

CONSERVATION-RESTORATION WORKS ON WALL PAINTINGS IN SNG OPERA AND BALLET THEATRE LJUBLJANA

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In this paper conservation-restoration works on wall paintings discovered in SNG Opera and Ballet Theatre in Ljubljana will be presented, focusing on the project preparation and preliminary research of the materials found in the original murals. The restoration methodology was determined according to the results of several researches. Technological procedures used for restoring wall paintings in oil with playful grotesque motifs and painted wall marmorino in the technique of *stucco-lustro* are the central point of restoration interventions.

KEYWORDS: conservation, restoration, mural paintings, stucco-lustro, grotesque, opera, protection of cultural heritage.

INTRODUCTION

SNG Opera and Ballet Theatre¹ (hereinafter referred to as Opera House) is an integrated 19th century masterpiece with an ingenious mixture of architecture, interior decoration, fine and applied arts, which represents a unique monument of that time. The theatre was built in 1892 according to the design plans by two Czech architects Jan Vladimír Hráský² and Antonín Hrubý³ in the neo-renaissance style [ill. 1].

1 SNG – Slovenian National Theatre.

2 Jan Vladimír Hráský (1875, Babule at Haliču – 1939, Poděbrady), an engineer.

3 Antonín Hrubý (1863, Prague – 1929, Bratislav), an architect.

In 1993, the building was declared a cultural (architectural) monument by the Decree on the Promulgation of Monuments of Natural and Cultural Heritage in the area of the Municipality of Ljubljana Centre, between Aškerčeva, Tivolska and Slovenska streets, published in the Official Gazette of the Republic of Slovenia.⁴

PROJECT PREPARATION

In 2003, as a part of the preparatory phase, the Ljubljana Regional Office of the Institute for the Protection of Cultural Heritage of Slovenia prepared a conservation

4 *Official Gazette of the Republic of Slovenia*, no. 60-29, X. 1993, pp. 2937–2944.



1. Old postcard of Ljubljana's Opera, photo collection ZAL, G5-002-026

Senas atvirukas su Liublianos operos teatro vaizdu

program for the renovation and rebuilding of the Opera House. The documentation was based on a holistic view of the monument and its parts, along with the guidelines for the protection of exceptional items. It introduced new findings and identified interventions needed to adapt to new standards and technologies.

In 2006, the Restoration Centre of the Institute for the Protection of Cultural Heritage of Slovenia prepared a restoration project for interventions on the most valuable parts, in which specific guidelines for renewal were prescribed on the basis of previous studies. Conservation-restoration works and some reconstruction works with certain functional upgrades were mainly carried out in the historical part of the building, while the part designed for theatre employees underwent a massive change. Above all, the theatre tower was subjected to a thorough transformation. It was pulled down and completely reconstructed. The entire project was funded by the Ministry of Culture.

The aim of the project was to perform a complete renovation of the old part of the Opera House, including the new findings and some adapted methods executed on a highly professional level. Although the renovation of the Opera House included all the present parts of the building, in this paper only the conservation-restoration works on wall paintings will be addressed.

The conservation-restoration works were executed by a professionally qualified team of the Restoration Centre of the Institute for the Protection of Cultural Heritage of Slovenia.⁵ Between 2008 and 2010, works were carried out by several groups of academic

5 Project manager: Matej Zupančič, BA in architecture, conservator; main conservator: Marija Režek Kambič, BA; conservator: Irena Vesel, BA in architecture, conservator; head of works on wall paintings: Tjaša Pristov, Mr. Sc., conservator-restorer; head of works on the façade, plasters and stucco decoration: Špela Govže, Mr. Sc., conservator-restorer; head of works on interior stucco decoration: Saša Dolinšek, conservator-restorer.

restorers and students of painting, sculpture and restoration from the Academy of Fine Arts and Design of the University of Ljubljana.

RESEARCH OF HISTORICAL DOCUMENTATION

While preparing the renovation project, several early documents revealed that at the time of its opening in 1892, the theatre was fully decorated and did not look much like its present state. Close-ups of the drawings of architectural designs by J. V. Hráský and A. J. Hrubý showed colourful decorations on the walls and the ceiling in the foyer and the lobby. Even though the architectural designs were slightly changed and rearranged, they indicated a possibility of presence of wall paintings and were an impetus for further research. However, information on the commission for the theatre's interior decoration found in the articles published by the local newspaper *Ljubljana's Bell* in 1891 and 1892 is inconsistent. Although there may still be some doubts (due to a lack of preserved documentation) about the authorship of individual wall paintings, some conclusions about the authorship can be made. The main fields on the ceiling in the auditorium were painted by academic painter Emil Czech.⁶ He painted six allegories of drama, comedy, lyric, music, dance and glory. He also painted the idyll of music on the ceiling above the proscenium.⁷ Adolf Liebscher,⁸ a history painter from Prague, painted the main stage curtain with the motif 'The Country Carniola Bows to Art'.⁹ The curtain does not exist anymore. Highly appealing and interesting grotesque paintings uncovered in the foyer were painted by Winter & Richter

6 Emil Czech (1862–1929), an Austrian painter.

7 Anton Funtek, *New Country Theatre in Ljubljana*, *Ljubljana's Bell*, 1892, p. 630, Anton Trstenjak, *The History of Theatre Performances and Slovenian Dramatic Literature, Dramatic Society of Ljubljana*, Ljubljana, 1892, p. 177.

