

DIAGNOSTIC SURVEYS OF THE FACADES OF THE CAPITOLINE PALACES IN ROME: A CONTRIBUTION TO KNOWLEDGE AND TO METHODS OF RESTORATION

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SUMMARY

The article summarizes the main results of the diagnostic analyses carried out by the laboratories of "Il Cenacolo", CNR "Gino Bozza" and ISMES, during the restoration of the facades of the Capitoline Palaces in Rome; the chemical-physical analyses have made it possible to identify:

- the original sixteenth century lime plaster of the Palazzo Senatorio, with a first white layer and a second light pink plaster, also found on the other two facades;
- the original plaster in "colla di travertino" survived in 30-40% of the surfaces of the pilaster strips and imitation stone parts and is now completely restored;
- the definition of deterioration of materials, and of the stratigraphic sequences of the various maintenance operations, based not only on historical reports but also on analytical results;
- the white plaster of the Michelangelo period, found on the right side of Palazzo dei Conservatori.

Key-words: Palazzo Senatorio, Palazzo dei Conservatori, Palazzo Nuovo, color sequences, original finishes, maintenance history, deterioration.



INTRODUCTION

Following the completion of restoration work on the facades of the three Capitoline Palaces which flank Michelangelo's Piazza del Campidoglio, it is now possible to summarize the diagnostic surveys which preceded and accompanied every phase of the operation. This paper analyzes the main results which have led to a better understanding of the materials used and the history of their maintenance, with the aim of assisting the restoration work. The analytical results refer to the three buildings: Palazzo Senatorio, Palazzo dei Conservatori and Palazzo Nuovo, thus respecting the chronological order of work and the acquisition of diagnostic data.

1. THE STRATIGRAPHIC SEQUENCE AND THE ORIGINAL COLOR OF THE WALLS OF PALAZZO SENATORIO

The initial diagnostic surveys were carried out on the facade of Palazzo Senatorio in 1995 using an inspection lift. The facade showed signs of much repair work and partial plastering with about fifty different plaster repairs on the base of imitation brickwork.

By means of stratigraphic analysis of the layers along the discontinuity lines between the single plaster repairs, it was possible to observe the chronological sequence of the plasterwork on each stretch of wall (Fig. 1). Measurements were taken on a 1:1 scale of the imitation brickwork structure showing that each plaster repair had a different dimension of imitation stonework, and that there was no apparent correlation between the areas except for a certain similarity of dimension in parts of the same wing of the facade.

At the time of the present restoration of Palazzo Senatorio, the building had an almost uniform ochre-like color. However, the analyses highlighted a series of quite complicated stratigraphic operations, without any affinity of composition between the different areas, showing that continual maintenance work was carried out on the building by different teams of workers using a number of different techniques.

During the cleaning of the facade and the removal of the surface color, we were able to identify a smooth white plaster layer dating from the 16th century which, instead of being demolished during the various maintenance works as in the rest of the facade, had been preserved by a thin layer of mortar and pozzolana applied subsequently.

In this way, not only were we able to confirm the historical data which recorded that the original 16th century finish was in imitation travertine, but we were also able to identify a subsequent first facing in imitation brickwork (about 26.5 cm x 5.2/5.7 cm), of an intense pink color. The brickwork effect was obtained by incising and painting the original smooth surface in imitation travertine.

TAB. 1 - PALAZZO SENATORIO – MAIN FACADE		
STRATIGRAPHIC WALL LAYERS IN IMITATION CORTINA		
1a - ORIGINAL SEQUENCE (TRACES)	1b – MOST FREQUENT SEQUENCE	1c – WINDOW CORNICES (TRACES)
<i>exterior</i>	<i>exterior</i>	<i>exterior</i>
8) Superficial ochre-color layers 7) Mortar with lime and sand 6) Mortar with lime and pozzolana (covers all layers from 1 to 5) 5) Yellow-pink layer 4) Pink and light pink layer 3) Light yellow layer 2) Mortar with lime and ground marble 1) Mortar with lime and pozzolana	2) Superficial ochre-color layers 1) Mortar with lime + pozzolana	3) Superficial ochre-color layers 2) Mortar with lime + ground marble 1) Mortar with lime and pozzolana
<i>interior</i>	<i>interior</i>	<i>interior</i>

Overall, one can deduce the succession of colors (tab.1) from the interior towards the exterior (logically, only present completely on the oldest plaster).

