

ARCHITECTURE, ARCHAEOLOGY AND CONTEMPORARY CITY PLANNING

"State of knowledge in the digital age"

PROCEEDINGS

editors: Giorgio Verdiani Per Cornell Pablo Rodriguez-Navarro

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ARCHITECTURE, ARCHAEOLOGY AND CONTEMPORARY CITY PLANNING

"State of knowledge in the digital age"

The workshop took place in Valencia, Valencia, Camino de Vera, Universitat Politècnica de València, School of Building Engineering (Escuela Técnica Superior de Ingeniería de Edificación) Building 1C, first floor, boardroom.

Workshop organizing committee: Pablo Rodriguez Navarro, Giorgio Verdiani, Per Cornell

The workshop has been realized in collaboration between Universitat Politècnica de València, Spain, the Architecture Department of the Florence University, Italy, the Department of Historical Studies, University of Gothenburg, Sweden.









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FROM *PORTA ALLA CROCE* TO *PIAZZA BECCARIA*THE EVOLUTION OF FLORENCE FROM CITY TO CAPITAL

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Abstract: The object of this paper is the study of an area in Florence, the *Mattonaia* Quarter, with the intent to analyze its transformation after one of the fundamental events in the history of this city: namely the proclamation of Florence as Capital of Italy in 1865. In the end, the analysis will reconstruct the quarter through a graphic representation and the construction of a three-dimensional model. The result will be a "photograph" of the area in two separate moments: 1855, just before the master plan designed by Giuseppe Poggi started expanding the city, and the years following 1870, as the work progressed. Piazza Beccaria, once known as Piazza alla Croce, is particularly studied because it is the focal point of the transformations made by Giuseppe Poggi. This reconstruction is based on the analysis of several fonts, among them being historical maps, documents and drawings by Poggi, photographs and landscape paintings by artists from that period. Thanks to this information it was possible to make graphic reproductions of the entire area. They enabled the distinction of the documented parts from those which are fruit of a procedure of deduction and hypothesis because of lack of detailed information. We can see the transformation of this area, from an expanse of vegetable gardens, fields and gardens, surrounded by the streets of the guarter border and to the North by the ancient walls, almost like a rural area, in an extension of the city center, with a dense mesh of new roads which creates a series of blocks built for residential use. Following the demolition of the walls and the creation of Viali di circonvallazione by Giuseppe Poggi, the city of Florence opened to the outside, including a large amount of neighboring communities and expanding its borders in a consistent way, turning from city to Capital of Italy. Finally, two plastic figures were constructed by means of a 3-D printer to the scale of 1:1,000 which reproduced the two situations of the Mattonaia Quarter. This method maintained the differences described by using a different level of definition in the 3-D model

Keywords: *Piazza Beccaria*, Giuseppe Poggi, *Mattonaia* guarter, Florence, 3d printing.

The Mattonaia quarter

The area of interest in this process of reconstruction is the Mattonaia quarter, located north-east of Florence (Fig. 1), bordered on the north by the ring road Viale Giacomo Matteotti, originally occupied by the walls, up to Cimitero degli Inglesi, where once was the ancient Porta a Pinti. This way Borgo Pinti is the northwest border. From Borgo Pinti to Piazza Beccaria the neighborhood is bordered by Via dei Pilastri, which continues with the Borgo la Croce. crossing Via della Mattonaia, which originally extended only in the north of the district. After work on the enlargement of Florence has been stretched to the south, overlooked by the market of Sant'Ambrogio and the

complex of *Santa Verdiana*. It wanted then to extend the area of the analysis also in this block, to highlight the development of *Via della Mattonaia* and changes in neighboring spaces, still important for the city.

The edge of the area is Via dell'Agnolo.

Taking analysis in various historical documents, such as plans, drawings, paintings and photographs, we tried to trace the evolution of this neighborhood, up to the situation closer to changes in the project of Giuseppe Poggi.

