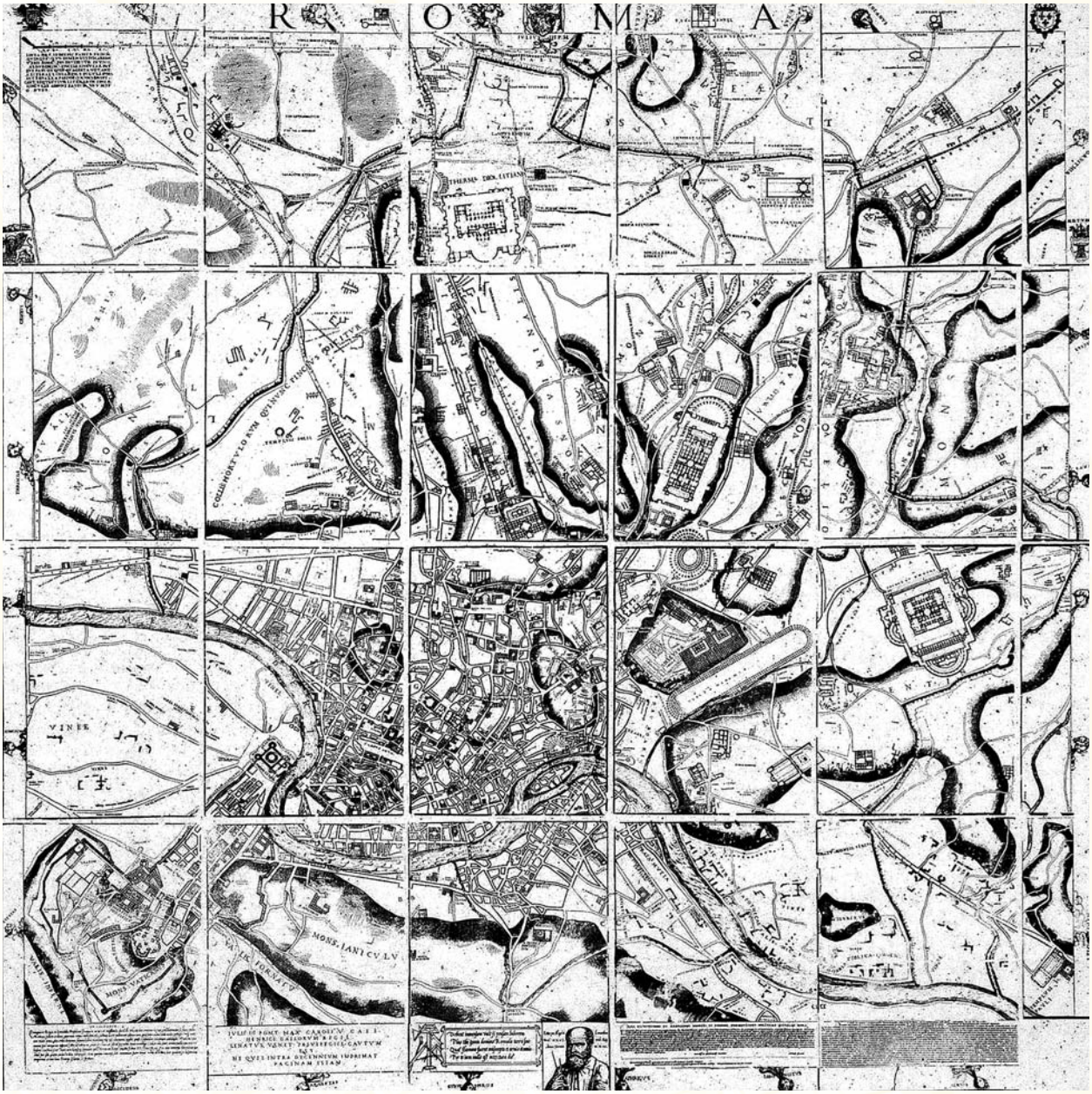
sional depiction within a scientifically accurate street grid. It is Rome seen from above, through a telescope, or a microscope, to use the metaphors which in the 17th century, the century of modern science, were often applied to urban cartography, constantly in search of technical advances.
Giovanni Battista Falda was the protagonist of this intense period of the publication of plans and views of Rome. Falda also produced hundreds of engravings illustrating the city's major monuments, churches, palaces and public works. At the same time, dozens of other engravers were at work with series production that became a specialised industry, equalled in Europe only by Dutch publishers, and in Italy by Venetian publishers.
In the 17th century, the dissemination of the cartographic image of the Eternal City coincided with the formation of many collections of engravings with views and perspectives of ancient and modern monuments, which in the whole of Europe provided the basis for the interpretation of views and architecture, thus promoting the growth of the modern monumental concept of cities. The engravers were Maggi, Falda and Venturini, followed in the 18th century by the phenomenon of the by Giuseppe Vasi's *Magnificenze* and Piranesi's *Vedute*.
Samuel Pepys is connected in various ways to the drawing up of the plan of London after the disastrous fire of 1666 which destroyed the entire City. The plan was drawn up with a campaign involving analytical measurement based on the scientific plan drawn up by mathematicians such as Christopher Wren and Robert Hooke, and published in 1676 by John Ogilby[1]. The original cartographic project aimed to provide London with an essential tool for information, also in relation to the presentation of rational, "modern" town planning, mostly based on the experience in the capitals of Continental Europe such as Paris, Amsterdam and above all Rome. In 1676, both Ogilby's iconographic zenith projection map of London – comparable, as Pepys recalled, with the recently published Gomboust plan of Paris – and Falda's bird's eye view plan of Rome were thus published. While the London plan is based on the need to provide information on the size of the private property in relation to the public streets, areas and function, intrinsically linked to the need for the correct and rational town management and planning, forming the basis for 18th century, Napoleonic and then modern land registers, Falda's plan of Rome, though impeccable in its general rendering of the topo-



Antonio Barbey. Plan of Rome. Engraving (1697), detail

graphic layout, highlighted a crystallised monumental magnificence, analytically distributed in a large number of street and building projects that made the beauty and modernity of Rome celebrated in the Europe of capital cities.