8 Adolf Liebscher (11 March 1857, Prague – 11 June 1919, Potštejn) was a Czech history painter.

9 *Ljubljana's Bell*, 1891, p. 571, Anton Funtek, *op. cit.*, pp. 628, 632, Anton Trstenjak, *op. cit.*, p. 172.

from Vienna.¹⁰ The room where the visitors could socialize was described as a 'bijou'. Because of the use of the same painting technology and grotesque motifs, Winter & Richter¹¹ were probably also the authors of the ceiling paintings in the lobby. Local painter Heinrich Wettach¹² was also mentioned as the author of the paintings on the foyer ceiling.¹³ He could be the author of the painting in the centre of the ceiling, but this painting could not be analysed because it was heavily deteriorated. It is not clear from this information who was the real author of the paintings in the foyer. Richter was also the author of the *sgraffito* decoration on the façade.¹⁴ Some other contractors for decorative assignments were mentioned in the archival documents, but it was not fully clear from the texts what their exact contributions were.¹⁵

OBJECT INVESTIGATION

Historical research helped to find many documents about the repertoire of the Opera House and very few written documents about the building maintenance and any other structural or restoration interventions. Due to a limited documentation on the previous works, some of the existing decorations could have been processed only in their actual condition. On the basis of object investigations it became evident that some decorations, including the paintings, had already been restored in the past. Soon after the Opera house was built in 1892, a massive earthquake shook

10 Anton Funtek, *op. cit.*, p. 630, Anton Trstenjak, *op. cit.*, *Dramatic Society of Ljubljana*, p. 176.

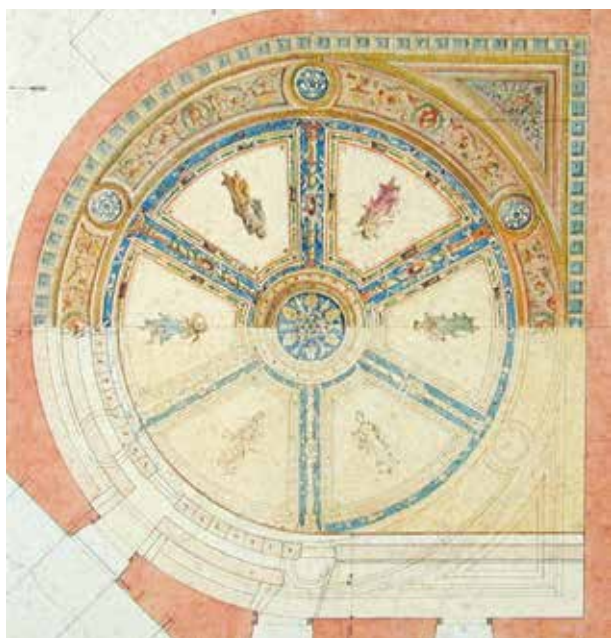
11 No other available data about the contractors Winter & Richter were found.

12 Heinrich Wettach (12 June, Vienna – 3. October, 1929, St. Andrä near Villach), an academic painter who lived in Ljubljana from 1858 to 1918.

13 *Ljubljana's Bell*, 1891, p. 571.

14 Anton Funtek, *op. cit.*, p. 629, Anton Trstenjak, *op. cit.*, p. 173.

15 J. Kautsky & Rottonara (ornamental design, gilding), Karel Lipovšek (room painter), and Brothers Eberl (painting works) were also mentioned among the contractors.



2. Cut-out of an architectural design of the ceiling in the auditorium, Project II (Archives of the RS, collection plans of Provincial Theatre, 106811), photo by Marija Režek Kambič, 2003

Salés lubų plano iškarpa, II projektas

Ljubljana in 1895. It may be presumed that some restoration works were carried out not long after that event.

As a part of renovation works in 1961, the paintings on the ceiling of the auditorium by Emil Czech were fully overpainted by Slavko Pengov.¹⁶ Unfortunately, the original paintings have not been preserved, but Pengov most likely followed the original contours.

In 1982, the façade with paintings on the frieze and the gable was renovated. According to the articles from 1892,¹⁷ original paintings on the façade were probably executed in the *sgraffito* technique, but even at that time, there had not been enough data for a complete reconstruction. The decoration on the façade was reinterpreted in the fresco technique. Based on the stratigraphic analysis, almost 100 square meters of

¹⁶ Slavko Pengov (24 June 1908 – 6 January 1966), a Slovenian painter.

¹⁷ Anton Funtek, *op. cit.*, p. 629, Anton Trstenjak, *op. cit.*, p. 173.

originally painted surfaces were overpainted and remained hidden until the present day. The time when the original paintings in the foyer, the lobby and some parts of the auditorium were overpainted could not be established. Some decorative paintings in the corridors and stairways were preserved only in fragments [ill. 2].

PRELIMINARY RESEARCH

The work started with a thorough stratigraphic analysis. Stepwise removal of the covering paint layers was used for the purpose of analysing and determining the chronological order of the successive paint layers.