Fonts, Hystoric maps

First, the search began with a series of historical maps from the late '500 to the mid-800. The first map that was consulted

is 1584 by Stefano Buonsignori. It is about a perspective view, which has already provided some important information about the shape of *Porta alla Croce*, the walls, the subdivisions in gardens and courtyards, as the various elements of fortification towers and ramparts. The drawing reproduced with remarkable fidelity buildings in their elevation. It is a true geometric construction, where streets and squares are drawn according to their proportions in horizontal projection, while the elevation is reproduced in perspective.¹

In the plan it can be seen as the neighborhood was bounded in part by the walls, interspersed with aates and towers. including Porta alla Croce and Porta a Pinti. The neighborhood appears underdeveloped, with an expanse of fields and orchards in the interior, and bordered by a series of houses and buildings, with their courtyards, on Borgo la Croce and Borgo Pinti. Already present in this map are the monasteries of Santa Verdiana and of Santa Teresa and the whole of Sant'Ambrogio, some of the elements still the most representative of the neighborhood. The current Cimitero degli Inglesi is represented as an accumulation of land, next to Porta a Pinti.

The following maps, like that of Francesco Magnelli and Cosimo Zocchi of 1783² and that of 1832, processed using the cadastral surveys during the rule of Ferdinand III³, show the development of the area. Are clearly visible here the complex of Santa Verdiana and Sant'Ambrogio, and the convent of Santa Teresa. The square outside Porta alla Croce is in this case named "Market Square of the beasts", which confirms the original function of the square. Besides the definition of the map in all its parts, the most important fact that it is able to derive is the structure of Porta alla Croce next to which are represented two elements, which represent a given entirely new up to this moment. Thanks to some drawings and other documented sources, it was possible to see that they are two loggias, built by



Figure 1 – Map of Present Florence: in red we can see the Mattonaia quarter.

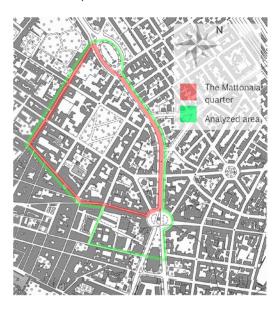


Figure 2 - Map of present Florence: in red we can see the outline of the Mattonaia quarter, in green the added part.

Paolo Veraci in 1818⁴, used to the functions of the cattle market.

In addition to these, other two elements appear on the inner side, probably the two guardhouses entered by Luigi Cambray Digny in 1813, and from the square outside a sort of entrance to the door, consisting of a parapet and stone elements, presumably used to coaching. The map closer to the state of the district before the works of Poggi, is that of 1855, by Giuseppe Pozzi. It is just from this map that have been drawn more information for the purposes of reconstruction of the area, since it was assumed that in the period between 1855 and 1865, in which it is drawn up the Giuseppe

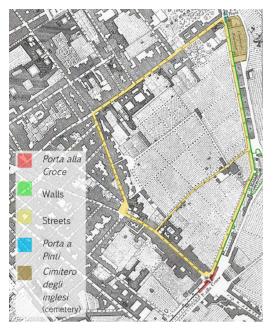


Figure 3 - Giuseppe Pozzi, map of the city of Florence, 1855. Scale 1:5.700 . (Copyright: Istituto Geografico Militare, Florence).



Figure 4 – Map of Florence, 1873. (Copyright: Istituto Geografico Militare, Florence).

Poggi's masterplan, the changes have been quite minimal and therefore negligible.

As for the reconstruction of the state after the changes, it was decided to reproduce a situation that describes the construction phase, during the works,

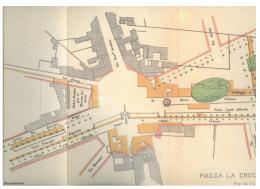


Figure 5: drawing by Giuseppe Poggi's collaborators, showing a superimposed between the state of the square before the intervention of Poggi and the state of the project, scale 1:2.500. In yellow we can see the demolished buildings, in red the new project, in grey the building not be demolished. (Copyright: Giuseppe Poggi, Sui lavori per l'ingrandimento di Firenze 1864-1877. Florence, 1882).

then in the 1870s. It was made this choice because the area in subsequent years has expanded so prolonged and substantial that it would be a long a period of time with a quantity of elements difficult to manage. For the study of this second situation we used the map of 1873, by Military Geographic Institute, by comparing the data with the drawings and the plans of Poggi and always taking into consideration the current state of the district.

