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Traditional Stucco Techniques in Interior Surface Coatings: Northern Portugal (19-20th Centuries)

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Abstract This paper presents the main stucco techniques used for decorative artwork in interior walls across the wide chronological span. This study is based on Archaeology and Art History contributions. We tried to understand some decisive artistic moments, stemming from the sixteenth century till the reconstruction of Lisbon under the Marquis of Pombal in the aftermath of the 1755 earthquake. The industrialization of the stucco art became widespread by the late nineteenth century, prompting the spread of stucco as a decorative solution for urban architecture, public or private. The plaster and lime-based stucco techniques form a complex and multifaceted corpus. In order to identify them in the context of Portuguese decorative arts applied to architecture in the nineteenth and twentieth centuries we followed an interdisciplinary approach that required laboratorial means, the review of specific terminology and the understanding of the diffusion of the Baganha and Meira workshops (the two major workshops active in Northern Portugal) and the spread of their influence in the rest of the country, especially in the South.

1 Stucco Artwork in Portugal. The Historical Context

1.1 Archaeological Materials

Stucco artwork in Portugal has traditionally been ignored by history of art, which has always considered it as a minor art, which is also the case with other decorative arts. We must turn to archaeology to understand its historical evolution, for there we find the oldest known vestiges in this country. The Roman cultural heritage is one of the most ancient and important to the Iberian Peninsula, and
lime stuccoes in its various technical expressions (moulded and surface coatings) were already present during the Roman occupation in some of the known archaeological sites: Bracara Augusta, Tongobriga, Miróbriga. The best preserved ones are the collection of moulded stucco and fragments of wall paintings on display in the Conimbriga Monographic Museum.

As introducers of the first urban culture in Portuguese territory, Romans brought their technical knowledge related to the arts of lime, which applied both to the construction or architectural decoration. Lime, more than gypsum, was the preferred material to manufacture mortars, plasters and coatings useful in multiple situations, all of them based in the multilayer technique, and whose composition varied depending on the function. Lime stuccoes were used to create sumptuous interiors decorations that combined mural painting, ornaments and figurative representations with coatings imitating rich marbles and other stones, largely due to the marmorino or stucco lustro technique. The Roman legacy of lime stuccoes remained and was reinforced with the coming of Italian artists, starting in the Renaissance period. On the other hand, its undeniable that coatings based on gypsum stuccoes like stucco marmo and scagliola techniques were introduced later, not before the end of the Baroque period by Italian stuccatori in Portugal and in Spain.

After 711 the incursions of Tarik ibn Malik led to the start of the Muslim presence in the territory that became known as al-Andaluz. The Islamic legacy of stucco artwork both in Portugal and in Spain can be seen in the moulded/sculpted or carved relief plaster techniques – yeserías, and in the lime stuccoes for wall coating, known as los estucos. The fact that the Muslim occupation of Spain continued into the fifteenth century explains the existence of a greater corpus of constructed heritage and a formal distinction made between techniques, which is more in evidence than in Portugal. In Spain the term estuco only means coatings that can be polished to imitate marble whilst yeserias comprise moulded, sculpted and carved stuccoes and even structural elements applicable to architecture. The latter were introduced by the Umayyad dynasty, which was considered the symbiosis of Roman-Byzantine and Partho-Sassanid cultures [1]. The mihrab of the old mosque in Mértola whose origins date back to the twelfth century is the only element in situ to have survived the attacks of the Christian Reconquest. A systematic work carried out at Silves Archaeological Site has revealed aspects of Islamic building using rammed earth, as well as decorative architectural elements in moulded stucco belonging to the Almohad Palace of the Alcáçova (Umayyad dynasty). Nevertheless, the Muslim heritage in Portugal has not been studied to any great extent either as regards the techniques or the materials employed.