The results of the analysis of the first layer in the foyer showed traces of small remnants of coloured surfaces, but the obtained information was not sufficient for making any decision on our further work. The first probes were executed mechanically with scalpels. The removal procedure was very difficult, since the subsequent layers of paint were strongly adhered to each other and glued to the foundation. The first layer (white) was thick ordinary acrylic wall paint. The second layer (beige – light ochre) was very smooth, waterproof and, according to the analysis, contained polyvinyl acetate; then followed the layer of original painting and the last layer, in which insulation of drying oil was applied on a very fine and smooth plaster. While mechanical uncovering proved to be inadequate, we proceeded with chemical stripping of recent paint. The most efficient and non-destructive method for removing a superimposed layer was the use of acetone and nitro diluent or their combination. Cotton pads soaked with diluents were put on the surface, which softened the recent layer and slowly started to dissolve it. When the original painting was completely cleaned, the surface was neutralized with benzene.

The results of the second stratigraphic analysis provided a sufficient amount of information on the type, area and preservation of paintings on the entire premises. With the help of stratigraphic analysis, wall

paintings in the lobby, the foyer, stairways, corridors and some small parts above the proscenium were located. Stencil decorations on the walls and ceilings of stairways and corridors were made with lime paint and strongly deteriorated. In most areas they were completely degraded. Grottesque paintings in the foyer and lobby were originally made in oil, and the painted marmorino on the walls was made in the technique of *stucco-lustro*. The use of the technique of *stucco-lustro* and wall painting in oil is uncustomary and quite unique in Slovenia.

Due to the rarity of the used techniques and, consequently, the lack of expertise in the professional circles, further research was necessary. It was important to obtain scientific confirmation (of our field investigations) and as much information as possible about the materials that were used and how they were used. With the support of the Natural Science Department of the Restoration Centre and in collaboration with the Institute of Civil Engineering ZAG,¹⁸ the analysis and chemical identification of all substances present in plasters and individual layers of paint was executed.

For the purpose of scientific research some smaller samples of plaster and colour layers were taken from different parts of paintings in the foyer, the lobby and the auditorium. Analysis was carried out in order to determine the composition of the plaster, to define the type of subsequent coatings, and to identify the binder in the colour layers and the insulating layer.

The selected samples were embedded in a small resin block, cut crosswise and polished until the sample was exposed and the entire surface became flat and smooth. Their examination provided information on the number of layers, their sequence and relative thicknesses, as well as enabled us to determine the nature and proportions of the constituent materials. Prepared cross-sections of samples were analysed by

optical microscopy (OM) in visible (VIS) and ultra-violet light (UVF). On the basis of OM it was already possible to identify the specific substance referring to its fluorescence. For reliable identification and characterization of the selected samples different methods were used:

- Histochemical painting – HB intersections with colouring were used to determine the presence of proteins or fats;
- Qualitative droplet tests – KP (spot test) in crude samples or sections confirmed the presence or absence of compounds or classes of compounds;
- Infrared spectroscopy – FTIR, information on the chemical composition of individual layers taken from particles or sections of samples was obtained;
- SEM EDX analysis of cross-sections was used to determine the presence of any other elements, especially pigments, in various layers.

The research served to characterize and identify the used materials and painting techniques. With the help of chemical analysis we could also assume the possible causes of damage and establish proper restoration methods.

1.1.1. Results of scientific research on the plaster and paint layer used for *stucco-lustro*:

In analysing the materials used for the painted marmorino, the aim was to determine the composition of the plaster, identify the binder in the plaster and in the colour layer, to define the type of subsequent coatings and to try to define the technique. The decorated surface was very smooth and cold to the touch.

To identify the binding material for the painted marmorino, a sample (OPR 118) was taken from the wall in the foyer. A piece of plaster taken from the

¹⁸ ZAG – Slovenian National Building and Civil Engineering Institute is an internationally recognized research organization in the field of construction.



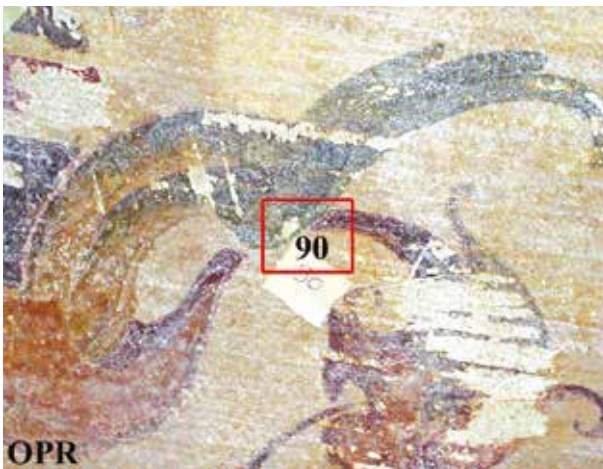
3. The uncovering of *stucco-lustro* on the southern wall of the foyer, photo by Tjaša Pristov, 2009