Fonts: Drawings, paintings and photographs Giuseppe Poggi and his colleagues have produced a series of drawings about the project that are very clear and helpful understanding the transformations. along with numerous paintings and some photographs of the time, which were a very important source to understand how was the city before the works, both in the most general but especially in the detail of the individual elements. For example, the design of the square showing a superimposed between the state of the square before the intervention of Poggi and the state of the project, was the starting point to identify individual buildings demolished and those who remained, the streets and



Figure 6 – plant of Piazza Beccaria with highlighted buildings to be expropriated, based on certain fonts, and their properties.

boulevards, and the shape of the square. We were confronted with this design the plan of 1855 by Pozzi and from there things have gone from general reconstruction to details. According to available sources it was made a distinction, crucial to the graphic rendering, highlighting all the buildings in which documentation was available, compared to others in the area of which we had no clear informations.

Of some of these elemens it was possible to obtain data complete enough, even with the directions of Poggi regard to the portion of the individual stable to be expropriated, paintings, plans and sections. For the others the information were obtained

from the data most approximate values, such as for example only some maps or only some perspective drawings, which are however served to reconstruct the number of levels, the size, the building type, some of the facades, the function. As for all the other buildings of which it was not possible to find information, especially the state before the work, they have adopted rehabilitation operations based on a process of deduction and hypothesis. In Piazza alla Croce and on Borgo la Croce, for example, knowing that the destination was mainly residential buildings, it was assumed that the buildings were homes, establishing size, number of floors and roof shape fairly approximate according to the type of adjacent buildings or surrounding. Instead along the way to the outer wall toward Arno, where some documents indicated stabling and storage, it was decided to lower buildings and larger.

Depending on the type of reconstruction buildings were divided into: TYPE A, TYPE B and TYPE C.

In the study of the buildings during the work, however, the procedure was based mainly on the observation of the current situation in the area, assuming that many of the buildings built in those years have remained virtually the same, keeping even here a distinction of what is certain and what it is only suggested. Another document that gave a general idea of what was the square before the work is, in fact, the report Sui lavori per l'ingrandimento di Firenze, where Poggi details the area, providing some details about the types of buildings, on the slope of the land, on the use of the square, on the intentions and motivations of the project and especially with regard to the next state in the work. In particular, it has been taken as a point of

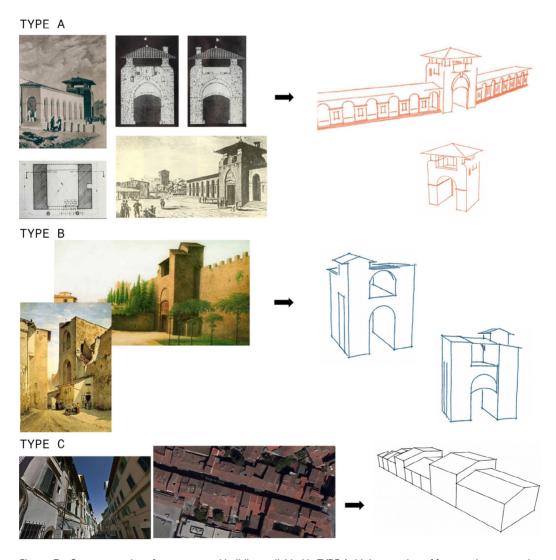


Figure 7 – Some examples of reconstructed buildings, divided in TYPE A: higher number of fonts and more precise informations, so more details and higher level of definition of graphical representation; TYPE B: lower number of fonts and less precise informations, so less detail and lower level of definition of grapical representation; TYPE C: no fonts or not enough informations, so basic and simple representation.



Figure 8 – Photograph of a part of the Mattonaia quarter during the works, 1865-66. (Copyright: Archivio Storico Comunale di Firenze, Florence)

to Zecca Vecchia⁵, along the street outside the walls and along the way inside the walls, which is superimposed on the state before the work and status of the project, and a number of cross sections, more or less equidistant from each other that cut the strip of land between the street inside the walls and the outer, dissecting the walls, from Porta a Pinti to Porta alla Croce.

