

RESTORATION FACTSHEET

The much-needed maintenance and restoration of the **Chapel of the Cardinal of Portugal** made possible by a generous contribution from the Friends of Florence Foundation is the product of teamwork. Each one of the professionals involved in restoring this rich and complex monument has been guided first and foremost by the principle of intervening only where strictly necessary, of ensuring the stringent compatibility of the materials used with the original materials, and of developing innovative methodologies to resolve a number of issues associated with cleansing the surfaces. Below we provide detailed reports on the restoration performed on the works of art in the Chapel of the Cardinal of Portugal.

WALL PAINTINGS

Alessio Baldovinetti and Piero ed Antonio del Pollaiolo

On 27 September 1466 Baldovinetti was commissioned to paint "all the parts of the Chapel" for the sum of 120 Florins¹. The wall painting cycle signed "Alessio Baldovinetti" comprises four lunettes depicting the Four Evangelists and the Fathers of the Western Church (St. Gregory the Great, St. Jerome, St. Augustine and St. Ambrose), ten squinches with Prophets and Patriarchs and a lunette depicting the *Hortus* set above a panel of the *Annunciation* also by him.

The wall decoration is completed by *Angels* holding back the curtain, painted by Piero and Antonio Pollaiolo to complete the altarpiece that was also their work.

Where the technique adopted is concerned, we know from the sources and from the results of scientific inspection performed during this restoration that Baldovinetti painted the entire cycle "a secco", or dry, rather than in fresco on wet plaster, using an organic binding agent on very smooth plaster. Vasari discusses Baldovinetti's technique in the Gianfigliuzzi Chapel in Santa Trinita: "**Alesso first sketched in fresco and then finished on the dry, tempering his colours with yolk of egg mingled with a liquid varnish prepared over a fire: this vehicle, he thought, would preserve the paintings from damp**".

The restoration conducted thus offered us the opportunity to explore in depth and to study certain aspects of the technique adopted in the painting, characterised by certain idiosyncratic features not only in terms of the binding agent used but also of the preparatory drawing and the choice of pigments, with lead white topping the list.

¹ **Stefano Causa**, *La Cappella del Cardinale del Portogallo*, p. 236, in *La Basilica di San Miniato al Monte a Firenze*, Cassa di Risparmio di Firenze, 1988. pp. 233-248.

After carefully photographing the visible parts in high resolution, we proceeded with a diagnostic campaign by images to obtain information regarding the artefact's morphology, its materials that cannot be made up under visible light, the highlighting of organic compounds and the identification of certain kinds of pigment, through ultraviolet and infrared photography.

In terms of their conservation, the paintings were in reasonably good condition thanks to restoration performed by Giuseppe Rosi under OPD supervision in 1974.

What deterioration there was, was caused chiefly by a biological attack perpetrated by fungi and bacteria in certain areas and caused by a combination of the microclimate and of organic substances present on the surfaces.

The problem was solved by analysing the species in the laboratory and testing potential biocides in vitro, thus choosing the lowest possible amount of active principle needed to guarantee a good result, for applying on the surfaces.

The delicate cleaning phase, preceded by careful testing, went chiefly in the direction of dry methods, affording priority to so-called dry cleaning using vulcanized latex rubber.

Dealing as we were with complex painted surfaces, cleaning was differentiated according to the areas requiring treatment, which is why we used a crucial tool such as a laser, kindly supplied by El.En Group and used to clean the red curtain held back by Pollaiolo's angels.

Restoration was concluded with the customary puttying and retouching of the paintwork with watercolours.