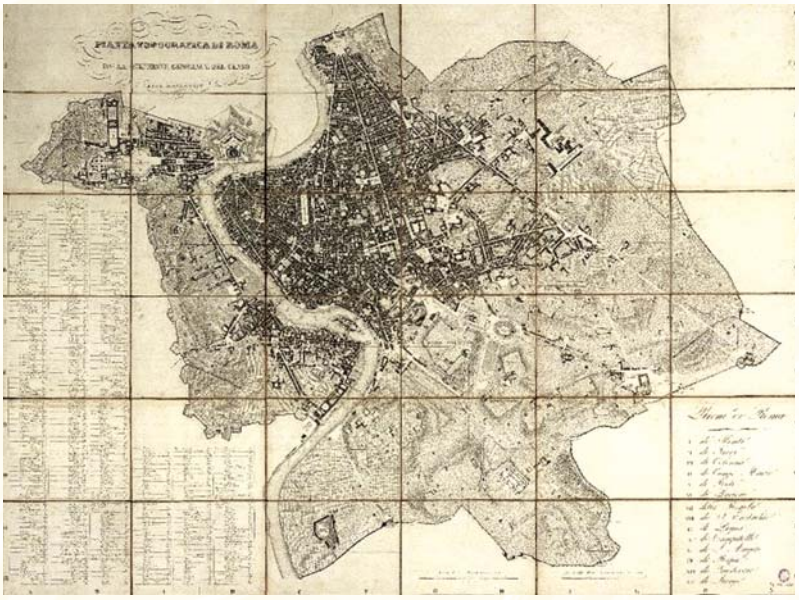
The two models of urban representation, exemplified in the 1676 London and Rome plans, were utilised throughout the 18th century. However, the planning abstraction of vertical projection iconography, due to its greater accuracy and its value as an objective, verifiable document, came to be recognised as the sole valid instrument for representing cities. Any type of views, from panoramas to axonometric projections, came to be considered as something



Leonardo Bufalini. Plan of Rome. Xylograph (1551)

valid only as an artistic product, bereft of any scientific accuracy. "Scientific" plans, the result of new, more accurate measurement processes, later culminating in the Napoleonic landed property register system, were considered in Europe during the Age of Enlightenment to be the only way for representing cities.

In 18th century Rome, though no longer in the forefront, was an extraordinarily active venue for travellers, the international centre of the Grand Tour, a great "Academy of the World", only one cartographic representation of the modern city was produced: the "New Plan of Rome" by Giovanni Battista Nolli, the surveyor from Lombardy, published in 1748 with just under 2,000 copies.



Pio-Gregoriano Land Register (1818-1820). Drawing (Rome, State Archive)

The operation started with the undertaking of a new, difficult survey (on the basis of the technical indications implemented in the Milan landed property register of Charles VI, where Nolli, from the Como district, was trained), as well as by a careful identification and comparison with historical maps (with the rediscovery - and relaunching - of Bufalini's Renaissance city plan); Piranesi, then only a youth, also took part in the proceedings.

The *New Plan of Rome* published in 1748 proved to be an immediate and lasting success. The work quickly spread (to London, Paris, Lisbon, Madrid, Amsterdam, Vienna, Warsaw, St. Petersburg, the "Indies" etc.), and was acquired by the major collections, museums and libraries.

It became a celebrated icon for its mapping accuracy achieved with surprising technical perfection, and for the wealth of data shown on the map and in the indexes to illustrate the complex reality of the city. The splendidly refined graphic features, its crystal clarity and its beauty as an engraving immediately turned it into a work of art, much sought after and collected; it has continued to fascinate Western culture, making it famous in Europe and America. It is a perfect balance between technical rigor and a highly artistic value, reflecting a landscape that was soon to be lost forever, a melancholy and sublime image of a metropolis with infinite "magnificent monuments" but immersed in an overall rural torpor, besieged by nature that had overgrown and ruined the remains of past grandeur.

Because of its accuracy, Nolli's basic mapping served for over a century as the cartographic reference point for all the new plans of the city, including the new landed property register map produced in 1818 by Roman surveyors on behalf of the Property Register Department. Even today, Rome's historical cartography from the 17th to the 20th century illustrates the problematic search for a balance between technical rigor, accuracy (a concept which is certainly not objective, but subject to constant change over the centuries), careful execution and a sense of the artistic. All these aspects have unexpectedly proved to be so vital in periods so close to our own, when the landed property register maps made after Italian unification required the surveyors to have both flawless technical abilities and great drawing skills. Now that the work is mostly done on computers, and the epoch of the surveyor-drawer seems to have definitively come to an end, the analysis, conservation and highlighting of the cartographic material related to the landed property register seems to be the last monument of a centuries-old tradition.

[1] R. Hyde, *Ogilby and Morgan's City of London Map, 1676*, in *The A to Z of Restoration London (The City of London, 1676)*, London 1992; M. Cooper, *'A More Beautiful City'. Robert Hooke and the Rebuilding of London after the Great Fire*, Stroud 2003.

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FROM THE CREATION OF MAPS TO THEIR DIGITALIZATION

Adriano Angelini, Giorgio Maria de Grisogono

Text of the address given by surveyors Adriano Angelini and Giorgio Maria de Grisogono on the occasion of the international Conference "The Plans of Rome. From the Baroque to the Land Registers", held in Rome at the end of 2010.

Angelo Messedaglia

PRE-UNIFICATION LANDED PROPERTY REGISTERS

One hundred and fifty years ago, in 1861, at the time of Italy's unification, there were 22 different land registers existing and applicable throughout the country, of which only eight were based on geometrical criteria, all the others being descriptive. The property values forming the taxable amount of property revenues were based on a variety of economic parameters, since the values were determined in various periods and involved the different currencies in use in the former States:

The land register in Milan (activated by Empress Maria Theresa of Austria) refers to the 1725 values;

The land register in Naples refers to the 1787 and the 1807 values according to the area;

The land register in Sicily refers to the periods 1821 and 1830;

The land register in the Kingdom of Sardinia refers to the period 1843-1852.

Moreover, the values were calculated with widely differing methods and criteria for estimation.

There was thus great confusion, a fiscal Babel further worsened by the use of different units of measurement and consequently the numerous scales used on the maps of the few, but widely differing property registers.

It was thus immediately clear that the unified nation had to undertake a great project for revising the landed property register and measurement standardisation, but some time was still needed.

In order to anticipate legislation for a broader property reform, a law defined as being for a "provisional supplement" was enacted in 1864, establishing a provisional land tax of 110 million lire. This amount was distributed over 9 categories, covering the provinces and municipalities, taking into account for each location the population density and the income of the property; the latter was quantified, however, on the basis of the reports by the owners, who were certainly not disinterested parties. While the State achieved the aim of collecting the "provisional supplement" tax, it undoubtedly failed to achieve a fair and acceptable distribution.

THE MESSEDAGLIA LAW

Law n. 3682, drawn up and proposed by Angelo Messedaglia, a major scholar in the legal, tax and statistics fields as well as literature, which he cultivated with enthusiasm, associating with authors like Giosuè Carducci and Antonio Fogazzaro, was not enacted until 1886.