Stiuko-liustro puošybos atidengimas fojė pietinėje sienoje

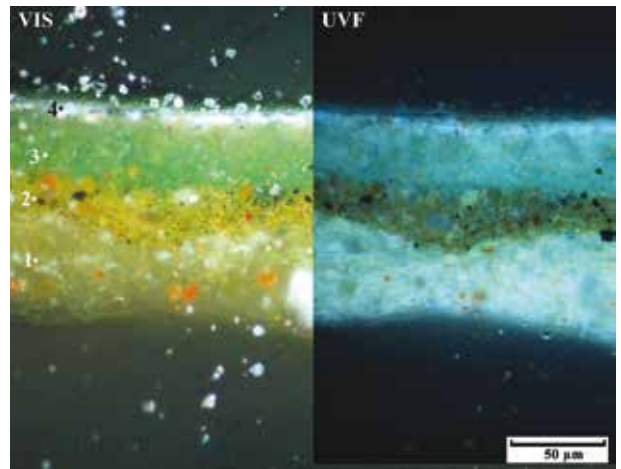
dark marmorino showed that fine and rough plaster consisted of pure lime binder:

- An aggregate of rough plaster had a more heterogeneous composition. The carbonate component (rounded dolomite grain) prevailed; individual grains of silicate rocks (quartz) and rock with iron minerals (sand) were present. The grains were well sorted and rounded, individual grains were sharp-edged. The grains were sized from 0.12 to 0.9 mm. The ratio of aggregate to binder was 1:1.
- For an aggregate of fine plaster (thickness 0.71 mm), crushed calcite – calcite flour was used. Grains were poorly sorted and sharp-edged. Their size ranged from 0.03 to 0.4 mm. The ratio of aggregate to binder was 1:2. The upper part of the fine plaster layer in sample OPR118 mainly consisted of mineral wax.
- Analysis of sample OPR118 showed that the lower layer consisted of white calcite with pigments appearing in the upper part of the layer. The method of distribution of pigments in the layer of lime plaster indicated that pigments had been applied on wet plaster.

The same results were obtained by analysing and comparing different parts of similar surfaces. The analysed materials revealed that the original colour layer of the marmorino wall painting was created by



4. Sample OPR 90 taken from the second cassette on the ceiling in the lobby. Sample for the analysis was extracted from the green dragon wings. The colour was scratched from the surface
OPR 90 pavyzdys iš antros vestibulio lubų kasetės. Medžiaga analizei buvo paimta nuo žalių drakono sparnų. Spalva buvo nugremžta nuo paviršiaus



5. Sample OPR 90 shot under an optical microscope in visible and ultraviolet light. The layers in the cross section: 4 – white, 3 – light green (FTIR), 2 – ochre, 1 – yellow (FTIR)
OPR 90 pavyzdys po optiniu mikroskopu regimojoje ir ultravioletinėje šviesoje. Pjūvio sluoksniai: 4 – baltas, 3 – žalsvas (FTIR), 2 – ochrinis, 1 – geltonas (FTIR)

applying pigments on fresh plaster and polishing it with mineral wax as the main characteristic of the *stucco-lustro* technique [ill. 3].

Stucco-lustro is a pure lime technique with precision-machined plaster and carefully selected materials. Since *stucco-lustro* is painted on fresh plaster, it falls within the *fresco buono* technique. The difference is in the preparation of fine plaster and binder, where Venetian soap can be added. Otherwise it works in the same manner as *fresco buono*. When the painting of a decoration is finished, the entire surface is smoothed with a spatula, and when it is completely dry, a coating of turpentine and wax paste is rubbed into the surface and polished with rags.¹⁹ The *stucco-lustro* technique requires a great deal of experience. Today, it has been almost totally replaced by techniques that use synthetic emulsions for modern polished surfaces, but in fact, the original *stucco-lustro* technique cannot be replaced by any other painting method.

19 Max Doerner, *Malmaterial und seine Verwendung im Bilde*, 18. Auflage, Stuttgart, 1994, p. 220.

Originally the ornamental borderlines on the walls were painted over the marmorino surface in oil. It is not known exactly when the entire decorated surface was fully covered with brown synthetic paint.

1.2. Results of scientific analysis of the plaster and the paint layer used for oil paintings:

Research was carried out in order to determine the composition of the plaster, define the type of subsequent coatings, identify the binder in the plaster, analyse the composition of the insulating layer and identify the binder of the colour layers [ills. 4 and 5].

- The results for the yellow insulation layer (layer 1) of sample OPR 90 taken from the ceiling in the lobby showed a spectrum of elements: the presence of drying oil, calcium carbonate and aluminosilicate (kaolin).
- Analysis of the light green colour taken from the green dragon wings located on the second

cassette of the ceiling in the lobby (layer 3) showed the presence of drying oils, aluminosilicate (kaolin) and plaster.

- Research by the FTIR method showed that the ochre-yellow insulating coating on the ceiling in the lobby contained varnish and linseed oil (possibly modified linseed oil). Analysis of the subsequent coating, which was very difficult to remove, showed that the paint was based on polyvinyl acetate. The same results were obtained when analysing the insulation layer and the subsequent coating taken from the wall paintings in the foyer.

Scientific research showed that the paintings in the lobby and the foyer were made in oil. Before applying the paint layer, the surface of the final plaster was insulated with a coating mixture of drying oil and shellac. The composition of rough and fine plaster of the samples taken from the parts of oil painting was also based on pure lime binder with the exception of fine plaster where gypsum was added probably for the purpose of smoothing the final surface more easily. Gypsum used in plaster mixture can be very unstable and, being a hygroscopic material, is extremely sensitive to moisture in the air and walls. With the presence of moisture, gypsum plaster deteriorates much faster than pure lime plaster. Due to these reasons it is necessary to ensure a stable indoor climate environment (air temperature, relative humidity), especially in the areas where gypsum plaster is used.

