

ARCHITECTURAL PHOTOGRAMMETRY IN THE STUDY OF THE BUILDING AND PERIOD TECHNIQUES: LA CHIESA MADRE DI ATELLA IN BASILICATA

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INTRODUCTION.

Atella is one of the few foundation towns. It was founded during the 1st decade of the XIV century by *Giovanni d' Angiò*, who was feudatory of the sites of *S. Fele*, *Vitalba* and *Armaterra*. In about one hundred years, Atella became leader in the Vitalba valley. In fact, it took place of the extinct centre (end of XIII century) named *Civitas Vitalba*. In relation with the history and the vicissitudes of *Atella*, few and mostly unpublished available documents furnish informations on the urban plant, but they don't give news about the date of foundation. All the same, the town of *Atella*, had from its construction, a quite large size; its boundary was 2,5 Km and on it there 4 gates.

In the town there were 3 parish churches: *S. Nicola*, the Mother Church and *S. Eligio*. The Mother Church was dedicate to *S. Maria* and it was located in the main square of the town, close to the House of the Court and to the jail.

The square had to be both the Centre of the political life and the parvis of the Mother Church.

Besides, it was the site of the two most important cattle fair of the town. Because of the documentation that's lacking in many ideas, it's only possible to assume that the town of Atella and its Mother Church should be constructed together.

During the whole Middle Ages, in fact, the Ecclesiastic Institution was at the head of the human activities and in encouraged the fine arts of which it helped itself to edify and to decorate its buildings.

Actually, the Mother Church only one nave with some side chapels. The tower bell is on the left of the Church; it is one orderless and without its spire. In the running of the years the plant of the Mother Church of Atella has been unchanged while the front and the side masonries have had many restore interventions.

One of the main causes of this interventions is due to several earthquakes that razed to the ground the whole town of *Atella*.

F.g. with the restoration after the 1980 quake, one mulioned window with two lights and one window with one light have been turned up onto the past masonry of the church.

Our work looks into the front and tower bell of the Mother Church through analysis undergone by our multidisciplinary task force. A singular photographic documentation (dated 1858) shows how the front before the restorations after the 1857 and 1930 quakes was. The cover of the Mother Church in the most damaged, in fact, it was undergone transformations after the fall of some structures with reconstructions not ever stand by the original context.

In our opinion is important to underline the remarkable artistic manufacture of the portal in the middle of the internal arches. It presents several representations of the Sun and of the Moon and the last of these images, slightly ogival is decorated by 8 semicircled concave rises from the outside, and above, on the two sides of the round shaped window by the Crucifix and two stone statues of Saints.

1) PHOTOGRAMMETRAL RESTITUTION OF THE MAIN FACADE.

The photogrammetric restitution presented has been realized by a digital monoscopic Rollei MSR.

This kind of restitution system, as well as digital softwares, allows to work directly on raster images through the digitizing of analogic images carried on video by a scanner.

The transformation from analogical to digital images, has been made with a HP Scanjet II C scanner and a resolution of 300 DPI. Then usual orientation is obtained by 10 topographic spots chosen among natural zones around the front and bell tower.

The straightening of digital image (Tab. 1) is the result of a single frame executed with a semimetric camera Rollei 6006, continuous of 40 mm. and clicked at a distance of 30 mt by the front of the church (Fig.1).

Finally, with MSR-CAD Software, the vectorialization of the image video, the structure of all elements of our interest has been perfectly traced.

It is possible to observe by restitution (Tab. II), that the front such as bell tower with square basis, is enough regular in complex, with thin mortar seams that, in some cases, seems absolutely inexistence.

The front, leaving bell tower, seems an almost perfect square of 12,00 x 11,91 mt. dimensions; the bell tower that doesn't have the original features, it has about 7,00 x 12,80 mt. dimensions.

Besides the restitution underlines some portions in which the regularity of ashlar stops, showing clearly posthumous rebuildings due to several falls after quake events, that are the main cause of Atella destructions in particular, there is a singular irregularity in the masonry texture across the point of junction of the bell tower and across the right cantonal concerning the rose-window situated in the middle of the front, its higher and lower boundaries present a series of irregular ashlar and it conduces to ipotize that it could have larger dimensions than the actual.

A similar hypothesis can be sustained for the two niches situated above the rose-window and that have, inside, "S. Nicola di Bari". And "Sant'Antonio Abate" statues that could have been located later during a reconstruction of the front. Actually the

ceiling cover as a central plain zone, while the sides are neathered and circled by pensile arcs this last rebuilding is dated post the quake of 1930 that caused the fall of the ceiling cover.

Particular relief has the portal, new refined done; its dimensions are about 3.13 x 5.26 mt. and it has a double sequence of jimps surmounted by round arcs.

The lunette in flowerly decorated and delimited by sun and moon symbols: all that for a lenght of 1.65 mt. This decoratione presents a recent fracture in the middle. The restitutio shows the evidence of an ogive and of a garland mede by 8 reserveded arc, each of them with opening of about 0,67 mt.