As these drawings in scale, have provided accurate data on the height of the walls in that stretch and the inclination of the ground, in addition to the shape of some ditches and

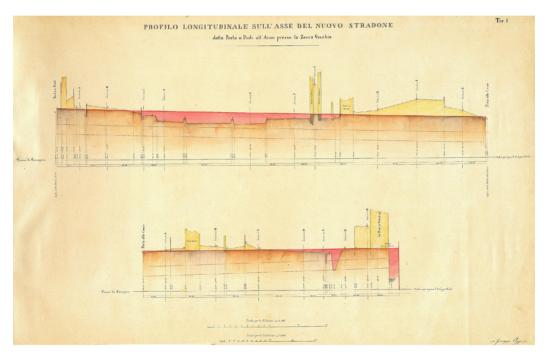


Figure 9 – One of the Giuseppe Poggi's drawing that shows two longitudinal sections along the walls from Porta a Pinti to Zecca Vecchia. (Copyright: Archivio Storico Comunale di Firenze, Florence)

reference for the general reconstruction of the district during the work a photo of 1865-66, showing one of the first buildings built by Società Anonima Edificatrice.

As regards the ground, the situation before the project was very different from as it is today, and thus had to reconstruct a very irregular and bumpy ground. To do so, the only accurate source used were once again the designs of the architect. Some of these show longitudinal sections respectively along the new boulevard from *Porta a Pinti*

build up near the walls. Crossing the data of the various sections, both longitudinal and transversal, it was rebuilt fairly accurately the strip of land occupied by walls and two-way internal and external, who would later become the space for the new avenue. Furthermore, in the drawings are also present paths that indicate the inclination of the new road, so it was possible to reconstruct the ground after the work, always making a comparison to the shares of the level curves of the area in the current state.

The Mattonaia quarter before the works

The *Mattonaia* guarter around 1855 was an underdeveloped part of the center of Florence. It was inserted at the edge of the old town, that was well established and widely built, towards the walls in the north east of the city. You can see from the historical maps contrasting density of buildings in the center of the city against the expanse of gardens and courtyards gradually you get closer to the walls. In particular, the district had a series of terraced buildings along the streets that bordered or Borgo la Croce, Via dei Pilastri and Borgo Pinti, who appeared the least built, with some buildings interspersed with courtvards, and that led to one of the two access doors to the neighborhood, Porta a Pinti.

The other door in this neighborhood was *Porta alla Croce*, inserted in the center of *Piazza alla Croce*. This space towards the outside of the city appeared as a square not well defined, surrounded by some buildings. Thanks to the sources, it was found that there are houses, a building with an outdoor area for the weekly market and other buildings not clearly defined but mostly warehouses, stabling, stockyards. Many of them, in whole or in part, will be expropriated and then demolished to make room for the new square.

Porta alla Croce was entered in Borgo la Croce, a road lined with buildings mostly residential, with terraced houses, mostly in three or four floors. On the back of the houses it was often present the courtvard, on both sides of the street. Here too, the first houses of the street were demolished under the provisions of Poggi in the following years. The road down widened into a small square, Piazza Sant'Ambrogio, with the homonymous church. Continuing the way he took the name of Via dei Pilastri, with a conformation similar to the previous one. The only way that crossed Borgo la Croce was Via della Mattonaia, a fairly secondary street, which is named the entire district, which was named for the brick kilns in the area. It was

almost a country road because crossed the district coming up to the walls meeting virtually only vegetable gardens, just called *Orti della Mattonaia*.

This parkland was largely owned by big convents and some Florentine aristocratic families, and was divided into plots crofting of vineyards, orchards, vegetable gardens and gardens.⁶

In *Via della Mattonaia* was the Monastery of *Santa Teresa*. The complex included a large vegetable garden, surrounded by high walls bordering *Borgo la Croce*.