1.3. Results of scientific analysis of the paint layer used for paintings in the auditorium:

Chemical analysis of paintings on the ceiling of the auditorium was carried out in order to investigate the obtained historical information on the renovation works of 1961.²⁰

²⁰ See paragraph 4, Object investigation.

In sample OPR 124 taken from the dress of a figure painted on the ceiling, layers 2, 3 and 5 were analysed. In the white layer (layer 2) $\text{CaCO}_3 + \text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ and drying oils were detected. The analysis of the white layer (layer 3) showed the presence of drying oils (remnants of original painting). Analysis of the orange colour (layer 5) showed the presence of $\text{FeAlSi H}_2\text{O}$ and gum arabic or guar (overpaint).

The obtained results can imply that the original painting was also painted in oils and can confirm that it was completely overpainted with watercolours.

RESTORATION WORK

The restoration of paintings that remained hidden under the layers of paint for decades was a real challenge for the conservation-restoration profession. The renovation process was based on the main restoration principles determining that the original parts of the painting had to be distinguished from the newly added elements in a way that would not be disturbing for the entire surface. With the aim to reconstruct the missing parts, a great many motifs were analysed to avoid any kind of erroneous interpretation. Compatible and easy removable materials were used in conservation-restoration interventions. One of the aims was to minimize the interventions and present the original in the most authentic manner. In the process of collecting information on the used materials and technologies, the theatre's history and integration into the total building renovation (with all technological and constructional improvements), an interdisciplinary approach was necessary. All collected data were thoroughly documented; photographic documentation was collected during the entire conservation-restoration process. Deterioration of wall paintings was indicated on drawings with graphic symbols, and a map legend for each pattern of different deterioration was included.

Based on the results of chemical analysis, technological characteristics and the state of conservation of

wall paintings, treatment trials for cleaning and consolidation were performed on site. For each technique several examples of application of different restoration methods were prepared, the final integration was presented and its adequacy was discussed. Under the supervision of the chief conservator from the Institute for the Protection of Cultural Heritage of Slovenia, Ljubljana Regional Office, different treatments were compared and confirmed, and the restoration procedures and materials were determined.

1.4. Corridors and stairways

In the corridors and stairways, a series of small-scale stratigraphic investigations were performed for the purpose of analysing the extent and preservation of decorative stencil painting and establishing its course on each wall and ceiling. Despite the poor preservation of the original layers, three representative pieces of decorative paintings were found. They were sketched, and the measures to be taken, their extent and the colour codes were determined. The precise execution of decorative paintings was included in the architectural plans, and the data were computer-processed. In this way, the relevant information and documentation for the reconstruction of corridors and stairways in their original form were prepared.

Due to massive construction works on the corridors and stairways resulting in the destruction of the already deteriorated decorative paintings, it was decided that it was necessary to preserve the four individual original fragments. A lime paint layer made in the *secco* technique was pulverized and was very sensitive to any kind of treatment. The adherence of the paint layer to the support was reinforced with acrylate and methacrylate-based fixative, and 2%–4% solution of synthetic resin Paraloid B72 dissolved in alcohol was used. The fixative was applied by spraying to avoid any additional damage to the paint layer (wiping the colour). For the protection of the painting

during the entire process, the facing with gauze and *Coletta*²¹ was applied and prepared for demounting (*stacco a massello*²²). After the demounting, the back of the fragments was thinned, evened and cleaned. In order to ensure better stability, the next step was the application of the backing with cotton gauze, calcium caseinate adhesive²³ and sand. Completely dry fragments with an intervention layer (Cadorite panel) were transferred to a new support (aluminium panel Milebond) with a protective border. All three were glued together with two-component adhesive Neostik PU 101. The facing was removed with steam under regulated pressure until the painted layer was completely cleaned. For the final touch, the edges of fragments were filled with a suitable decorative render and some small local retouches were made.

For decorative paintings in the hallway, mimetic reintegration or total reconstruction was prepared in situ. Stencils were drawn and designed on the basis of the discovered original paintings. Despite the insistence of the Commission of Experts to fully implement the reconstruction of the stencil paintings, the reconstruction was dismissed according to the guidelines of the new concept of the entire image of the Opera House. Today, the preserved fragments serve as a documentary sample of the original paintings and are exhibited in one of the corridors of the Opera House.

1.5. Foyer

During the works on the ceiling, lunettes, spandrels and barrel vaults in the foyer, also called a smoking room, oil mural paintings with rich grotesque motifs were

21 *Coletta*: a paste used for lining paintings. It consists of animal glue, molasses, vinegar and fungicide.

22 *Stacco a massel*: demounting the painting with the render or a part of the support.

23 Calcium caseinate used for the consolidation of painting grounds and for gluing gauze and other backing materials to a transferred painting consists of casein, slaked lime, acrylic emulsion and some water.



6. Uncovered paintings in the foyer imitate the Greek, Renaissance and, above all, Italian style of grotesque, photo by Tjaša Pristov, 2011

Fojè atidengta tapyba imituoja graikų, renesanso ir ypač itališką grotesko stilius

revealed. Both technologically and in terms of content they are a rarity in the territory of Slovenia [ill. 6].