Under this law, the New Land Register was set up to replace the old registers from the pre-unification period, and the Urban Property Register was created as a development based on the Urban Property Register created nine years earlier.

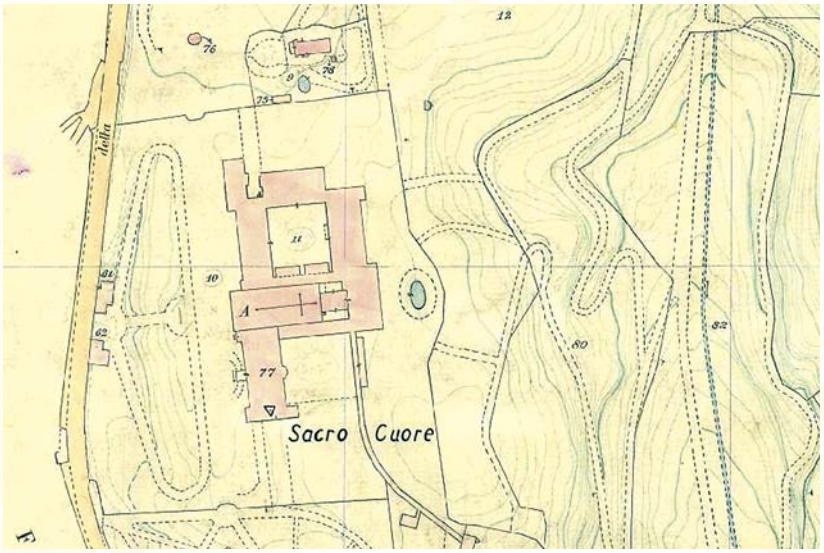
The first two articles of this fundamental law stated:

"The landed property register shall be geometrical and based on parcels, based on measurement and estimates, with the purpose of ascertaining the real estate properties and recording their changes".

"The purpose of the measurement will be to survey the shape and extension of the single properties and of the different property register parcels, and to represent them on geometrical maps connected with trigonometric points".

"The area of urban buildings and other features not subject to land tax shall also be recorded".

You will see that three short phrases have been underlined: *"…recording the changes in the properties…"* – *"…represent them on geometrical maps connected with trigonometric points …"* – *"The area of urban buildings and other features not subject to land tax shall also be recorded"*.
We have highlighted these phrases since they will provide the basis of this discussion, though in the opposite order.



Extract of official map, sheet 361, Municipality of Rome (detail)

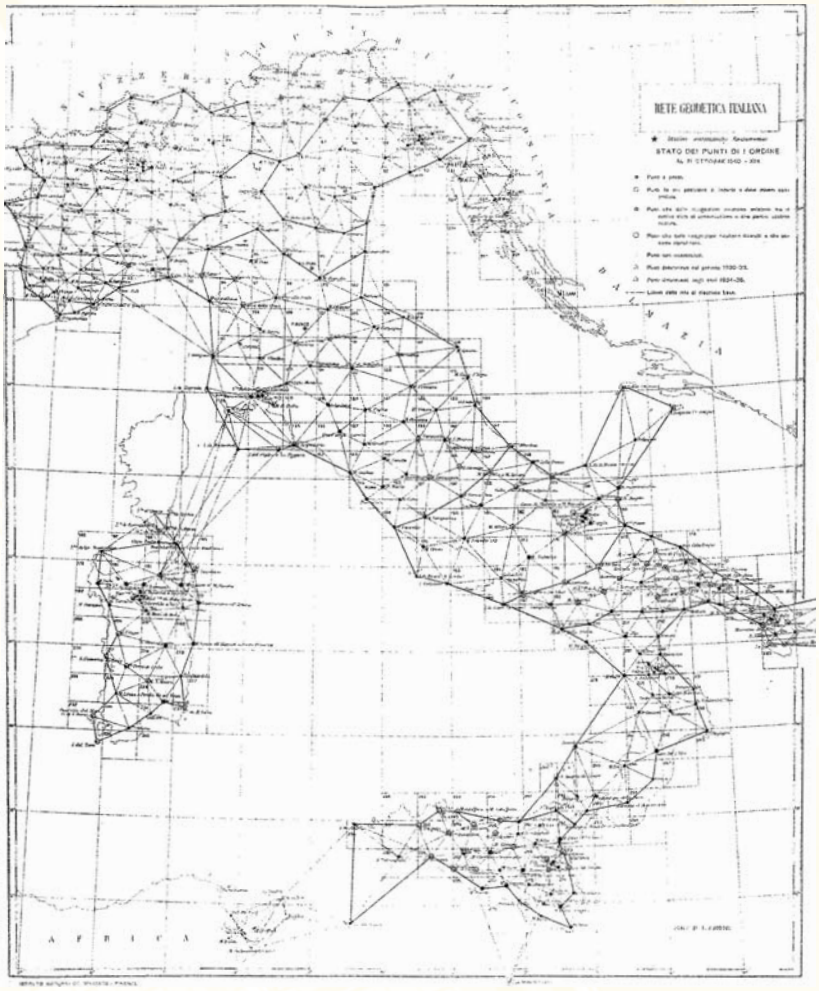
FORMATION OF PROPERTY REGISTER MAPS

In providing for the survey of urban buildings and buildings not subject to land tax, the law requires that the property register maps must no longer simply be the mere representation of agricultural land and rural building to be subjected to land tax, and become a system of mapping representing the territory, with and accurate and rigorous representation of the characteristic and distinguishing features.
The maps not only show features like roads and rivers, but also urban buildings subject to a different tax liability, and exempt structures like churches, monuments and ruins.
This led to the production of those little masterpieces, now called "mappe d'impianto" and previously referred to as "canapine", measuring 100 by 70 cm, on a heavy hempen cardboard to prevent distortion.
The sheet has parameters forming a grid of squares measuring 10 by 10 cm to facilitate the placement of the survey points and to make it easier to read the graphic coordinates.
The mapping system used is called Cassini Soldner.
The points surveyed were then entered on the map by pencil only, with the help of goniometers and rulers, and with the measurement and sketch notebook used during the survey, the single parcels were drawn. After the drawing of the parcels and other survey lines, they were numbered and their areas calculated.
After these stages were completed, all the lines were drawn over with India ink, and the representation was completed with the internal labelling of place names, and with external labelling to indicate the province, the municipality, the number of the sheet and the number of the adjacent sheets, the map scale and the coordinates of the reference parameters of the sheet.
The last phase was using water colours to colour the roads, buildings and rivers.
From then on, the sheet, or rather the grid of the sheet, could no longer be altered; a transparency was then made, drawn in India ink, to be used to show updates, and from this the heliotype copies would be made for data extracts and for sale.
At that time the ultimate need for the maps was for taxation purposes, but the extreme details of the drawings, the perfection of the captions and the colour balance of the representations, reveal the laborious activity involved in the survey, investigation and search for geometrical precision that were the factors undoubtedly inspiring those who did the work, with a result that actually showed the dynamic

