

# Modern Scientific Approaches for Documentation, Examination and Analysis of Museum Artifacts

## With Application on Some of Archaeological Objects

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### Abstract

International museums in general, and the Cairo Egyptian Museum in particular, are rich in many antiquities, which represent the legacy of the past, which must be passed on to future generations. The museum is an educational and recreational institution, which works to serve society by collecting, preserving and presenting the antiquities in interesting and fun ways.

Scientific documentation is the first and most important steps to start with when restore or conserve any object. It is also considered a kind of preservation of the state of the artefact in its various stages before, during, and after restoration. Scientific examinations and analysis using modern scientific equipment are also considered among the necessary operations that must be carried out before setting up a treatment and maintenance program for antiquities, as it plays a major role in identifying the materials that make up the antiquity and causes of damage and deterioration, and thus in choosing the appropriate materials for treatment.

This research aims to identify and present modern scientific methods for documenting, examining and analyzing museum objects in general, and archaeological textiles and carpets in particular, with practical applications for that on some artefacts.

Among the modern methods of documenting museum artefacts, documentation using software like Auto CAD & Adobe illustrator, X-ray Radiography, infrared IR, UV detections, and 3D laser scanner. The most important methods of examination and analysis of museum collections in general, textiles and carpets in particular, various types of microscopes such as optical, polarizing, (UV-Vis) and Scanning Electron (SEM) microscopy, X-ray fluorescence, Atomic absorption, Raman, Fiber Optics Reflectance Spectroscopy (FORS), infrared spectroscopy (FTIR) and High-performance liquid chromatography (HPLC), which is an accurate method for identifying the organic dyes in ancient manuscripts, textiles and carpets.

### Keywords:

Museum Objects, Scientific Investigation and Analysis, Documentation, Archaeological Textiles.

### Introduction

The cultural and natural heritage represents the reference point and the identity of the peoples, and it is the legacy of the past that must be passed on to future generations. Works of value in being historical, artistic and cultural evidence that represent for us today a recognized heritage for its protection, preservation and exploitation in various branches. This huge heritage, which bears a historical, archaeological and artistic character, which has been collected in museums and spread all over the world, has been entrusted to preserve and maintain it to the experienced

and qualified technical and scientific cadres of archaeologists, architects, art historians, restoration experts and experts in various fields related to heritage preservation.

The operations of maintaining and restoring antiquities at the present time are based on an accurate scientific basis and in accordance with established laws, and are carried out by specialists, not only for the sake of restoring the artifact, but also for preserving and protecting it in the future. Scientific documentation is considered the first and most important step to start dealing with any trace of treatment and restoration, and it is considered a kind of preservation of the state of the artifact in its various stages before, during and after restoration. Scientific examinations and analysis using modern scientific devices are also considered among the necessary operations that must be carried out before setting up a treatment and maintenance program for antiquities, as it plays a major role in identifying the materials that make up the antiquity and the causes of damage and deterioration, and thus in choosing the appropriate materials for treatment.

From this point of view, this research mainly aims to identify the most important modern scientific methods for documenting, examining and analyzing museum holdings in general and archaeological textiles in particular, with a presentation of practical applications of some of these methods on some diverse models of artifacts, especially textile ones. As well as identifying the meaning and importance of scientific documentation and recording of museum holdings and its traditional and modern methods.

Among the modern scientific methods used in documenting artifacts are documentation using Auto CAD & Adobe illustrator program, X-ray, infrared and ultraviolet imaging, and three-dimensional scanning laser documentation. Among the most important methods of examination and analysis used in examining museum holdings in general and archaeological textiles in particular, are microscopes of all kinds, such as optical, stereoscopic, polarizing, scanning electron microscope, ultraviolet and visible microscope, scanning electron microscope, X-ray diffraction and fluorescence analysis, atomic absorption, Raman, spectrophotometry and reflectance analysis. Visual, infrared spectroscopy and chromatography, which is one of the modern and accurate methods for identifying the types of organic dyes in manuscripts, textiles and archaeological carpets.

## Research summary

- The process of maintaining and restoring museum artifacts is a joint operation or function between the museum curator, restoration specialist, and examination and analysis specialist. It is very important that they cooperate, appreciate and respect each other's job and responsibility in order to preserve the artifacts.

- Museums are considered the safe place in which humankind's cultural, artistic, natural and industrial heritage is preserved throughout the different historical eras.

- Accurate scientific documentation of museum holdings is of paramount importance on the archaeological and restoration level.

Scientific documentation during the treatment and maintenance stages of antiquities is a protection document for the restoration and maintenance specialist about his performance in his work and as a reference when scientifically publishing the antiquity.

- Modern technology has significantly helped in the development of means and methods of documentation and scientific analysis of museum holdings.

- It has now become very important and necessary for important museums all over the world to include a team of scientists (chemists and physicists) to help conduct scientific examinations and analysis of artifacts before carrying out treatment and maintenance operations for them.
- Scientific examinations and analysis of museum holdings are very important steps to take, in order to obtain all information related to the condition and type of materials used, manufacturing techniques, causes and manifestations of damage to the antique, as well as its importance for setting an appropriate treatment and maintenance program for it.
- The importance of conducting more than one type of scientific examination and analysis of the artifact according to its condition, in order to ensure the integrity of the results before starting the treatment and maintenance operations.

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