Grotesque indicates a form of dreamy, imaginative and unusual wall decorations, based on a composition of real and imaginary images derived from both the animal and plant world. Generally, the images represent the metaphoric meaning in nature. Flowers, plants, animals and mythological creatures (griffons, sirens and centaurs) are featured in all kinds of transformations taking place in vine tendrils and creating their own metamorphosis between them.²⁴

The studies and comparison of the preserved historical grotesque paintings helped to explain the motifs and to reintegrate the deteriorated images.

24 Alessandra Zamperini, *Ornament and the Grotesque*, London: Thames & Hudson, 2008, pp. 6–7.

Uncustomary selected motifs with symbolic meanings seemed to be appropriate for decorating the theatrical spaces of Ljubljana's Opera House and were in accord with the fashion of that time. Similar motifs are also found in the decorations of the Vienna Opera House. Despite the fact that grotesque decorations were widespread and popular all over Europe, they are rarely found in the Slovene area. Compared to the rest of Europe, we can hardly speak of the existence of grotesque paintings in Slovenia, let alone its development. Until today, only four cases of wall paintings with the motifs of grotesque have been recorded. One is located in the hallway of Sevnica Castle,²⁵ and the second one was in

25 Wall paintings in Sevnica Castle were painted in neo-classicist arabesque style in the beginning of the 19th century (1804 / 1807). The author is unknown.

the promenade of Rogaška Slatina,²⁶ which was unfortunately destroyed. Individual elements of the motifs and compositions of early grotesque are detected in two rooms of Tartini House in Piran,²⁷ and the newly discovered painting in the Opera House in Ljubljana may be considered the fourth case [ill. 7].

The restoration process of uncovered paintings was quite demanding. Removing the paint with chemicals and using acetone in nitro diluent was extremely difficult. More than half a year restorers worked in extremely difficult and health-endangering conditions, wearing protective gloves and masks all the time. After uncovering, it became clear that the entire area was heavily damaged.

Therefore, in the first phase, the mapping of all deteriorated areas and the recording of deterioration phenomena such as numerous cracks, lacunas, abrasions (scratches), swelling of plaster and paint layers as well as inappropriate an intervention in the past, was necessary for compiling sufficient documentation on the preservation of paintings.

Object investigation revealed previous restoration interventions. In some places old lacuna fillings, patches of different plaster and retouches were located and their adequacy was assessed. All old fillings and retouches were inadequate and were removed after thorough documentation. A great deal of painted surfaces had already fallen off due to poor cohesion of the painted layer with the base, and in many parts the paintings were preserved only in fragments, which may have also been caused by excessive moisture in the room. To a large extent deterioration was deliberate, probably caused by those who overpainted the originals. The paint layer was locally severely



7. Detail of the painting discovered on the ceiling cassette shows the metamorphosis of mythological creatures, photo by Tjaša Pristov, 2010

Ant lubų kasetės aptiktos tapybos detalė vaizduoja mitologinių būtybių metamorfozę

scratched, because rather thick layers of original paint were producing a relief reflection on the overpainted surface [ills. 8 and 9].

After uncovering, a meticulous process of surface cleaning started. All inadequate elements and materials from previous interventions were removed. The paint layer was carefully cleaned with acetone and cotton wool; soft brushes were used for the relief parts of the paint layer. Hollow areas of plaster, cracks and pores were filled in with an injection of grout Ledan TB. New infillings were made with lime mortar and a small per cent of gypsum as in the original plaster. Selecting a suitable consolidation of plaster and paint layers presented some limitation because of gypsum that was added to the mortar. Water-based adhesives were unsuitable because they started causing

26 Promenade Rogaška Slatina – ‘Valdenban’ painting is described by Ivan Stopar as similar to those in Sevnica Castle. These arabesques were painted by painter Albert Üetz from Gratz around 1843.

27 Wall paintings conserved in two rooms of Tartini House in Piran were created in the late 18th or early 19th century. The author is unknown.



8. The process of uncovering the lunette in the north side of the foyer. Various superimposed and overlying layers were removed with a chemical solvent, photo by Tjaša Pristov, 2008

Liunetės atidengimas šiaurinėje fojė dalyje. Cheminiu tirpikliu buvo pašalinti keli užtapyti ir uždažyti sluoksniai

9. Graphical documentation of deterioration phenomena in the arch in the west side of the foyer

Arkos vakarinėje fojė pusėje nykimo procesų grafinė dokumentacija



additional damage to the plaster and the paint layer. Treatment trials showed that a certain quantity of water in diluted consolidant started to dissolve the gypsum in the mortar and caused the weakening of the material as well as the flaking and peeling off of the insulation and paint layer from the base. Original

materials also did not react well to a solution with synthetic resin Paraloid B72 diluted in alcohol because it caused the darkening of the colour layer. The most efficient adhesive for consolidating the plaster and the smaller flaking paint layer proved to be acrylic emulsion Sokrat 2802 NA with only a small amount of water



10. North side of the foyer after completing restoration interventions on the walls and the ceiling, photo by Tjaša Pristov, 2010

Šiaurinė fojė pusė po sienų ir lubų restauravimo

added. For deteriorations (peeling and scaling) of the colour layer the Lascaux adhesive diluted with White Spirit was injected or applied with a paint brush under the colour layer and, when dried, ironed over the Melinex paper²⁸ with a hot spatula. By these actions the internal cohesion of the colour layer and the base was improved. The next challenge was to find the right binding material for retouching and reconstructing the missing parts of the colour layer. Reintegration tests with oil colours and Maimeri Restauro, as well as varnish colours showed good compatibility, but their superficial look and surface glow did not match the original colour layer. A unified surface look was finally achieved with pigments mixed with acrylic emulsion Socrat 2802 NA and a small per cent of varnish. The use of this mixture was approved also due to its reversibility (it is easily removable with acetone). For the reintegration of the damaged parts of the colour layer, mainly *tratteggio* combined with pointillism, some tonal adjustments and mimetic reintegration was used.