1.2 From the Renaissance to the Baroque

In the sixteenth century, whilst in Europe moulded stucco was used for interior decorations based on the exploration of the new idiom discovered by Giovanni da
Udine, in Portugal the Manueline style concentrated on decorating stone with themes from the Discoveries. The decorative programme of the Ambulatory of the Convent of Christ in Tomar is one of the best examples of Renaissance stucco decoration of Italian influence, although of unknown authorship. The presence of some Portuguese artists in Italy, in this period, is well known. Francisco de Holanda, a Portuguese painter and humanist who became Michelangelo’s disciple, is the main reference for Portuguese Renaissance.

The fact that no nationwide inventory exists makes it impossible to find out about the stucco decorative programmes prior to the Baroque, reinforcing the idea that this art form had been introduced into Portugal in about 1748 with the arrival of Italian plasterers, one of them being Giovanni Grossi. The Flemish work with painted circular medallions linked by garlands and festoons, and the influence of the Antwerp engravers, and Sebastiano Serlio’s drawings are highlights of fifteenth century stucco work. At the same time, it is important to underline that the various techniques of stucco artwork were exported overseas by the Portuguese and gained considerable aesthetic influence in India, where plaster and lime techniques were combined. We do not know the extent of this heritage or the composition of those stuccoes [2].

The Baroque age was the period when stuccowork, particularly moulded stucco, became more widespread. At the time this was done completely by hand in situ using drawings transferred onto the wall and then applying clay moulds that served to model the plaster, although some pieces were moulded off-site. The majority was plaster stucco work placed on lathwork ceilings (tecto de fasquiado) which replaced the overlapping board ceilings (tecto de saia e camisa). In 1764 in Lisbon, during the post-earthquake reconstruction, the Marquis of Pombal created the Stucco and Drawing Class to provide training for stucco workers. This city also has the artistic creations of various Italian and Portuguese stucco workers led by Grossi. In Porto two other Italians worked, Nicolau Nasoni and Luigi Chiari, the latter responsible for most of the city’s neoclassical stuccoes.

It was at the end of the eighteenth century that a circumstance occurred that was to mark the following two centuries with regard to stucco artwork – the village of Afife, north of Viana do Castelo, became the cradle of Portuguese stucco workers. The skill of these men in applying plaster coatings and moulded stuccoes became famous to the point that in the few extant contemporary documents the term afifanos is employed to designate a professional who applies various revetment layers both inside and out, as the expression “estucador” makes a belated entry in the lexicon, as its use only became a norm in the second half of the nineteenth century.

1.3 The nineteenth and twentieth centuries

The preponderance of the Afife school marked stucco artwork during the nineteenth century and the first decades of the twentieth century [3]. From an
artistic point of view this century is distinguished for the predominance of a revivalist taste, full of eclecticism, where stucco became the material of choice for interior and exterior decorations. The technical evolution that took place in the late nineteenth century (Paris Universal Exhibitions of 1878 and 1889) was decisive for the change that occurred at the heart of this decorative art, which tended to keep pace with building needs and materials. The dissemination of Desachy’s patent (1856), led to the development of plaster ceilings which tended to replace the traditional lathwork ceilings. Similarly, mouldings also changed as clay moulds were replaced by gelatine moulds. The use of wax was on a par with gelatine to make the moulds impermeable and to mould the stucco, but lost its place to silicon in the mid-twentieth century. Stucco became industrialized and moulded stucco work began to be manufactured, almost as if mass-produced, in moulds. The technical complexity of the stuccoes and their widespread use led to a career split into areas of specialisation: plasterers worked in the construction industry and stucco moulders in decorating, their training taking place as part of industrial teaching, then at its height.

Afife produced various generations of stucco workers from different families (Meiras, Baganhas, Ramos), who became famous for their work throughout Portugal. The nineteenth century migratory surge ended with a move to countries such as Brazil, Argentina, Uruguay, North America and Spain, a fact that still requires study and knowledge. The Afife stucco workers occupy a leading position in the history of interior decoration. To them we owe most of the integral decorative programmes as well as minor works in most of the buildings that today are considered as being part of our contemporary constructed heritage. The two workshops that stand out as receiving most orders were those belonging to the Meira and to the Baganha families. The Baganha workshop was founded in 1905, operated till 1974 and closed in 1975. The Meira workshop was founded in 1913 and ceased operations in 1999. Both gave rise to a remarkable museological collection that enables us to understand the relationship established between stucco as a form of decoration and the construction industry.