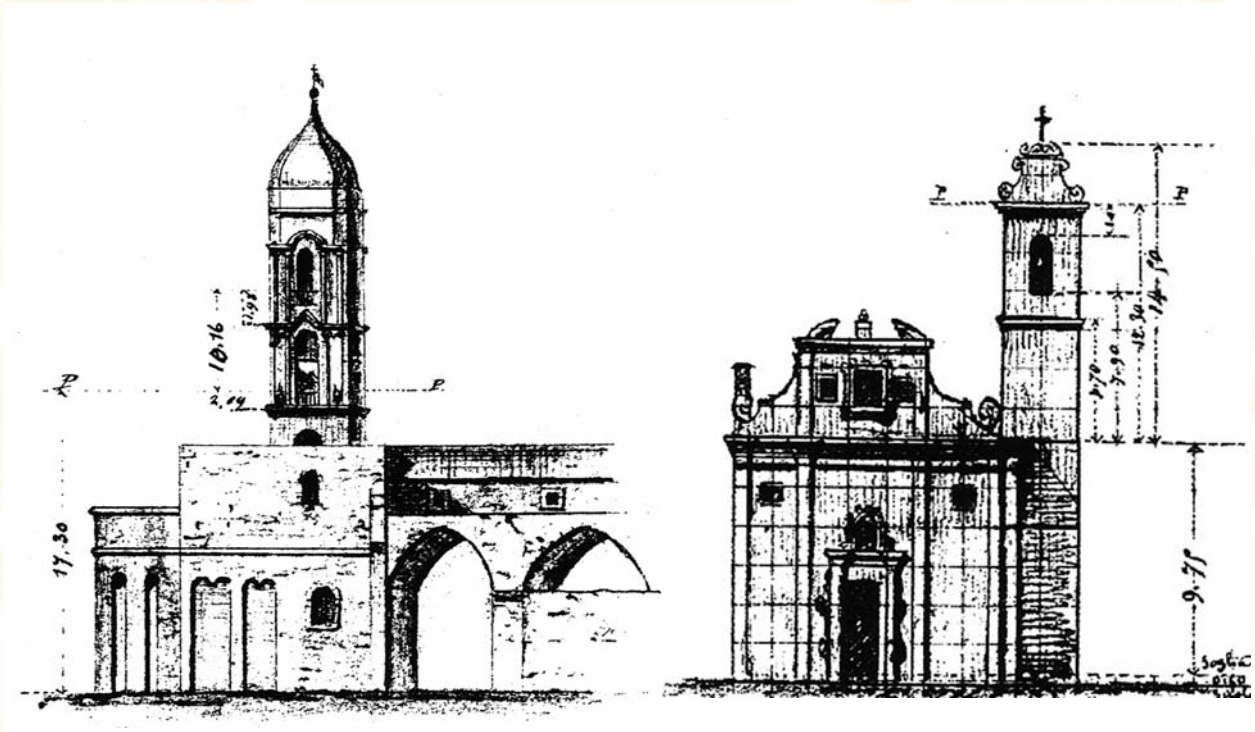
beauty of the countryside, the roads, the houses and the landscape.
Today, these maps are still often fundamental for our technical work, but they are also miniature masterpieces.
Some of these masterpieces still show the name of the author and date of completion carefully noted in pencil in the left-hand margin of the sheet.

THE TRIGONOMETRIC NETWORK

The second strong point of this property register mapping is the linking to trigonometric points specified in the law.
From the political point of view, we might say that the aim was to represent the unified nature of Italy through highly detailed mapping, as well as by a single geodetic reference network.
From the technical point of view, the mapping aimed to achieve a perfect (as far as possible for the time) a geographical connection between the property register maps all over the country, from Piedmont to Sicily. We can only imagine how difficult this was if we recall how long Italy is, and therefore to what extent the grid could be subject to distortion.
Before Italian unification, the confusion of the States was accompanied by an absolute confusion between the mapping systems.
One of the first measures was to set up the Higher Office for Geodetic, Topographic and Military Works, part of the Army General Staff, maintaining as a detached section the Royal Neapolitan Topographic Office of the Kingdom of the Two Sicilies.
Enormous work was involved in unifying the survey methods and the linkage of the few triangulation points already identified.
The new map of Italy was completed in 1876, after the Office for Geodetic works was converted into the Military Topographical Institute, which later became today's Military Geographical Institute.
It is easier to talk about than to set up a trigonometric grid, since the survey operations for each point had to be made under particular weather conditions and for entire days; to this we have to add the time required for travel since, in order to be able to see two other points from each point, they often had to be placed at high altitudes.



The Italian trigonometric network, 1940



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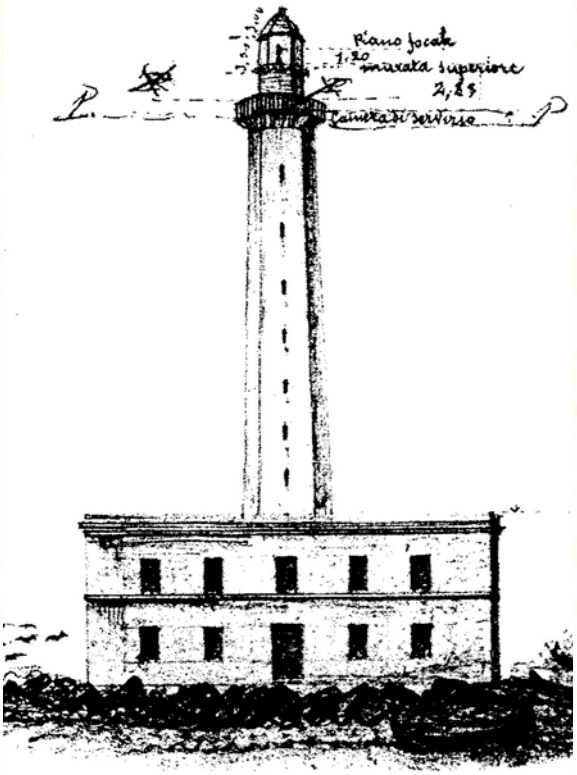


