



Cairo University
Faculty of Archaeology
Conservation Department

Study in conservation of painted and gilded stucco in historical building upon period of Mohammed Ali family with The Application on one of the Selected objects

A Thesis

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Submitted by

Shrief Abd-alaty Soliman Abd-alaty

Demonstrator – Cons. Dep., Faculty of Archaeology,
Fayoum University

Supervised by

Prof. Dr. Mohamed Abd-El Hady

Prof. of Conservation of Monuments – Cons. Dep. Faculty
of Archaeology, Cairo University

Prof. Dr. Abd-Alzaher Abo EL Ela

A Prof. of Conservation of Monuments – Cons.
Dep. Faculty of Archaeology,
Cairo University

ASS. Prof. Shehatta Abdel-Rahim

Assistant prof. Conservation. Dep., and Vice Dean
for education and students , Faculty of Archaeology ,
Fayoum University

Summary

The painted and gilded Stucco in historical buildings which go back to period of Mohammad Ali`s family in Egypt suffering from many deterioration factors, specially physico-chemical factors and role of the man made deterioration factor which caused loss of the decorations of some stucco or loss of gilding and painted layer on stucco , so the study of this kind of monument is more important , therefore I intended to make this study under the title of ***“Study in conservation of painted and gilded stucco in historical building upon period of Mohammed Ali`s family with The Application on one of the Selected objects ”.***

The research consists of an introduction , objectives , and conclusion of the six main chapters as follows:

Chapter One :-

“study of stucco and their ornaments in the newest architectural styles in Mohammed Ali Family`s period “ this chapter deals with the study of the origin and development of Islamic stucco from the Umayyad period until Mohammad Ali family`s Period as well as the different techniques to implement the types of stucco ornaments and the tools used in carving and moulding the ornamental stucco.

Chapter Two :-

“ Study of components of painted and gilded stucco monuments and their techniques” , It started by the study of the term” Stucco”, then throws the light on the components of gilded and painted stucco as gypsum, lime, materials and techniques of gilding and painting of the stucco.

Gypsum study tackles the usage ,sources, manufacturing ,calcination products ,storing , mixing , pouring ,setting accelerators , setting retarders , the other organic and inorganic additives and the advantages and disadvantages of gypsum .

The lime study tackles its sources , manufacturing ,calcination products ,slaking of quick lime , mechanism of setting and hardening as well as the advantages and disadvantages of lime .

Then the chapter exposes to gilding techniques through different ages and types, such as water and oil gilding , as well as the various tools which used in the gilding , and it tackles the process of painting on the stucco, and its techniques, medium , Pigments.

Chapter three :-

“Study of Deterioration factors of painted and gilded stucco in historical building ” The chapter explains the role physiochemical deterioration factors (moisture ,temperature ,salts and air pollution)in deteriorated of gilded and painted stucco, then it tackles the effects of the mechanical deterioration caused by earthquakes and vibrations as well as biological deterioration factors (microorganisms , birds , insects, plants) and the role of man made deterioration .

Chapter four :-

this chapter explains the steps of conservation and restoration of gilded and painted stucco so it started by explain, how the dirt stick with surface then it presents the various methods of cleaning , mechanical cleaning , chemical cleaning , cleaning by enzymes , cleaning by lasers and use poultices in cleaning .

This chapter, also, deals with the polymers used in fixing of paint flakes and used as injection grouts of separated stucco layers and it included comparative study of Acrylic and silicone polymers used in consolidation of painted and gilded stucco, as well as it discusses the methods and importance of completing the losing parts of stucco.

Chapter five :-

This chapter is based on explaining scientific methods of documentation, examination and analyzing of painted and gilded stucco by using light microscope, polarized microscope, Scanning electron microscopy and X-ray analysis (SEM-EDX), X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR) and Gas-chromatographic/mass-spectrometric analysis (GC/MS).

Powder XRD showed that the plaster under the stucco is composed of Quartz, gypsum and lime, and by Study of mineralogical composition of the stucco ornaments by using X-ray diffraction (X.R.D) indicated that the stucco composes of calcite, gypsum, dolomite (indication of using dolomitic limestone as a source of lime) and anhydrite, and by Examination of gilded Samples by using (X.R.D), (SEM-EDX) and polarized microscope established that under the gold leaf there is a layer composed of hematite (Fe_2O_3) and zinc oxide (ZnO).

The Gas-chromatographic (GC) and Fourier transform infrared spectroscopy (FTIR) analysis for painted and gilded samples revealed that animal glue was used in the mordant for the gilding and walnut oil was used in the mordant for the painting on stucco.

The study the microbiological deterioration of an isolated fungi from Nostor Janklis palace gives an indication of the presence of *Aspergillus flavous* , *Aspergillus niger*, *fusarium* and *pencilium*.

This chapter is finished by an experimental study to evaluate four consolidates applied by brush on painted and gilded stucco samples (Brimal ACTM E, Wacker OH, Paraloied BTM, poly vinyl alcohol) and after study of physical & mechanical properties for the consolidated samples and studies it with S.E.M. Before and after artificial aging [included cycles of heating & cooling and aging with UV radiation] the results proved that wacker OH and paraloied BTM are very suitable consolidant for consolidation of the gilded and painted stucco .

Chapter six :-

This chapter devoted to the applied study which was carried out on Nostor Janklis palace, it presents the documentation , mechanical and chemical cleaning, consolidation and complete losing parts of the stucco by using silicon mould and treatment of some cracks in the gilded and painted stucco in this palace according to the result of experimental study.