2 Stucco heritage. Technical typologies

2.1 Moulded stucco and surface coatings

The use of stucco as an artistic material for interior decoration, became widespread in the nineteenth century, being applied in the ornamentation of the houses of the middle classes and of the “Brazilians” [so called because they were built for Portuguese emigrants who returned from Brazil with a fortune] (1870-1890), on church and palace ceilings, palace walls and villas of eclectic style. This fact was reinforced in the first decades of the twentieth century with the surge in
building and the connection between workshop-studios and the construction industry, a fact that was visible throughout the whole country but had its high point in Porto and the North. Accordingly, the stuccoed heritage of interiors in the nineteenth century and the following decades represents the greatest repository of decorative techniques of the period. Attention is drawn to the frequent use of false marbles as well as moulded stucco and smooth polychrome stucco, which contrasted with the practice during the Baroque age, where the most common typology is moulded stucco, and imitation stone marble coatings being rarer. During the Baroque period and as far as we know to date, there are few examples of false marbles using the *stucco marmo* or *scagliola* techniques [1-6-7-11]. Apparently Portugal did not follow the tradition of other countries such as Italy or France, where the word stucco was technically synonymous with surface coatings based on plaster, animal glue and pigments [1-4], opting rather for moulded stucco. In the nineteenth century, the use of false stucco work to imitate more noble materials, either painting applied to wood to simulate a better quality of wood or coatings in stucco plaster (lime and plaster or a mixture of both) became common, particularly after 1830 [5-6], was widespread by about 1870 and continued to the 1940s and 50s.

### 2.2 Moulded stucco

Moulded stucco, which in Portugal was commonly called decorative, is a branch of sculpture. Moulded or relief stuccoes have always been divided into two main types: those done on site (on the actual wall) and those off site, on a bench, using moulds and shapes. The former were achieved by direct modelling of the fresh plaster. Should it be necessary to manufacture projecting elements such as capitals, cornices, coves, frames or cymas, then supports had to be mounted to underpin the structure during production. Cornices were made using metal profiles or *terrajas* [7] in hard wood covered with a fine metal (zinc or brass) sheet that reproduced the curves of the moulding. The profile was pushed along by screed, known as running mould with bed. In the construction industry in Portugal, coves and cymas acted as transition elements between ceilings and walls. The frames divided spaces on the walls which were then decorated with false marbling or painting. The latter were obtained by pouring liquid gypsum plaster into the moulds. Then a wooden “core” had to be introduced for structural reinforcement of the small pieces such as brackets, chimneys and cornices; an iron or wooden reinforcement was applied to columns and turned moulds. The most common forms for making moulds were “tacelos” (in clay and plaster) and the gelatine mould, as opposed to the lost wax casting usually employed for moulding figures [8]. There are no records of the use of shapes to make architectural moulded work in *stucco marmo* as was common in central Europe.
2.2.1 Decorative Surface Coatings: False Marble, Brescia Stone and Lioz Limestone

Of the many surface coatings that make up the interior decorating programmes of this period, those that imitated marble and other stones have the greatest patrimonial value. There are some cases of exterior marbling, but these have generally reached the present day in a bad state of repair. The predominant typologies of the north, which can probably be applied to the rest of the country, correspond to two major groups: stucco lustro, polished stucco and, less rarely, stucco marmo, both Italian in origin.

However, as the artists explored the potentials of these materials to their limits, it is important to know the composition of the stuccoes to enable correctly to identify the techniques. So, from the point of view of the materials, coatings are divided into two principal groups: lime-based (Museu Militar do Porto and Porto Cathedral Baptistery) and gypsum-based (Baganha’s column, Palácio da Bolsa and Estoi Palace), each one corresponding to a certain range of techniques that can be obtained.