Faro di Bari

Here we can see some of these beacons acting as trigonometric points.
These are some of the ones in Puglia that have been published in a fine book promoted by the Lecce College of Surveyors.
Also in this case, we can see the great detail of the mapping, which often goes beyond the schematic character of geometrical drawings to achieve levels of detail which even today are useful, also for the reconstruction and restoration of buildings that time has damaged.
Besides the detailed indication of these points, there is also an accurate description in the "summaries" filled in by the topographers for each point; this description regards the site, how to reach it and with what means, how to work there, how to spend the night after a day of work and everything else necessary for those seeking those sites for further unending operations.
Here is a short version of two of these "summaries":
S. Maria di Leuca Telegraph: *this telegraph is located on a mountain that goes steeply down to the sea. It is a fine point because it has a view of the entire coastline up to the Otranto lighthouse ... it is half and hour from Gagliano by road, part mule-track and part footpath ... The station can be in the shed. There is no need for a ladder, a chair is sufficient. The air is good. It should be pointed out that there is no inn in Gagliano and the village has no facilities. The mayor is a farmer, and should be spoken to in terms suited to the circumstances... in order to be understood. (Capt. Del Giudice, 24 July 1872).*
Otranto, Cathedral: *Axis of the station erected on the bell tower of the Cathedral ... On the top, the short pillar was constructed where a station can be made in the centre, but with the help of a small passage, more for individual safety than for necessity ... The air is very poor, the main cause being the Alimini marsh and lake. In Otranto, however, they assert that this is a libel and that the air is fine. Currently there is also rather serious smallpox. (Capt. Del Giudice, 15 July 1872).*

After suitable and necessary operations for the filling in and conversion of the system, the property register inserted its networks and sub-networks into this geodetic system to create the grid including all the register map sheets and connecting them numerically.

DETAILED SURVEYS

The detailed survey operations were conducted by linking trigonometric points with polygonal figures that we can briefly define as sequential alignments with the measurement of the distances of the sides and angles they form from those formed in the vertices. The vertices are chosen with criteria designed to reduce the "systematic" survey and positioning errors, thus favouring subsequent detailed survey operations.

Various instruments are used for these operations, according to the type of survey to be conducted and to the continuous technical improvements and the strong interest in innovations.
In the beginning, the main tool was still the plane table, the same one used by Nolli, but in which the sight with threads was replaced by an alidade designed for indirect measurement, through the readings on metric scales on a stadia, the distances between the observation point and the point to be represented; surveyor's chains, three-metre measuring sticks and squares were still used.
Later, they used tachymeters that could simultaneously measure horizontal and vertical distances and angles.
Aerial photography was not neglected, and this method was used in the 1930s for creating the maps of the provinces of Terni and Viterbo.

THE CONSERVATION OF THE LANDED PROPERTY REGISTER

The work was enormous, and lasted 70 years instead of the 20 that had been estimated, since the two wars in the 20th century could not be taken into account.
The creation phase of the landed property register, which did not only involve survey operations and the drawing of maps, but also all the operations for value estimations and classification of land and the preparation of the registers, was

completed 1952 for all of Italian territory except for the provinces of Trieste and Gorizia; another four years of work was required there due to border disputes with Yugoslavia, which after World War II had already acquired Istria and the Italian enclaves of Ragusa, Spalato and beautiful Zara.
From that time on, the landed property register entered the conservation phase, but a dynamic type of conservation.
We can, in fact, recall that Art. 1 of the 1886 law stated that the purpose of the landed property register is to ascertain real estate property and put the changes in evidence.
It is obvious that the triple link between the map parcel number, its nature and its ownership must be constantly updated when a change occurs in one of these three items.
In the early conservation period, it was considered sufficient to undertake the 5-yearly inspections (the municipalities of a province were subdivided into five groups, with one year of work being done on each one). It was soon realised, however, that the time required could no longer be reconciled with the demands on the management which was barely sufficient. Therefore, in the 1960s and 1970s a new phase was started, with the involvement of owners or possessors interested in having the records updated by experts certified as professional surveyors.


Laser scanner

SURVEYORS ARE AGAIN PROTAGONISTS

At that time, surveyors were the professionals most widely distributed throughout the country, and soon became the protagonists of this new phase. Their natural vocation and concern for technological progress both in the area of surveying instruments and in the automation of calculations and mapping provided a major stimulus to the civil service.
The traditional theodolites and tachymeters were gradually replaced by full stations containing electric and optical instrument directly and simultaneously measuring angles and distance using infrared rays and laser beams with immediate recording of data.
For some years, the decrypting of satellite signals has allowed for use of GPS to identify points of topographical interest through a sort of multiple spatial intersection between the satellites and the mobile device receiving their signals.
Today, the latest frontier of surveying is the laser-scanner. Without going into technicalities, we can say that it works by filling space with a cloud of points that stop on the features which form the feature being surveyed, determining its shape and position with respect to the centre of the instrument, and enabling the reproduction of these features on an analytical basis.

The land register has, though more slowly, adjusted to technological developments, with the computerisation of its databases and the creation of computer programs to impartially ensure the correctness of the updating. This now enables professionals to directly update the databases and the computerised mapping, which has been digitalised and converted into numerical sequences identifying the vertex points of the property register parcels, their nature and quality and their size.

NEW MANAGEMENT TOOLS

More goals can be achieved by the integration between the land register mapping and high definition aerial photography, the so-called orthophotography.
The functions of the landed property register are increasingly correlated with those of the local authorities dealing

not only with physical aspects but also environmental policy, town planning, disaster relief, as well as the protection of the territory and the enhancement of its value.
Since 2005, the land register database managed by the Agenzia del Territorio (the landed property registration authority), coinciding with what was once the landed property register, has been declared by law to be of national interest, and its data can be utilised by all the branches of the civil service through interoperability processes.
The development of specific technologies has led to the initial stages for creating GIS (geographical information systems). By clicking on a parcel in the land register, it will thus be possible not only to know the size and/or assessment data, but also to know if the parcel is crossed by service networks, the town planning status and whether the owner has settled tax requirements. The same applies to buildings, so that it will be possible to know the building authorisation documents, the number of real estate units, their use and the utilities.

CONSERVATION OF HISTORICAL MAPS

We stand firmly planted in the present with our eyes looking towards the future, but due respect is required for what has been done in the past; this respect means the need to protect and preserve the original survey maps, which still form an information resource of incalculable technical, legal and historical; they are still indispensable, for example, in order to solve boundary disputes.
In continuing the operation for the digitalisation and GSI referencing of the original survey maps recently started by the Agenzia del Territorio, many surveyors' associations have, at their own expense, digitalised the maps for their local area.
A few months ago, the surveyors' associations in Lazio have completed the digitalisation of over 18,000 image document including survey maps, annexes and triangulations! This enormous work has been completed by involving numerous young colleagues as volunteers, and with a financial commitment hardly covered by the virtually symbolic contribution from the Lazio Region for this major operation.