In addition to these finishes found on the wall surfaces, on the rear areas of the lateral pilasters of the first order windows, we came across the presence of areas of an intense green color on the imitation travertine plaster (see the following paragraph). This light green color belongs to an intermediate phase in the facade's history and again confirms how much variation there was in the Palaces' facades over time, according to the fashion and the taste of the period.

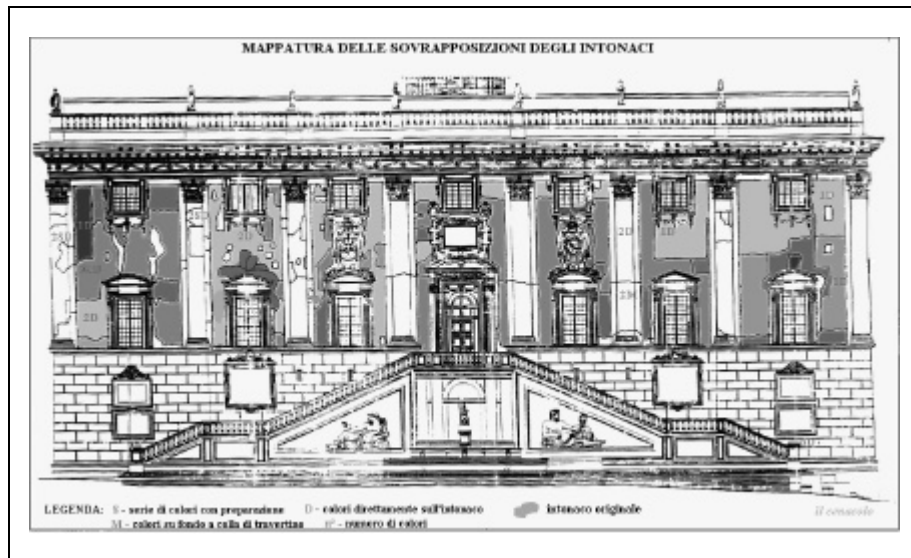


Fig. 1 - Mape of chronological sequence of the plasterwork on each stretch of wall

2. STRATIGRAPHIC SEQUENCE AND ORIGINAL FINISHING OF PILASTER STRIPS ON PALAZZO SENATORIO

The pilaster strips are made of plaster consisting of one or two layers of mortar with lime and aggregate composed of natural pink pozzolana from the Alban hills near Rome. On the plaster surfaces of the original part of the building, there is an imitation travertine finish (“colla di travertino”) with smooth surfaces worked into imitation steps and a smooth edge (dimensions: width and depth about 0.6 mm, height about 0.3 mm) creating a perfect imitation of travertine slabs. This layer is made up of mortar with lime and aggregate binder composed of travertine and marble, broken up and ground down before being put through a sieve with 2 mm grid, producing grains ranging in size from coarse silt to very coarse sand.

This finishing in “colla di travertino” is present on about 30-40% of the pilaster strips and, before restoration, they were covered by layers of paint that completely obscured the fluting so that it was practically invisible.

In the “non-original” parts, there are smooth plaster finishes with very hard surfaces. Some of these plaster surfaces have a smooth outer finish made of lime and only ground marble, others have lime and pozzolana aggregate with larger grain sizes (from medium-to-fine silt to grainy).

3. ORIGINAL FINISHING OF MOLDED CORNICE AND IMITATION ASHLAR OF PALAZZO SENATORIO

On the smooth surfaces of the entablature, on top of the original finishing in “colla di travertino”, there was an initial series of seven layers of paint, ranging from pale yellow to ochre, and a second series (separated from the first by a layer of mortar with lime and ground marble) made up of three colored layers ranging from pink to the present-day yellow. On the relief parts, there was a sequence of fourteen layers of which the eight most recent correspond, in sequence and type (allowing some degree of approximation), to the seven smooth base surfaces. Furthermore, since the first layers, only in the relief part, were of a color that varied between shades of gray to yellow-black, one can suppose that initially there was a two-color finish on the relief parts of the cornice and the smooth parts, with some “strengthening” of the shading by means of painted shadowing, and that the whole section was only subsequently painted in one color.

On the oldest part of the imitation ashlar base, on top of the mortar with lime and pozzolana, a beige mortar with lime and aggregate had been applied, on which there was an extremely thin finish to take the subsequent white-painted layer with occasional yellowish coloring (yellow ochre). This was the original layer in imitation travertine which was subsequently covered with various layers of pigment, including a white acrylic paint as well as the yellowish color preceding the present restoration.