PAINTED PANELS

Alesso Baldovinetti

Annunciation

The operation performed on the precious panel painted by Alesso Baldovinetti allowed us to discover a considerable amount of information on the unusual technique that the artist adopted and on the very unique kinds of deterioration that the painting presented, forcing us to identify appropriate conservation solutions. The scene of the *Annunciation* is painted using a protein-based tempera applied on a very thin oak-wood support devoid of any primer. The painting must originally have been embellished by considerable amount of mordant gilding and red lacquer, of which we can appreciate nothing but the residual traces today. The surfaces were much darkened and full of lacunae, and it was clear that woodworm was still very much at work, with over 500 woodworm holes being counted. First of all the panel was disinfested of biodeteriogens by being treated in an anoxic environment. A perimetral stretcher frame was placed on the back and fitted with a spring-based elastic system allowing us to check the natural movement of the panel structure without blocking it. Intervention on the surface involved removal of the very extensive and badly deteriorated retouching applied in a restoration performed in the 1970s, lightening of the darkened filmogenic substances present and restoration of legibility thanks to specific chromatic completion using watercolours and coloured crayons.

Copy of Antonio and Piero del Pollaiolo's altarpiece depicting *St. Vincent, St. James the Great and St. Eustance*

The painting depicting *St. Vincent, St. James the Greater and St. Eustace* is a 1930s copy of the altarpiece by Antonio and Piero del Pollaiolo now in the Gallerie degli Uffizi. The painting was affected by a very visible biological patina and a thick layer of deposit caused by burning candles. In an earlier restoration the whole area of the sky had been given an even *velatura* using a pigmented varnish that had considerably dulled its shade of blue. After removing the biological patinas with the application of a biocide, the deposits and varnishes were softened using solvent mixtures.

STONEWORK

Antonio Rossellino - *Tomb of the Cardinal of Portugal*

The restoration of the tomb involved cleaning and aesthetically renovating the stonework surfaces. The substantial atmospheric deposits blurring the marble were removed through preliminary aspiration and initial dry cleaning with polyurethane sponges. A second phase involved the softening of the more substantial areas of deposit through topical cleaning with cotton swabs and solutions with a low concentration of ammonium salts. Very few watercolour *velature* allowed us to balance the areas whose *velatura* had been lightly removed by old cleaning. The restoration revealed minor traces of colour and gilding that must have originally covered a large part of the marble, as well as restoring the proper balance between the parts carved in the round and the architectural elements, which now appear to be in greater harmony with the chapel's surfaces as a whole.

PIETRA SERENA STONE FEATURES WITH POLYCHROME COAT-OF-ARMS AND MARBLE INSCRIPTION

The architectural composition of the chapel designed by Manetti in *pietra serena* stone consists of four coffered arches adorned with 69 stone roses decorated with gold leaf on grounds probably imitating such precious stones as marble and porphyry. Observation under UV light and chemical inspection of the backgrounds revealed the use of lead white with streaks of darker colour and traces of red ochre.

The Cardinal's coat-of-arms in painted *pietra serena* with a cardinal's hat adorning the archway leading into the chapel was produced with inorganic pigments applied in tempera and mordant gilding. Beneath it, a white marble inscription tells us that the body was transferred and the chapel consecrated by Archbishop Alvaro and dedicated to St. James, St. Vincent and St. Eustace in 1466.

Restoration appeared to involve a conservative revision of the stone surfaces damaged by more or less recent infiltration from the windows beneath the vault and by earlier restoration involving the application of various patinas to standardise the replacement of entire pieces of stonework. Cleaning not only removed the substantial atmospheric deposits but also the polluting salts brought in by the infiltrations of rainwater and the deteriorated patinas masking the typical colour of the *pietra serena*.

The gilded elements were cleaned using swabs with artificial saliva, while the polychrome parts of the backgrounds suffering from major biological attack were treated with a biocide identified with antibiograms performed on a culture of the samples taken.

And finally, the aesthetic appearance was renovated in order to even out the surfaces.

GLAZED TERRECOTTA

Luca della Robbia's *Four Cardinal Virtues and Holy Spirit*

The vaulted ceiling of the Chapel of the Cardinal of Portugal presents a glazed terracotta surface depicting five large medallions with bas-reliefs, with the Holy Spirit in the centre and the Four Cardinal Virtues at the sides in high relief. The ground around the medallions consists of rhomboid tiles in yellow, green and purple.

The figurative elements were directly modelled in clay, while the decorative parts surrounding the medallions were moulded. The various tiles, most of them square but some shaped to follow the curve of the vault, were decorated using metal needles to etch the required design on the unfired clay.