CONCLUSIONS

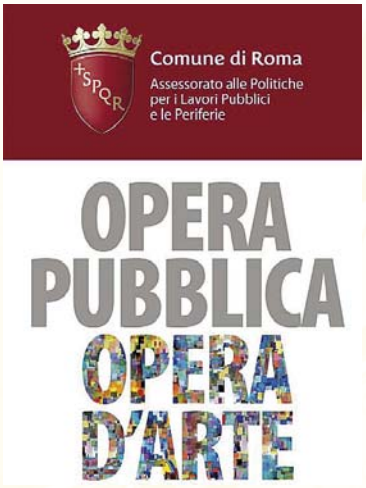
No-one can deny that surveyors have been the most active protagonists of this long history, and that they are still willing to pursue this role in the future, making available their knowledge and skills, their patience and the their strong, indissoluble link with their local area and with society.
This is because survey operations have always been a way of acquiring ideal possession; it is as if by the sole fact of giving shape and size to the land, using a type of geometry made available to others for ordinary legal or fiscal needs, the topographer somehow retains and interiorised the basic essence of the territory, the magic that attracts man to a place, the same magic that convinces him to settle there to build first one home, then another, and then the town that soon grows into a city and finally a metropolis.

[GEOPUNTO N. 34/10]

PUBLIC WORK, WORK OF ART

Vittorio Meddi

On the occasion of the Conference entitled "Opera pubblica, Opera d'arte" (Public work, Work of art), promoted by the Department of public works of the Municipality of Rome on 16 April of last year at the Central State Archives, a roundtable involving experts from the sector to discuss the subject: "The quality of works, from the experts' viewpoint". The surveyors category was represented by Vittorio Meddi, council member of Rome College of Surveyors, whose address in published here.



First of all I would like to again thank, on behalf of Rome's surveyors, councillor Fabrizio Ghera, who actively sought our participation in this roundtable. The title of this appealing and stimulating initiative immediately grabbed our interest. We wish to bear witness here to the day-to-day experience of surveyors in the sphere of public works, also in view of the particular nature of our category, which works chiefly in the smaller Municipalities, where there is only one tender manager, notwithstanding the many facets and steps involved for the completion of the public work.

One aspect of the meeting that appeared to us to be of great interest was that of giving the sector's actors – Acer, Federlazio, surveyors, engineers and architects, i.e. all the main protagonists – the opportunity to get together and debate the subject of public works, a very topical subject directly involving citizens and worthy of special attention.

The Councillor's inspired idea, which gives a unique flavour to the event, is contained in the intriguing and brave pairing: PUBLIC WORK/WORK OF ART. A match which, upon first hearing it, evokes a time in the distant past when *"by the book"* had a real and constant meaning in the public works sector.

Today, unfortunately, there is a widespread negative perception among citizens of the public works sector, presumably because of the accumulation over time of negative experiences in this sphere, which have gone to create a lack of confidence and an opaque atmosphere, an ideal habitat for criminal activity. Even so, there is a feeling that citizens are searching for values and respect for the *"genius loci"*, i.e. the special atmosphere of a place, something that a professional must be able to identify in order to make the place where people live a comfortable one. This is a central issue with reference to the aim of the public work, which is basically that of providing greater wellbeing. Art. 2 paragraph 1 of Law 109/94 defines public works as follows:

"Public work is taken to mean the construction of structures (usually in areas acquired through expropriation) at the expense of the community by bodies such as the State, Region, Province or Municipality, that are to be used by citizens, i.e. structures intended to further the public interest".

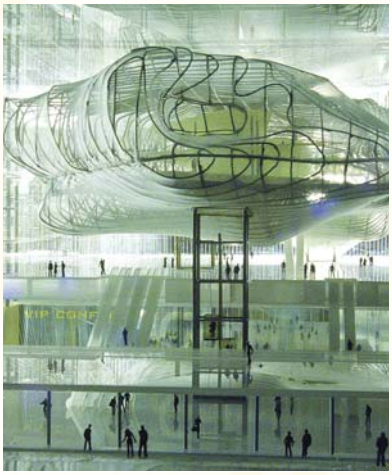
We like to believe that a work is public not only due to the nature of the constructor and the funder of the initiative, but also when its function is in response to the demands of a group of people. Roads, stations, railways, airports, prisons, schools, aqueducts, etc. are in the public interest when their existence is really perceived in terms of the welfare of citizens. It follows that, should this vital requirement be missing, and even though the structure may have been built by a public authority at the expense of the taxpayer, the product is devoid of the value and the status typical of a public work.

A study of the subject points to the following definitions:

Public work: intervention in the territory whose aim is to meet the needs of the community operating in its scope of action.

Quality public work: when the degree of satisfaction expressed about the public work is high and optimal in terms of

participation, sharing of goals and results achieved.
Work of art: when the technical solutions adopted materially satisfy the needs of the community and also produce creative forms of aesthetic expression capable of transmitting emotions; these may derive in part from users' perception of wellbeing and security.
It clearly emerges from this outline that the distinctive element of the public work is that of furthering the public interest, which in turn allows the possibility of resorting to special procedures and laws to aid the realisation of the public work (expropriation, services conference, etc.).
On this complex and important matter we agree with the need expressed by the Municipality of Rome, especially at this time of scarce resources, to examine the current situation with the involvement of the protagonists, from the author of the proposal to the building contractor.
Many actors are affected by the outcome of the work:
- the public authority, as author of the proposed work and the body responsible for the regulatory system;
- the expert responsible for the procedure (Tender Manager);
- the Designer:
- the Works Supervisor;
- the Building Contractor.
It has also been seen, over time, that working *"by the book"*, which ever since medieval times has seen works performed "in a workmanlike manner", or "to the highest standard", has increasingly lost importance in relation to growing "political" or "social" needs.
It is no coincidence in this respect that the quantity and not the quality of works is now considered as being a predominant factor when evaluating the operations of an authority (Municipality, Province, Region, Government). Another emblematic aspect is the debate going on in recent times that assigns to public works a chiefly "social buffer" function, which produces temporary and limited effects, downgrading the true purpose of the work, which is that of improving the living conditions of citizens in the long term.
All of the above phenomena highlight an underlying shortcoming, namely a lack of planning. This is one of the main causes of resource depletion and of the Authority in question shying away from the task of identifying and determining the priorities of the work through a global analysis.
The planning process has lost in effectiveness since it has been separated from financial resources, consequently the realisation of the work is linked to the opportunities arising from funding laws regardless of actual priorities. There needs to be an immediate reverse in this trend and this method, with the local authority restored to its rightful role, that of selecting and planning works, also with reference to the number of Authorities that have operational competence, from the Municipality to the Region and even the EU. In short, the three-year plan for public works, a document preceding the approval of the relative budget, should not be seen as simply a bureaucratic obligation but as an essential tool for allocating resources.
Carrying on with our analysis, the regulatory system is too


The "Nuvola" by Fuksas, EUR


The City of Sport, Tor Vergata - Rome, by Santiago Calatrava


Recovery of the Aquila Cinema in Rome

often based on "*mood swings*", the result being that, over the past fifteen years, from Law 109 of 1994 to legislative decree 163 of 2006, we have seen a succession of provisions that have only served to destabilise the regulatory framework and to confuse the sector's players. Obvious contradictions have often resulted in effects at odds with pursued objectives. A prime example is that of the method adopted for design assignments.

