

THE GCI Project  
Bibliographies  
SERIES

Terra



Sorted by General Category



## The Getty Conservation Institute

The Getty Conservation Institute works internationally to advance conservation and to enhance and encourage the preservation and understanding of the visual arts in all of their dimensions—objects, collections, architecture, and sites.

The Institute serves the conservation community through scientific research; education and training; field projects, and the dissemination of the results of both its work and the work of others in the field.

In all its endeavors, the Institute is committed to addressing unanswered questions and to promoting the highest possible standards of conservation practice.

## GCI Project Bibliographies

Project bibliographies represent a distillation of many years of research by Getty Conservation Institute staff in support of a given project. The unique bibliographic resources available at the Getty Center and in the Los Angeles area make it possible for GCI staff to access and review literature that is not easily obtainable by many conservation practitioners. With this unique opportunity comes a unique responsibility to share the results of this research with the conservation community and other interested parties.

The TERRA bibliography is an effort to provide information to the conservation community regarding this important area of the world's cultural heritage. Earthen architecture exists globally and continues to provide housing for many people. These buildings represent a contemporary manifestation of an ancient tradition. Examples of this tradition in archaeological sites all over the world present challenges for those entrusted with their preservation. It is hoped that this bibliography will be helpful to them.

## TERRA Project Overview

In academia, earthen architecture and materials are largely absent from courses on history, design, and construction technology. With earthen structures constituting only a fraction of new construction in the industrialized world, there is no industry to support continued investigation of earthen materials and their applications. As such, the scientific and technological research base for earthen architecture and its conservation is very limited compared to that of stone, brick, and timber. Procedures and information are frequently borrowed from other fields, such as agriculture and road building, but significant differences in application often preclude a direct transfer of technology. The result is a fragmented body of knowledge.

The past two decades have witnessed considerable advancement of the earthen architecture conservation field through a series of international conferences, training initiatives, and the formation of national and international committees devoted to the cause; a network of practitioners, scientists, and academics has been established through these opportunities for exchange. Institutional commitment has lagged behind, however, along with support for larger scale initiatives and collaboration. Institutional involvement and cooperation is key in developing the broad-based support needed for the conservation of earthen architecture.

In November 1997, following their collaboration on PAT96 (the first Pan-American Course on the Conservation and Management of Earthen Architectural and Archaeological Heritage), the International Centre for Earth Construction—School of Architecture of Grenoble (CRATerre-EAG), the Getty Conservation Institute (GCI), and the International Centre for the Study of the Preservation and the Restoration of Cultural Property (ICCROM) initiated discussions to establish a joint program in the study and conservation of earthen architecture.

These organizations recognized—through their independent and collective activities in earthen architecture conservation—that the most successful means of leveraging resources and developing the field was through partnership. Having a long history of involvement in the field, these institutions created a cooperative framework—Project Terra—to promote the study and conservation of earthen architecture heritage. Within this framework for international collaboration, previous institutional activities such as ICCROM/CRATerre-EAG's Gaia Project and the GCI's research in the field, are evolving into Project Terra.

## The GCI Bibliography of the TERRA Project

Literature in this bibliography was compiled over the past decade at the Getty Conservation Institute as a part of the TERRA project.

The research component of this project involved the review of a very large body of literature. The prevalence of earthen architecture worldwide both past and present means that a great deal has been published on the subject in many languages and disciplinary fields. To address the conservation of earthen architecture has also meant that a thorough understanding of the nature of the materials involved is essential; this has necessitated a review of mineralogy, clay and soil science, chemistry, and the analytical techniques used in these fields. The deterioration mechanisms affecting earthen architecture also needed to be well understood. For that reason, the literature on biodeterioration, and wind and water erosion, as well as damage caused by salts and seismic activity, had to be reviewed in light of their effect on earthen structures.

A number of dedicated individuals have been involved in this effort over the years and this bibliography gives us an opportunity to share with the conservation profession their expertise and the fruit of their bibliographic research. They are listed below.

## Project Team Members

### GCI

Mary Hardy, Project Manager  
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Gaetano Palumbo (past team member)  
Evin Erder (past team member)  
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## Methodology and Arrangement

The bibliography has been arranged in thematic sections that were settled upon after considerable discussion and thought. This topical arrangement is followed by a reiteration of the entire bibliography alphabetically by author. Users may simply view sections of interest or scan by author. Some citations will appear in multiple sections because they address more than one of the subjects defined in this bibliography.

Particular credit goes to Urs Mueller who devoted many hours to refining this bibliography, bringing to the task great professional rigor and the highest professional standards. Eric Bruehl assisted Urs in this process. Prior to Urs's arrival at the GCI, Gaetano Palumbo and Evin Erder applied a great deal of their time and expertise to the formation of the bibliography. Thanks also goes to the reviewers who took the time to examine the bibliography in light of their professional experience and to make suggestions which have been adopted whenever possible.

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# Identification and Characterization

Citations in this section deal with the identification and characterization of the discrete components of earthen structures, as well as the analytical methods involved in doing so. This section is divided into four subsections.

## Mineralogy

Mineralogy lists literature addressing the mineral components of earthen materials and their influence on the behavior of earthen structures.

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- Driessen, P. M. and Schoorl, R.** Mineralogy and morphology of salt efflorescences on saline soils in the Great Konya Basin, Turkey. *Journal of Soil Science*, 24, no. 4 (1973), pp. 436–42.
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## Soil Science

The Soil Science section addresses the behavior, properties, and characteristics of various soils.

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# Deterioration and Pathology

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## Seismic

The influence of Seismic activity on earthen structures and seismic amelioration is the subject of the literature in this section.

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# Diagnosis and Conservation

This overall heading deals with diagnosing and assessing the state of earthen structures, appropriate documentation and planning, subsequent interventions, and the maintenance of structures.

## Assessment

Citations in the Assessment section are concerned with recording and condition surveys and evaluations of earthen structures. Structural, environmental, and moisture monitoring are also addressed.

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## Intervention and Maintenance

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# Construction and Architecture

## History of Earthen Architecture and Traditional Methods

The history of earthen architecture and the occurrence of traditional cultural methods and practices are examined in this area. The section is divided by topic and by geographic area.

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## Materials, Construction Techniques and Architectural Design

This section is concerned primarily with contemporary earthen construction, materials, construction technique, and architectural design using earthen materials.

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