Conservation-restoration of the *stucco-lustro* marmorino walls represented a real challenge because of a complex technological process. Before starting the work, various experiments of making *stucco-lustro* were performed for the purpose of testing the quality of execution and the mimetic adequacy of the surface. The first treatment trials were made on a portable surface, and the next ones – in situ. Taking into account the good results of treatment trials, it was decided that the deteriorated wall marmorino could be entirely reconstructed in the original technique [ill. 10].

The reconstructed areas were painted on wet plaster and smoothed with a spatula. Highest caution was required when processing the joints of the old and the newly made *stucco-lustro* and using the right method of colour application, because it was necessary to predict the final tone and the exact image of the surface.

²⁸ Melinex paper is used as an intervention layer to prevent the adhesive from sticking with a spatula.

1.6. The lobby

For the paintings and *stucco-lustro* uncovered in the lobby, the same materials and conservation-restoration interventions as in the foyer were used. The chemically conducted uncovering process revealed that original paintings were still preserved on all five cluster fields on the ceiling. The edges of the frames were decorated with coloured lines, bands and a Greek meander pattern, while the interior spaces were filled with painted floral motifs, volutes, small faces and griffons. Since the same motif was repeated in all five fields, the entire drawing of the original painting in scale 1:1 could be sketched despite the extended deterioration of the painted surface. The surface was completely cleaned, the plaster and the colour layer were consolidated, and the missing parts of the original drawings were reintegrated with minimal retouching and partial mimetic reconstruction.

Stencil paintings on the ceiling up to the lintel of the cluster fields were also entirely reconstructed.

The walls and the pilasters in the lobby were covered with layers of varnish and oil mappings. Underneath, there was a well-preserved painted marmorino. All overlying layers, as well as all inadequate infillings and retouching were removed. Marmorino reconstruction was carried out in the new entrances to the basement as well as in those parts where it was destroyed by moisture and mechanical damage [ill. 11].

1.7. Auditorium

Painted decorations in the auditorium were fairly well preserved. Paintings on the rounded ceiling and part of the proscenium were renewed or overpainted by Slavko Pengov in 1961. According to the testimony of Pengov's family, the painter renovated old, poorly preserved frescoes depicting the dancing muses.²⁹ This state-

²⁹ Elizabeta Šprager, *Slavko Pengov, a Fresco Painter*: Diploma Thesis, 1993, p. 50.



11. View of part of the ceiling in the lobby after the completion of restoration interventions, photo by Tjaša Pristov, 2010

Dalies vestibulio lubų vaizdas po restauravimo

ment was confirmed by scientific research.³⁰ As part of renovation works in 1961, Pengov repainted six allegories, most likely following the contours of the original painting. The painting on the ceiling was restored directly on the basis of its present appearance and condition (reclaimed from a swollen state). The removal of overpaint would have caused a great risk of losing both paintings – the original and Pengov’s works.

While the results of scientific research proved that the overlying painting was made with watercolours, a different conservation-restoration approach had to be

established. Despite the good overall condition of the painting, the most disturbing elements were superficial impurities, strongly concentrated on the areas where the metal construction of the ceiling was built in. The concentrated superficial impurities showed a grid of inbuilt iron construction on the painting surface. This phenomenon may have been caused by some kind of static thickening of dust and other kind of air pollution. All superficial impurities were gently removed with Wishab sponges, which are very effective for dry cleaning. The grid of impurities was erased from the colour layer. After the cleaning, the surface looked much brighter and more colourful. In the process, some cracks were infilled, and lacunas in the colour layer were reintegrated with watercolours.

30 Scientific research that was carried out during conservation-restoration interventions on the murals in the auditorium showed that the original painting was still partly preserved under Pengov’s secondary painting.



12. Painting on the ceiling of the auditorium after the finalization of restoration interventions, photo by Tjaša Pristov, 2011

Salės lubų tapyba po restauravimo

On the basis of stratigraphic analysis, small parts of the original painting were fully uncovered on the lunettes of the proscenium above the stage. The same conservation-restoration procedures as in the lobby and the foyer were used for the plaster, insulation and the colour layer prepared in the same manner. A deteriorated paint layer (scratched and destroyed before applying a superimposed layer of paint) was retouched and partially mimetically reintegrated [ill. 12].

1.8. Façade decoration

Despite the fact that the paintings on the frieze of the northern, southern and eastern façades were already restored in 1961, they deteriorated again to such an

extent that restoration was needed. The main cause for deterioration was the negative impact of atmospheric influence, strong sun exposure, and possibly inadequate materials used in the previous restoration. Since there had not been enough data available for an authentic reconstruction of the original *sgraffito* technique, the heavily deteriorated decorative paintings on the frieze and the turrets were reintegrated using the *secco* painting technique [ill. 13].