It is only fair to highlight the parts of law provisions that have had a positive effect, such as art. 47 of Presidential Decree 554/99 concerning project validation, and art. 7 of Law 109/94 and art. 5 of Law 241/90 on the figure of the tender manager, and art. 8 of Law 109/94 regarding companies' quality systems.

Provisions whose quality objectives are rendered futile by the use of "lowest bid" tenders, leading to tenders awarded thanks to unimaginable discounts, close to fifty per cent, for both works and design services, are an evident symptom of a malaise that should cause everyone involved to cast a critical eye over the situation.

Monument to the Fallen of Nassirya

Contractors are required to reappraise the purely opportunist approach to public works, to invest in quality, to be aware of the contingency factor included in regional rate tables, for profits and overheads, which is generally put at around 25%. They must also act to downsize disputes with the commissioning body; the dispute instrument has become overused, and is often improperly used as a source of income. I believe that this phenomenon is fuelled by the tendency in recent years to gauge the suitability of the contractor more on its financial soundness than on its construction capabilities. Actions have been taken in this area with the recent creation of the pooling instrument, through which bidders for tenders called by the P.A. may, in order to demonstrate they meet the economic-financial and technical-professional requirements of a given call, refer to the capabilities of other partners, presenting the latter's formal commitments to the project in question.

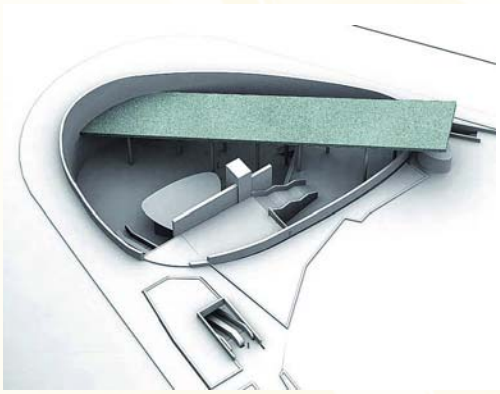
Designers too are not blameless if one considers that one of the most common practices during the execution of public works, is that of making design *alterations* during the construction phase, an unequivocal sign of inadequate preparation.

To combat the use of *alterations* the legislator has introduced mechanisms to deter this practice, seeking to eradicate or at least reduce cases only to those that are really necessary. For instance:

1. Articles 25 and 29 of Law 109/94, articles 134-135-148 of Presidential Decree 554/99 and art. 132 of Legislative Decree 163/06, establishing rigid parameters within which one can resort to an *alteration,* as well as design error regulations;
2. Art. 47 of Presidential Decree 554/99 (*validation)*, art. 5 of Law 241/90 and art. 7 of Law 109/94 (*tender manager*) defining the figure that is to supervise the work and express an opinion on the operation of the designer;
3. Art. 16 of Law 109/94 and articles 18-25-35 of Presidential Decree 554/99 – Design levels and content.

It appears evident that the above law provisions have a control function within the procedure, and betray an ele-

The City of the Other Economy, Testaccio (by Luciano Cupelloni)


Annibaliano Station, Rome Metro B1

ment of mistrust towards the professionals involved. Here we are called upon to respond with a sense of responsibility and strong commitment, both individual and for the category as a whole. And we must act quickly, because after over ten years, despite the rigidity of these norms, tender procedures continue to present design shortcomings and, consequently, a continuing widespread use of design alterations, which are harmful for the designer, for the category as a whole and for the community.

This situation leads us to stress the importance that all protagonists operating in the sphere of public works must be clearly aware of the important role they play in representing the community. This responsibility requires them to possess the requirements of technical expertise, correct knowledge of and respect for *genius loci* (designers), *by the book* knowledge (contractors) and possession of *insight* (administrators). In addition to these requirements it is essential to know about and conform to **ethical** principles, to ensure the necessary transparency and correctness of one's actions.

In light of the many lights and shadows of this analysis, one question is inevitable: is it possible to talk about public work/work of art? We are in no doubt this is possible, and believe that the dark points are the result of indifference and poor use made of power delegation. For this reason, as a professional category we appreciate the initiative of the Municipality of Rome, and we intend to make our contribution, with the means at our disposal, so that the protagonists of public works understand the importance and responsibility of the tasks entrusted to them.

Restoring a certain quality to public works must be the overriding objective of surveyors, since it is only by seeking quality that a work of art can be created. This can happen when the work succeeds in communicating, both directly and indirectly to the user, facilitating the perception of security and wellbeing as well as satisfying aesthetic needs. It is not easy of course to attain such a high goal, a fact confirmed by the words of art historian Sergio Bettini: *"one infinitesimal variation is enough to make of a masterpiece a near miss"*. According to the same principle an infinitesimal variation can make a work a masterpiece.

The importance of the role of our category in terms of responsibility is unquestionable, and thanks to lifelong training and education on technical matters surveyors' skills are growing continuously, while the tasks of the surveyor are increasingly being likened to those of a public service (DIA and DOCFA documentation, occupancy, responsibility for the tender procedure). Again based on ethical principles, this role requires the expertise and awareness that are fundamental for the realisation of a **public work** which, with an infinitesimal variation, can become a **work of art**.