- Lime stuccoes – made of lime, water, minerals (pozzolanic ash, pigments, plaster) mineral fillers (aggregates) and additives; used in marmorino, stucco lustro, white stucco and stucco burnished with hot irons.
- Gypsum stuccoes – made of gypsum, glue, water, pigments and additives; used in stucco marmo, scagliola or carved stucco and also stucco lustro, among others.

3 Case Studies. Analytical methodology

By implementing a working methodology for the inventory based on a visual inspection of interior wall coatings in buildings of various types that took place over a period of years (2001-2007), I was able to acquire considerable knowledge of the predominant techniques, about which I wrote in my MA thesis [6]. This, however, would be incomplete if I did not resort to experimental techniques to allow me to ascertain what materials were used, the method of execution of the traditional techniques and even any possible variations. This experimental study was conducted by Teresa Domenech Carbó, senior researcher from the Instituto de Restauración del Patrimonio of the Polytechnic University of Valencia, in Spain, who applied SEM/EDX, combined with optical microscopy (LM), XRD (X-Ray Diffraction), FTIR (Fourier transform spectroscopy) and Py-GC/MS (Pyrolysis Gas Chromatography) to the selected case studies to analyse the coating samples[9].
### Table 1 Analysis and Interpretation of the Selected Case Studies

<table>
<thead>
<tr>
<th>Building</th>
<th>Sample</th>
<th>Composition</th>
<th>Technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>Porto Cathedral – Baptistery</td>
<td>Coating imitating pink marble on the panelling</td>
<td>Preparatory layer – lime stucco with added plaster, stone powder and/or kaolinite, pigmented with iron oxide. Low concentrate lipid agglutinant (wax or oil). Superficial pigmented layer with white lead and barium sulphate.</td>
<td>Similarities with <strong>stucco-marmo</strong>, without animal glue. Manufactured in layers and applied in panels.</td>
</tr>
<tr>
<td>Baganha collection</td>
<td>False marble coating on column</td>
<td>Plaster stucco with added zinc sulphate agglutinated with drying oil. Pigmented with iron oxide</td>
<td>Similar to <strong>stucco marmo</strong> without the animal glue. T. Turco [10] A plastic stucco applied with a spatula in strips.</td>
</tr>
<tr>
<td>Palácio da Bolsa – Porto</td>
<td>Pink marbling of first floor corridor</td>
<td>Plaster stucco agglutinated with animal glue, pigmented with iron oxide. Beeswax finishing.</td>
<td><strong>Stucco marmo</strong> Manufactured in layers and applied in panels.</td>
</tr>
<tr>
<td>eEstói Palace – Faro</td>
<td>Fragment of moulded stucco imitating porphyry – door</td>
<td>Plaster stucco agglutinated with animal glue, pigmented with iron oxide. Beeswax or drying linseed oil finishing.</td>
<td><strong>Stucco marmo</strong></td>
</tr>
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### 4 Conclusions

The methodological approach adopted leads me to conclude that the techniques employed most frequently in producing wall coatings simulating natural stone
were *stucco-lustro* and *stucco-marmo*. There are no cases of the *scagliola* technique in its pure Italianate form that is, with carved plaster, being used.

Lime stucco as well as plaster stucco is present in interiors. Both materials were often combined, generally to improve the plastic properties of the putty to be worked and applied. The formal distinction between *stucco-lustro* and *stucco-marmo*, including in Portugal, was achieved by including pigments – *stucco marmo* – or applying colours independently, generally by painting – *stucco lustro* [1-11].

The traditional *stucco marmo* technique appears to have been used less frequently, although it was mastered and employed by great masters. The *stucco lustro* technique, on the other hand, was used more often, perhaps because it was simpler and continued as a mixed technique, shared between stucco workers and painters. As the variety of stone imitated depended on the region, this led to the adoption of specific pictorial solutions, and we noted a few deviations from traditional formulas.

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