4. STRATIGRAPHIC SEQUENCE AND ORIGINAL FINISHING OF WALL BASES AND TRAVERTINE ELEMENTS ON THE FACADES OF PALAZZO DEI CONSERVATORI AND PALAZZO NUOVO

The results of the surveys showed the presence of surface maintenance treatments that were common to both buildings. In spite of the fact that nearly a century went by between the reshaping of the facade of Palazzo dei Conservatori (work initially carried out by Michelangelo and completed by Giacomo della Porta in the mid-16th century) and the erection of Palazzo Nuovo (fully constructed in the first half of 1600 by Girolamo and Carlo Rinaldi), the surveys did not show any particular stratigraphic differences on the surfaces, except for the first bay on the right-hand side of Palazzo dei Conservatori.

By means of microscope analysis and direct observation after the cleaning of the facade, it was possible to draw up a brief history of subsequent maintenance operations which are summarized below (tab. 2).

TAB. 2 – STRATIGRAPHIC WALL LAYERS IN CORTINA		
<i>PALAZZO DEI CONSERVATORI</i>		<i>PALAZZO NUOVO</i>
2a – RIGHT-HAND SIDE FACADE (MICHELANGELO'S BAY - Photo 1)	2b – MAIN FACADE	2c – MAIN FACADE
<p style="text-align: center;"><i>exterior</i></p> <p>6) Blackish atmospheric deposit 5) Pinkish and pale pink layer 4) Pale yellow layer applied in 3 coats 3) Whitish layer, slightly yellow 2) Very thin ochre-color atmospheric deposit 1) Pale yellow-pink brickwork</p> <p style="text-align: center;"><i>interior</i></p>	<p style="text-align: center;"><i>exterior</i></p> <p>5) Blackish atmospheric deposit 4) Pinkish and pale pink layer 3) Pale yellow layer 2) Thin brownish patina 1) Pale yellow-pink brickwork</p> <p style="text-align: center;"><i>interior</i></p>	<p style="text-align: center;"><i>exterior</i></p> <p>5) Blackish atmospheric deposit 4) Pinkish and pale pink layer 3) Pale yellow layer 2) Thin brownish patina 1) Pale yellow-pink brickwork</p> <p style="text-align: center;"><i>interior</i></p>

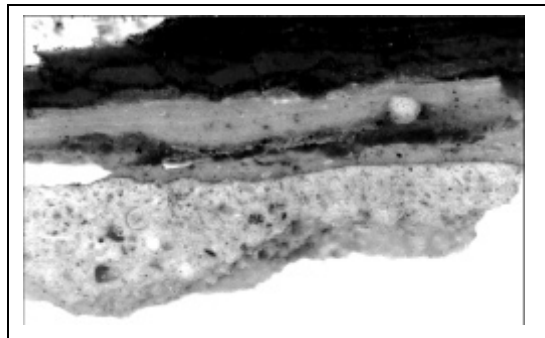
Historical research shows that the facades were originally designed in imitation travertine, with smooth whitish surfaces, and this is confirmed by traces of whitish to very pale yellow plaster (layer 3 in table 2a) whose special feature is that it covers the joints between the brickwork so as to create a smooth surface in imitation stonework. However, this unusual feature, which is not recorded in the research archives, is confined to the first bay of the right-hand side of Palazzo dei Conservatori, while it is certainly not present in the main facades of the other two buildings. After a certain period of time, but definitely following the completion of Palazzo Nuovo, all the wall surfaces were treated with plastering of a light yellow color (the presence of which was unknown up to now). This was a thin layer that probably did not completely cover the color of the brickwork but which perhaps served to enhance the surfaces.

This plastering (layer 4 in table 2a), is made up of three coats on top of the part of the plaster in imitation stone, while it is only one coat on the rest of the facades (layer 3 in tables 2b-c), showing the need to hide the whitish layer in order to give a homogeneous aspect to all the surfaces.

Subsequently, we noted a phase which involved a proper plastering layer (made up of lime, ground marble and pinkish pigments) which covered the surfaces well. It was of a pinkish color and had regular incisions imitating the brickwork beneath, but with a different pattern of lines. This layer was similar to the imitation brickwork that had been found on Palazzo Senatorio and makes it possible to say that the pink color dates from the 17th century period of restructuring and re-organization of the piazza and the facades of the three buildings (Palazzo Senatorio, Palazzo Nuovo or “Capitoline” or “dei Musei”, and Palazzo dei Conservatori).

This phase of re-organization was accompanied by the application of a fairly thick layer of plaster of a pale yellowish color, on all the travertine parts of the buildings, perhaps with aim of eliminating the discontinuity and deterioration of the stone. It was previously restored in patches, like leopard skin spots, and was the point of reference for the present restoration project.