[GEOPUNTO N. 25/09]

NOLLI: A LOVE STORY

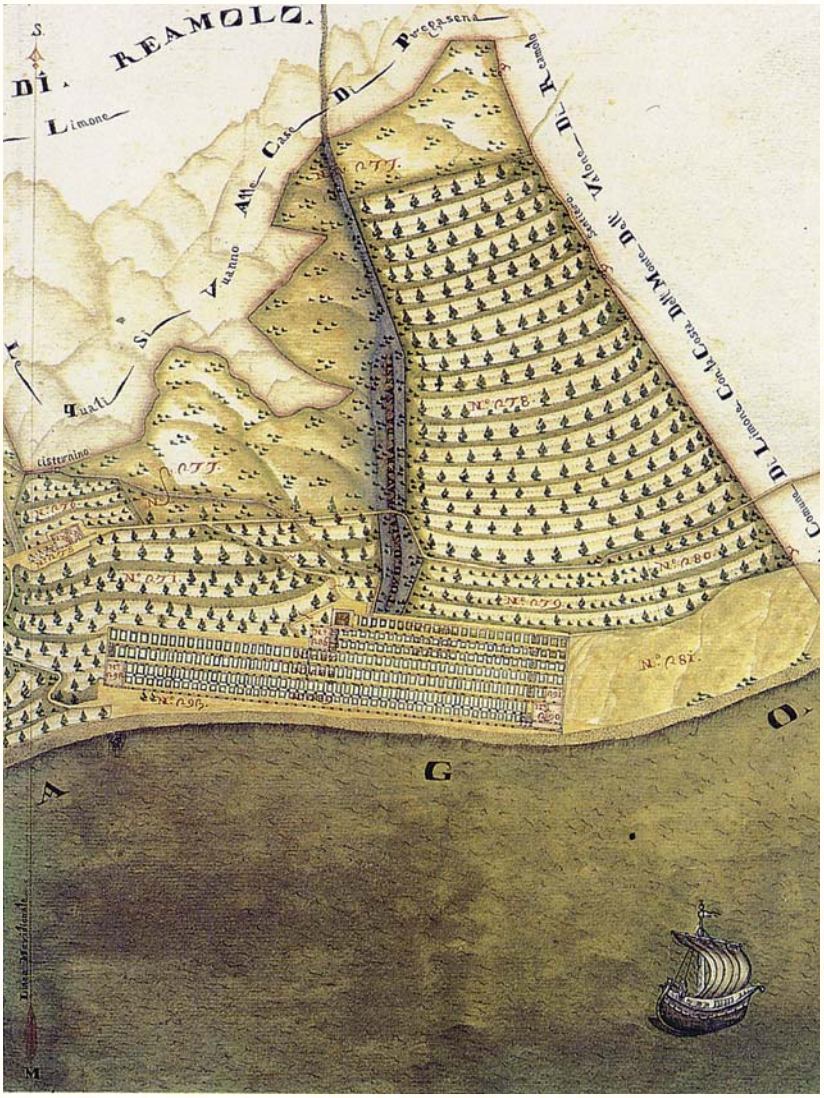
Giorgio Maria de Grisogono

We certainly cannot claim to be making news when we proclaim modern-day surveyors' love for Giovan Battista Nolli, a passion they have shown in the past by actively seeking the publication of Prof. Mario Bevilacqua's book *"Roma nel secolo dei Lumi"* (Rome in the 18th Century). Nolli for his part was very proud of the title (of surveyor), and indeed wanted it inscribed on his gravestone.

It is therefore a mutual love affair, transcending time, and is surely one of great satisfaction to his modern-day professional heirs.

To study the reasons for this mutual passion one should go back to the history books, and not only history books, and project oneself towards the cultural and scientific climate of the age, whose influence still affects our way of seeing things, and our way of living and acting.

Just a hundred years before Nolli, between the Renaissance and the Baroque, Galileo Galilei was defending – insofar as humanly possible – with scientific cognition and experience, the heliocentric theories of Copernicus, and attracting the wrath of the Catholic Church, a symbol of the political and cultural despotism of the aristocracy that prevailed in Europe at that time, in cahoots with the absolute monarchy.



G.B. Nolli, Map of Cabreo Bettoni, 1724-25

Galileo planted the seeds for that ideological and cultural revolution that would germinate in 1688 in England and fully blossom in 1789, a century later, with the French revolution.

An age-old plant that would gain fresh sustenance from reason, scientific research as well as cultural, political and social studies. The bourgeoisie was the patient gardener seeking redemption and the light that cancels the darkness of the dogmatism expressed every more shakily by the clerical and noble classes, who sought to protect their privileges, in-

tellectual and otherwise. So the light slowly and gradually came into being, with the establishment of reason and science, prudent for D'Alambert, more daring for Diderot, but who would together unite – taking advantage of the heavyweight collaboration of figures such as Montesquieu, Voltaire and Rousseau – to produce the first *"Encyclopédie"*, the philosophical epitome of the 18th century.
It was in that climate of great cultural fervour that Nolli grew up, participating first in the creation of the Lombardy land register (called the Teresiano Land Registry), the first example of large-scale application of the geometric and parcel-based system of the rigorous land survey. And it was here – in the school of Marinoni – that our illustrious colleague of the past got to grips with the plane table that had, over the previous decades, replaced the surveyor's cross, allowing for more accurate definitions of alignment, and the simultaneous performance of surveying operations and graphic representation of measurements. This indeed was the biggest innovation of this new invention, comparable today only with aerial photography and map restitution.
After other experiences, Nolli came to stay in Rome, a city that was still a few steps behind the cultural progress being made elsewhere at that time. Being a good surveyor

G.B. Nolli, New Plan of Rome, detail

Nolli was able to perfectly gauge the needs of the time within the city context. He proposed and was entrusted with the job of surveying the city for a new plan that combined the geometric rigour of topography with respect for ancient vestiges, which were depicted in full detail. Then there was the immediate identification of Rome's basilicas (Holy Year was coming up) and churches, and of their internal representation.
Indeed, he managed to do more than even he might have imagined possible from a technical and scientific point of view. And perhaps frightened at this success, he gave in to the Baroque temptation, and dedicated more than a quarter of the twelve plates to a frame-

G.B. Nolli, New Plan of Rome

work of allegorical representations, where the influence of Piranesi is recognisable and where, at the centre of the left side, a false fold in the paper (similar to the creases made by all pupils in their exercise books) has the apparent intent of making the work more humanly acceptable even to those unable to appreciate the mysterious and intriguing beauty of geometric representation.
The plan of Rome was a success, and became a template for all the subsequent experiences that would see the emergence of a new professional category: the land surveyor became a surveyor, with the opening of the first schools of a new profession which, while having its roots firmly planted in the past, became established thanks to its ability to come into closer contact with the territory it measured and surveyed.
So it is bearing all of the above in mind that Rome's surveyors wish to celebrate Nolli by helping with the production of the exhibition "*Nolli, Vasi, Piranesi. Immagine di Roma Antica e Moderna*" (Nolli, Vasi, Piranesi. Images of Ancient and Modern Rome), which will be inaugurated at the end of November 2004 at Palazzo Fontana di Trevi.
We love Nolli for all the reasons given above, and as a mark of our esteem want to be the first in line in celebrating his work.

[GEOPUNTO N. 04/04]