The area taken into analysis also extends south of *Borgo la Croce*, limited by what was called *Via della Fornace*, the current *Via dell'Agnolo*. There we find the monastery of *Santa Verdiana*, founded towards the end of '300 by Niccolò Manetto di Buonagiunta. The monastery was subject to numerous interventions and restoration work over the centuries, surviving until the Napoleonic suppression of 1808, becoming first plant for the slaughter, and culminating with the final abolition of the monastery in 1865, with the transformation in women's prison.⁷ Today it houses the headquarters of *Dipartimento di*

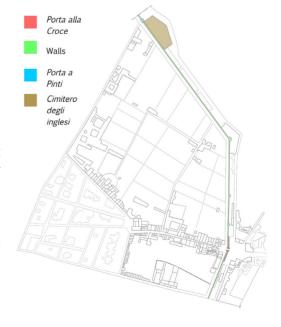


Figure 10 – Plan of the area according to the reconstruction, around 1855.

Architettura of Florence University.

Along the walls, especially in the north of the district, the ground showed the great differences in height. On the inner side of the walls there are large bumps of the ground, and more precisely in Porta alla Croce and on the stretch of wall to Porta a Pinti is reported that the ground rose up to 5 meters and a half compared to the floor of Porta alla Croce. These accumulations of earth is supposed that were placed next to the walls on the inside as a reinforcement of the city in case of attack of the artillery. In fact, following widespread floods that hit the city over the centuries, gradually accumulated debris and mud, as in the case of 1557. when Cosimo I decided to use that huge land mass to complete the work of strengthening the city. Finally, all this must be added the masses of debris and waste products from the city and pushed outward, that created this irregular situation.8

Giuseppe Poggi's Masterplan

In 1865, Florence was proclaimed capital of Regno d'Italia. The city was surrounded by walls, with the focal points in the dome and other monumental buildings, in a centuriesold balance between built areas and open spaces, gardens and orchards, especially near the walls, as in the district of *Mattonaia*. In a short time the city underwent the change of role and function, highlighting a number of functional inadequacies of urban fabric, without a distinction between areas divided to public functions or private. Urgently the town entrusted the implementation of a plan to expand the city to the architect Giuseppe Poggi, that was delivered February 18, 1865. The plan had to answer a number of pressing issues, such as to provide new housing and services for the population increase due to the arrival of employees for the offices of the Capital; replace the customs border to the one formed by the walls; defend the city from the floods of the Arno; give the city a celebratory, modern and bourgeois face, in line with contemporary trends in other European cities. One of the key elements of the plan was the demolition of the walls on the north side of the Arno, to create the new boulevards. With the disappearance of the walls, the city lost a fundamental element of its structural, functional and formal definition. The distinction between an inside and an outside disappeared, and began a new relationship between the various parts of the city, between a center and a periphery.

As it happens right in the *Mattonaia* quarter, from a neighborhood inside the walls but almost comparable to the campaign to a dense set of isolated housing. The figurative presence of vertical walls that contrast with the horizontal design of the campaign replacing the section of the treelined avenues, interposed between the internal development of the new districts and the external expansion along the whole circuit.

The Mattonaia quarter after the works

The new square acquired its present appearance, which is a large ellipse with the major axis of about 130 m that less than 106 m. The shape was chosen because it made easier demolitions, the conjunctions with the streets and reduced the differences on the fronts of the buildings that were built around. The buildings were designed by Giacomo Roster, who chose to create uniformity between the facades, with the same proportions and decorations, all made up of four levels, allocating higher ones in homes and those on the ground floor with shops, with large openings on the square.

The entire area was leveled and matched as much as possible, creating a slightly tilted from *Cimitero degli Inglesi* until *Zecca Vecchia*, softening the many irregularities that were present before the works. North of *Piazza Beccaria* was drawn one avenue to *Borgo Pinti*, with a very slight slope. The cemetery at the old *Porta a Pinti* was partially expropriated and the main part was preserved, respecting the sights around him. The irregular shape it had before the work was arranged, acquiring an elliptical

structure, enclosed, elevated above the street level, and isolated in the middle of the avenue that runs around.

As for the district of Mattonaia, this had great development. Borgo la Croce did not undergo major changes, while maintaining the axis with the door and remaining a mainly residential street. Via della Mattonaia was extended south of Borgo la Croce, where he was going to form a part of the block that would house the market of Sant'Ambrogio, on the other side it closed the space occupied predominantly by the monastery of Santa Verdiana, bordered south Via dell'Agnolo. The northern part of the district was divided by a series of streets perpendicular to each other to form blocks of buildings in the course of the following years were of great growth, with a central large garden square Piazza d'Azeglio.