2) METROLOGICAL ANALYSIS OF THE FRONT OF THE MOTHER CHURCH.

The metrological analysis of the front of the Mother Church in Atella, underlines the evidence of a modularity in the planning and realization of the plant and front raised both. The M module obtained is 175 cm, comparable to 7 maedieval "palmi".

In plant it is possible to obtain the following module multiples: tower basis 4M, front 7M, left and right side keepof portal 2,5 M, portal opening 2M.

Very interesting, from a typological point of view, is the unitary relation basis/height of the front, that could be a first step for historical-architectonic analysis. Very interesting, for the same analysis, is the hypotesis substained on the division of the front, whose main score in height present modular dimensions (from the top: tympanum 2M, rose-window 2M and portal 3M).

3) INDIVIDUATION OF THE BUILDING STRATIGRAPHIC UNITS (BSU).

BSU1 : Masonry with horizontal and parallel courses formed by flat squared calcareous ashlars. Height among courses: 20 - 23 cm (A) and 29 - 31 cm (C) with prevailing of A and B cases than the C. In this masonry there is the keep on the right side of the portal just of 5.0 - 5.3 m for a width of 3.0 - 3.3 m and then it's joinde to the cantonal whose masonry is a different BSU (see BSU2).

BSU2 : Masonry with sub-horizontal and horizontal courses partially split formed by calcareous ashlars that are coarsely squared by back hammer and by chopped rusticated ashlars. It is present near the right cantonal, just to a level, from the ground, of 5.20 m. It is a masonry that has been later added in the BSU1, probably during reconstructions dued to the quake damages. Well refined are the seams between BSU, thanks to the employment of ashlars settled infixed joint.

BSU3 : Similar to BSU1 except for the different distribution of height among ashlars. As consequence there is not a justification between BSU2 and BSU2 and BSU1 stone laying. The masonry characterizes the keep on left side of the portal, just to about 5.0 m, for width of 2.5 - 3.0 m just join to the left cantonal of the front. Height among courses: 20 - 23 cm (A), 25 - 27 cm (B) and 29 - 31 cm (C) with prevailing of A and B than C (nC=8, nB= 2 and nA=7).

BSU4 : See BSU2. This masonry is similar to BSU2. It has been added after reconstructions dued to quake damages.

BSU5 : Masonry completely similar to BSU1 except for the distribution of higt among courses. This masonry characterizes the west wall of the tower. Height among courses: 20 - 23 cm (A), 25 - 27 cm (B), 29 - 31 cm (C), 33 - 36 cm (D) and 38 - 39 cm with prevailing of B and C cases (nC=14, nB=13) than A, D and E (nA=2, nD=5 and nE=2).

Table height of ashlars:

A= 21 - 23 cm;

B= 25 - 27 cm;

C= 29 - 31 cm (h= 60 - 65),

d= 33 - 36 cm;

E> 38 cm.

BSU = Building Stratigraphic Unit;

----- = Tower masonry building phases;

_____ = BSU perimetric measure.

Building techniques and materials employed underline the BSU1, BSU3 and BSU5 similarity towards one important building - historical phase that is the originary phase of XIV century.

The differences in dimensions and stone laying among BSU show the evolution of the yard in agreement with lots and not in horizontal way. In particular, there are 3 lots: tower, left wall and right wall of the main front of the facade. BSU2 and BSU4 are referred to reconstructions after falls and damages. In this table aren't analyzed other eventual BSU of the front, above the portal. These BSU are linked to restore and reconstruction interventions from last century to our days.

4) MORPHOLOGICAL ANALYSIS OF THE PORTAL.

The morphological analysis of the archivolt of the portal underlines:

1) the evidence of a double typology of arcs: external ogives and internal round arcs

2) the just lengthened shape towards high of the ogives ($f/r=1,17$; $Rr/Ra=1,12$)

3) The centres of bending round arcs are nearly coinciding

4) parallel among joints of the external and internal

5) pensile and concave towards high arcs have very similar dimensions (diameter is about 35-36cm).

For all what we affirm, we can conclude:

- various sequences of the archivolt have been concomitantly installed

- the relation between height (rise) and span of the external archivolt refers to the late Gothic ogives

- the ashlar of the archivolt were realized taking measurements before the installation, with particular care of the standardization methods.

E.g as regards the pensile and concave towards high arcs semicircular with known radius (about 35-36 cm) profiles have been used.

5) MAP OF DECAY.

It has been possible, for the church of Atella, to define a good level of a conservation.

On the other hand, we have noticed 3 types of decay.

In agreement with Normal Lexicon (1/88 ICR-CNR) it has been possible to define the evidence of:

1) ALVEOLI isolated event of "carios" alveoli in bayway progress;

2) SUPERFICIAL DEPOSIT as heap of extraneous material close to prominent architectural elements;

3) DEFICIENCY present in some spot of the masonry, in relation to the loss of stone.