Photo 1



5. DIFFERENT CONSTRUCTION TECHNIQUES FOR PORTICO VAULTING OF PALAZZO DEI CONSERVATORI AND PALAZZO NUOVO

The surveys showed obvious differences between the vaulting of Palazzo dei Conservatori, all in stucco and made up of mortar with ground marble or lime and lime putty, and those of Palazzo Nuovo, which have cornices and all relief parts in stucco while the smooth backing is of simple plaster with pozzolana (a poorer material which is simpler to work) subsequently covered by one or two coats of whitewash (photo 2 - fig. 2), to imitate the stucco parts. All the whitish surfaces of this type were then treated with a semi-transparent finish in pale yellow in order to imitate perfectly the appearance and the discontinuity of travertine. After the cleaning process, a perfect visual combination was achieved of the stucco parts and those made from plaster and pozzolana painted white, both plastered with the same treatment in imitation travertine. This leads one to imagine with reasonable certainty that the wall bases were made from pozzolana for simple reasons of economy and for easier working, and that they were never intended to be visible.

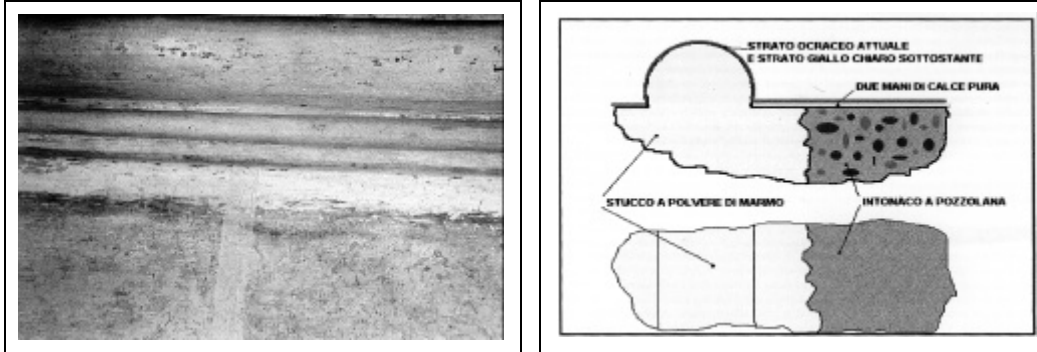


Photo 2 and Fig. 2 - Vaulting stuccos and relative plan of Palazzo Nuovo

6. CONCLUSIONS

We have outlined briefly the main results obtained from the diagnostic surveys carried out during three years of restoration work. However, although the surveys were predominantly of an analytical type, the raw data provided by laboratory analysis was always combined and integrated with careful visual inspection, often assisted by the stratigraphic core samples taken by the restorers, and by advice and comments from all the experts on the Scientific Commission, as well as modern survey techniques such as thermography and endoscopic exams.

The guiding principle has always been to try to provide a reliable picture of the materials used and their state of conservation, in order to enable restorers to plan their operations, reducing to a minimum changes in the approach as the work proceeded.

In addition, useful information of a historical nature emerged, and is presented here, thereby expanding the already wide knowledge of the maintenance history of the facades

The aim was not to take the place of historians but to attempt to give diagnosis that interdisciplinary character that is often requested but so rarely achieved.

7. NOTES

The articles referred to are:

- G. Alessandrini, C. Molteni, N. Berlucchi, R. Ginanni Corradini, *Diagnostica dei materiali e stato di conservazione, in La facciata del Palazzo Senatorio in Campidoglio: momenti di un grande restauro a Roma*, Pacini Ed., 1995, Pisa
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The Scientific Commission was made up of: E. Tittoni (co-ordinator), G. Capponi, M. Cordaro, F. De Tomasso, F. Formosa, C. L. Frommel, R. Magrì, C. Molteni, T. Rinaldi, E. Rocca

The restoration project for the Facade of Palazzo Senatorio was drawn up by Dott. C. Molteni

The restoration project for Palazzo dei Conservatori and for Palazzo dei Musei was drawn up by Ing. N. Berlucchi

The restoration work was carried out by the firm Pouchain s.r.l. (Rome)

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8. BIBLIOGRAPHY

For reasons of space, it is possible to list only the publications relating to the restoration of the Palaces' facades, which should be consulted for specific bibliographies. These are the volumes mentioned in note (1) and the volume: *La facciata del Palazzo Senatorio in Campidoglio: momenti di storia urbana a Roma*, Pacini Ed., 1994, Pisa