The protagonist of this process was Società Anonima Edificatrice, founded in 1848, which gave accommodation to more than 700 families.8 One of the first buildings dates back to 1865-66, when the area was still under construction. The building is located on Via della Mattonaia, corner of Via *Niccolini*, one of the new roads built by Poggi. The main landmarks of the neighborhood. like the church of Sant'Ambrogio, the monasteries of Santa Verdiana and Santa Teresa, that were already present in previous years in the work, remained almost intact, in some cases changing their use. The perpendicular mesh of orchards and gardens in the neighborhood before the works was then replaced by that of streets and blocks.

Three-dimensional modeling: 3D modeling for graphical display

The aim of the reconstruction consists in the creation of two models in scale 1: 1000. To do so, starting from what has been possible to study and understand the area, you have adopted the operations of digital modeling. The main elements to be played were the buildings and soil, carried out separately

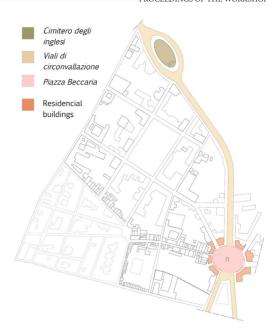


Figure 11 - Plant according to the reconstruction of the area after the changes of Giuseppe Poggi, around 1870.

and in parallel. Based on the amount of information and details that have been collected for each part of the reconstruction they were made distinctions in their graphic representation, and then later in plastic figures. Are distinguished two types of modeling, one intended to graphical display, such as renderings, the other to the production of the plastic figures, since first of all the very small scale of the model did not allow to bring a number of details, and then because the 3d printing demanded a series of measures and adaptations that had to be made to the original digital model. With regard to the neighborhood of *Mat*tonaia, modeling has focused more on Piazza alla Croce and the surrounding buildings, such as changes in Borgo la Croce later demolished, and consequently Piazza Beccaria and avenues. For all other parts of the area it was chosen for a more approximate reconstruction that is reflected in the modeling and in plastic figures, both for the large amount of items, both because the part most involved in the changes of Poggi was indeed that described above.

For convenience will be called before the model of the quarter before the works, and after the one after the work. For buildings, both in the before model that in the after one, as already mentioned it was adopted a distinction between those that had complete sources or sufficiently comprehensive and those reconstructed on assumptions. The number of details in this case is proportional to the number of the collected data, such as for the TYPE A was adopted in which the maximum accuracy in design, have been also reproduced moldings, arches, niches, decorations, steps and other types of secondary elements, as in the case of Porta alla Croce and the galleries adjacent. For Type B have been played fewer details, reporting windows, roof overhang, shadows and more generic elements.

As for the other buildings located near *Porta alla Croce*, of which there are little or no information, TYPE C, has opted for a more graphic bare, with no elements in the facade, without overhang of the roof, but still respecting what sources have described and making assumptions quite realistic about the number of floors and the roof shape. The same approach was taken for all buildings in the neighborhood, on *Via dei Pilastri*, *Borgo Pinti* and in the inner part.

For the after model the distinctions are the same, unlike the fact that many of the buildings in the model before which have a high level of definition are those that are demolished as a result of the works, and then in the second model virtually all the buildings of Borgo la croce are represented in the most approximate way. (Type B and C) Piazza Beccaria instead, it opted for the higher level of accuracy, thanks to plans and sections. In this second model, a further distinction was made, for the development of the district, as previously described, it was decided to represent only a few buildings, which more or less those who were present in the 1870s, during the work. As for the other, arose gradually in subsequent years, they are represented only with the shape, to

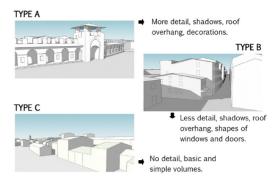


Figure 12 – Some examples of buildings in 3D model for graphical display, divided in the three types.

make it clear that they would be soon built. This operation was mostly aimed at the realization of plastic figures.