The entire surface of the vault was covered by a thick layer of atmospheric deposit, concentrated chiefly on the lower elements, in the undercut areas and on the figures.

In particular, on many of the background tiles we noticed through cracks of various sizes probably caused by attrition between the various terracotta parts. The glazing of the figures in high relief, on the other hand, revealed small lacunae.

Between the background of each medallion and its frame one could see what was probably the original mortar pigmented in a deteriorated green colouring.

Other elements include other stuccowork attributable to earlier restoration attempts that occasionally covered the original surface. There was partial presence of original gold: the residual gilded decoration had been broadly reinforced by coats of brown paint in and purpurin roughly applied and now deteriorated.

Restoration involved making safe and consolidating the various terracotta elements and mortar holding them together to form a solid single structure, while also restoring the glazed surface from an aesthetic standpoint.

Consolidation involved the surface, with the application of fluorinated acrylic resins to restore the adhesion between the enamel and the underlying clay layer, and at a deeper level to restore cohesion to the ceramic body by infiltrating the same material.

The glazed surface was cleaned with compresses of lightly basic pH water solution which solubilised and thus removed the thick layer of deposit on the surface. This was followed by mechanical removal of the mortar from earlier restoration attempts covering the original surface. That mortar was then replaced by new formulation mortar to complete the previously consolidated original mortar.

An important phase in this restoration was the cleaning performed with a laser for the first time on a glazed terracotta surface. This technology made it possible to selectively remove the now deteriorated purpurin repainting and to rediscover the original mordant gilding.

And finally, first textural and then painted completion restored legibility and unity to one of Luca della Robbia's most important works.

RAILING

The emergency restoration of the railing in wrought-iron and partly gilded with gold leaf served to remove the substances applied in the course of earlier maintenance operations, to eliminate deteriorated products and to stabilise the corrosion process.

In the course of the operation we discovered the autograph signature of the MASCHIETTI brothers who made the railing for the chapel in the mid-19th century.

WINDOWS

The Chapel has two circular (Ø 66 cm) and three lunette-shaped (63 x 156 cm) glass windows

The five windows were filthy with dust deposits, splashed lime and resistant deposits.

Some of the glass was broken or missing, while the lead surrounds and support bars were in an appalling condition. The glass is plane, old but not rolled. The original glass is likely to have been replaced by this more modern glass in the last century.

Restoration involved the dismantling of the five windows by mechanical means, their storage in an adjacent room and the same operations performed on all of them. After photographing and dusting them, I cleaned the glass and lead with a water and neutral tensio-active solution. The windows were dried with pure cellulose paper. The missing glass was replaced with similar pieces while the broken glass was glued with specific resins. The deteriorated lead was replaced with new lead and all the old binding was replaced with new copper wire. All the windows received fresh puttying to seal their *tesserae* using the traditional technique. The operation different from the past in that five new painted steel frames were made, on which the glass was reinstalled, bound to the bars and sealed. The frames and glass were placed in the existing spaces on the *pietra serena* stone intradoses, fixed with screws and rawl plugs and sealed with structural silicone.

MONITORING THE MICROCLIMATE

In view of the damp problems detected in several artworks a microclimate monitoring campaign was prepared involving the installation of instruments for measuring thermo-hygrometric parameters inside the chapel over a nine-month period. The instruments used were positioned at different heights and on different sides of the chapel, recording relative humidity and both ambient temperature and the temperature on the painted surface.

The recordings revealed that surface temperatures never go below the dew temperature of the interior air mix, which means that during the monitoring period no risk situations occurred due to the condensation of water vapour present in the air on the interior surfaces.

This very important piece of data allowed us to realise that the problems detected were chiefly due to rainwater infiltration coming from the windows situated in the last register beneath the vault. Thus with the Soprintendenza officials' agreement it was decided to reinstall the restored windows on a slight inclination, thus leaving a tiny gap at the top to air the chapel and to ensure that driving rain slides towards the exterior. The same ploy, to prevent water from entering, was achieved by puttying at the base of the windows with a slide towards the exterior.