The golden background of the painted decoration on the frieze was generally in a poor condition. The surface was heavily washed out and worn out, without any gloss. Since the local treatment of the damaged gilded surface alone would have been too disturbing for the overall look, it was decided that the

golden background needed to be fully reconstructed. Retouching of the damaged parts of the painting was carried out locally with pigments and acrylic emulsion Sokrat 2802 NA. Where the original colour layer had faded significantly, tonal adjustment was used to achieve the unification of the painted surface. Just like in the original, painted shadows of the motif were added over the golden background. Almost completely destroyed and almost unrecognizable decorative paintings on the turrets were reconstructed in the *secco* painting technique with Keim mineral exterior paint in order to minimize the deterioration caused by negative atmospheric influence [ill. 14].

CONCLUSION

Despite several problems that emerged in the process of total renovation of the entire building, restoration works were performed successfully. During the three-year conservation-restoration of all decorative elements originally present in the building, the main goal of restoring the representation of the initial atmosphere of the Opera House interior was achieved. By following the phenomenological approach for collecting relevant information, technological and conservation problems were well diagnosed. The results of the material analysis and investigation significantly enriched the expert knowledge of the classic *stucco-lustro* technique as well as the quite uncommon use of oil colours applied on a plaster surface. A better understanding of the materials used in those techniques and the preparation of a significant number of treatment trials helped to ensure a better quality of conservation-restoration procedures that were carried out on the original decoration. At the end of the project, a final report on the conservation-restoration works was prepared. It included the results obtained by the material analysis, all stages of conservation-restoration interventions and the maintenance instructions regarding the cleaning of decorated surfaces, the



13. Detail of the paintings on the central frieze of the façade after restoration interventions, photo by Tjaša Pristov, 2009

Centrinio fasado frizo tapybos detalė po restauravimo



14. Paintings on the tower and the frieze of the south-eastern part of the building after the completion of restoration interventions, photo by Tjaša Pristov, 2010

Bokšto ir frizo tapyba pietrytinėje pastato dalyje po restauravimo

monitoring of indoor climate and the observation of individual elements in case of their deterioration.

By following the basic principles of conservation and by making small adjustments that the modern standards for public spaces demand, a beautiful appearance as well as practical and functional areas that can enrich our culture were created. The further task of the investor's maintainer is to ensure all proper conditions for the further preservation and maintenance of the decorations. The task and the obligation of the representative of the Institute for the Protection of Cultural Heritage is to control the state of the building and educate people about the value and importance of the protection of rare cultural heritage.

Received 15 04 2016

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LIUBLIANOS SNG OPEROS IR BALETO TEATRO SIENŲ TAPYBOS KONSERVAVIMO IR RESTAURAVIMO DARBAI

Tjaša Pristov

SANTRAUKA

REIKŠMINIAI ŽODŽIAI: konservavimas, restauravimas, sienų tapyba, stiuko-liustro puošyba, groteskas, opera, kultūros paveldo apsauga.

SNG operos ir baleto teatras – XIX a. šedevras ir unikalus to meto paminklas, kuriame yra sumaniai integruota architektūra, interjero puošyba, vaizduojamoji bei taikomoji dailė. Teatras buvo pastatytas 1892 m. neorenesanso stiliumi pagal dviejų čekų architektų J. H. Hraskio ir J. A. Hrubio projektą.

2006 m. Slovėnijos kultūros paveldo instituto Restauravimo centras parengė ankstesniais tyrimais paremtą vertingiausių pastato elementų restauravimo projektą. Konservavimo ir restauravimo darbus 2008–2010 m. atliko grupė mokslininkų restauratorių, tapytojų, skulptorių ir Liublianios universiteto Vaizduojamojo meno ir dizaino akademijos studentų.

Nemažą bendros Liublianios operos teatro renovacijos dalį sudarė sienų tapybos konservavimo ir restauravimo darbai. Nuo pat pradžių iškilo rimtų problemų, nes kai kurie tapybos darbai jau buvo restauruoti anksčiau, o kai kurie buvo smarkiai sunykę. Deja, dėl istorinės dokumentacijos trūkumo kai kuriuos sienų tapybos kūrinius galima buvo apdoroti tik remiantis dabartine jų būkle. Originali salės lubų tapyba buvo visiškai užtapyta 1961 m., o 1982 m. fasadas su frizo ir frontono tapyba buvo renovuotas. Be to, fojė, vestibulyje ir kai kuriose salės dalyse buvo aptikta beveik 100 kvadratinų metrų ploto sienų tapybos. Koridoriuose dekoratyvios tapybos išliko tik fragmentai.

Po dažų sluoksniais paslėptų sienų tapybos kūrinių atidengimas tapo tikru iššūkiu restauratoriams. Atlikus tyrimus, buvo pasirinkta restauravimo metodika. Tapybos rekonstrukcija rėmėsi pagrindiniais restauravimo principais – išsaugoti originalią tapybą ir pateikti kuo autentiškesnę jos rekonstrukciją, konservavimo metu naudojant tarpusavyje suderinamas, lengvai pašalinamas medžiagas ir minimaliai retušuojant.