Three-dimensional modeling: 3D modeling for plastic figures

Since the goal is to print a number of elements in scale 1: 1000, the modeling was adapted to a different level of detail. So even those buildings that had been treated with the higher definition, in this case have been deprived of elements in the facade, stairs or small shelters and decorations to adapt the models to a scale so small.

To highlight this type of buildings remained the roof overhang in front. The only expedient has been adopted, in addition to maintaining always the overhang at one meter, is to give a thickness of one meter to the groundwater in the most extreme part of the projection rather than leave it to zero, so that proves 1mm in the plastic figures. Even the door has been deprived of some ac-

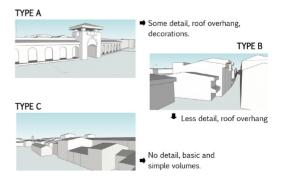


Figure 13 - Some examples of buildings in 3D model for plastic figures, divided in the three types.

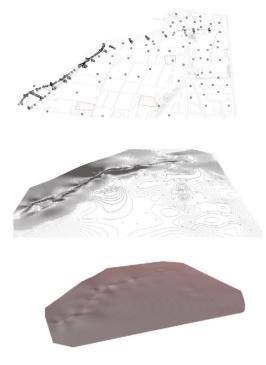


Figure 14 – Stages of the construction of the soil surface before the works.

cessory elements, while maintaining the openings in both layers. All other buildings appear as simple blocks topped by two sloped.



Figure 15 – Stages of the construction of the soil surface after the works.

Three-dimensional modeling: Soil

The soil of the before model, as already explained, it appeared very irregular originally, and then through the sections of Poggi, and combining the data obtained from all drawings observed, has created a network of points in proportion to different levels, places on the strip occupied by the walls. Based on the point which represents the threshold of *Porta alla Croce*, taken as a reference, it joined this set of points with those derived from shares of the contour lines of the plant of Florence today.

In this way it was possible to build a course that combines information taken from different sources, mapping throughout the whole neighborhood.

By this point network was built a three-dimensional sinuous surface, with peaks near the walls, due to uneven ground. Once the surface has been divided, "slicing" it through level curves, apart from one another about 30 cm, so that in the scale of each plastic would have been 0.3 mm, a right size to create a surface composed by the superimposition of layers that might be quite homogeneous and continuous. For the after model the matter it was easier because the ground appeared much smoother and cleared after the work of Poggi.

Then, by comparing the coordinates of the points taken as the sections of the project with the contour of Florence present and noting that they were very similar, the ground surface is constructed according to the interpolation of these points.

Preparation to printing and laser cutting

Before arriving at the printing stage, the individual parts have been organized to be ready for production. It is given a code number to each single piece, with a letter according to the type of element that represents and the sequence number. For example, a portion of the walls has been called 01.W, with W for Walls, and so on all other pieces of walls, or building 01.B, with B which stands for Buildings, with the assigned numbers start-

Vaencia, Spain 18-20th May 2015

Scientist workshop: ARCHITECTURE, ARCHAEOLOGY AND CONTEMPORARY CITY PLANNING "State of knowledge in the digital age"

The workshop took place in Valencia, Valencia, Camino de Vera, Universitat Politècnica de València, School of Building Engineering (Escuela Técnica Superior de Ingeniería de Edificación) Building 1C, first floor, boardroom.

Workshop organizing committee: Pablo Rodriguez Navarro, Giorgio Verdiani, Per Cornell

The workshop has been realized in collaboration between Universitat Politècnica de València, Spain, the Architecture Department of the Florence University, Italy, the Department of Historical Studies, University of Gothenburg, Sweden.



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In discussions on urbanism, the need to involve new actors has been a major theme of recent debate. In this field, throughout Europe, various ways of allowing citizens to take a more direct part in planning is stressed. It is also important to look at the role or lack of role played by particular research fields. Architecture plays a major role in city planning. While archaeology has become increasingly involved in field projects in urban environments, the discipline seldom plays an important role in city planning. In several countries and particular cities this situation has been questioned during the last decades. In May 2015 a group of scholars from different countries met in Valencia to discuss about the relationship between Architecture, Archaeology and contemporary City Planning. This book collects the final papers from that meeting.



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Committee: Pablo Rodriguez-Navarro, Per Cornell, Giorgio Verdiani,