For the mineral characterization of the stones and of the mortars some XRD analysis have been made.

These analysis put in evidence:

prevailing calcite, followed by abundant quartz and traces of clay minerals and in some cases abundant plagioclase.

CONCLUSIONS.

Analysis methods are preceded by the survey realized two an architectonic photogrammetric software. The obtained drawing is used as the basis, practically has the design on which morphologic and metrological studies develop. On the other hand geochemistry and mineralogical analysis for the characterization of the mortars and materials here used move after the photogrammetric relief. The conclusions of our researches have common result that is the same answer to our different questions. Even is there is evidence of several restore and consolidation interventions, we can affirm that, for the Mother Church of Atella there is only one planning stage as regards its tower bell and front. As result of our work, it is possible to define the date of building of the Mother Church of Atella: it is fixed around the 1330 not far from the construction of the whole town.

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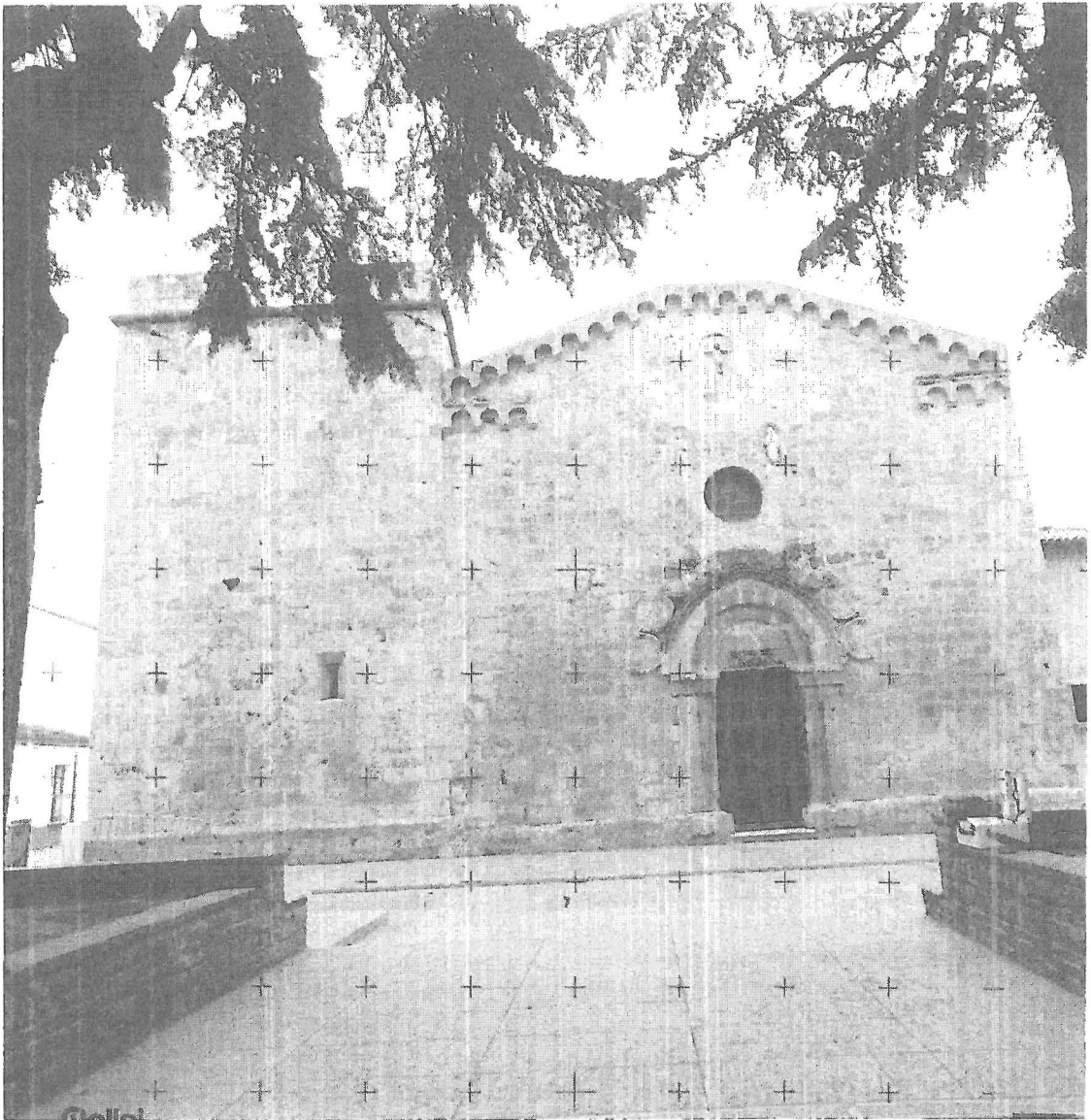


FIG. 1: Metric photo of the front of the Mother Church of Atella.