



«We must find a solution to the hitherto insoluble problem of the clash between the products of industry and the demands of nature and of society. It would be useful to subject technology to the economy and materials of a particular region. In this way the quality and values inherent in the traditional and human response to the environment might be preserved without a loss of the advances of science. Science can be applied to various aspects of our work, while it is at the same time subordinated to philosophy, faith and spirituality».

Hassan Fathy, *Architecture for the Poor*, 1976



Villages of Northern Syria. An architectural tradition shared by East and West

Earthen Domes and Habitats

Edizioni ETS



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Education, Audiovisual
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Directorate General of Antiquities and Museums, Syria



Hellenic Society, Greece



University of Liège, Belgium



Polytechnic University of Valencia, Spain



Ecole d'Avignon, France



CNR - ICVBC, Italy



Culture Lab, Belgium



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EDIZIONI ETS
Piazza Carrara 16-19, I-56126 Pisa
info@edizioniets.com
www.edizioniets.com

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Scientific Committee

Saverio Mecca, *University of Florence*
Fabio Fratini, *ICVBC-CNR*
Vassilis Koniordos, *Hellenic Society*
Michel al-Maqdissi *Directorate General of Antiquities and Museums of Syria*
Camilla Mileto, *Polytechnic University of Valencia*
Patrice Morot-Sir, *Ecole d'Avignon*
Önhan Tunca, *University of Liège*

Editors

Saverio Mecca & Letizia Dipasquale, *University of Florence*

Authors

University of Florence, Italy: Saverio Mecca, Valentina Bonora, Maddalena Chiellini, Letizia Dipasquale, Natalia Jorquera Silva, Giuseppe Lotti, Alessia Nobile, Dalia Omar Sidik, Silvia Onnis, Mirta Paglini, Elena Peducci, Flavio Ridolfi, Luisa Rovero, Ugo Tonietti, Grazia Tucci
Hellenic Society, Greece: Vassilis Koniordos, Maria Arakadaki, Clairly Palyvou, Konstantinos Tokmakidis.
Ecole d'Avignon, France: Patrice Morot-Sir, Jean-Jacques Algros
Polytechnic University of Valencia, Spain: Fernando Vegas, Camilla Mileto, Valentina Cristini, Adolfo Alonso Durá, Arturo Martínez Boquera, Verónica Llopis Pulido
University of Liège, Belgium: Önhan Tunca, Emmanuelle Devaux, Katrien Rutten
Institute for the Conservation and Enhancement of Cultural Heritage, CNR, Italy: Fabio Fratini
Directorate General of Antiquities and Museums, Damascus, Syria: Bassam Jammous, Michel al-Maqdissi, Laila Alturk, Nazir Awad, Antoine Suleiman, Fadia Abou Sekeh

Invited Authors

John Hurd, *ICOMOS International Scientific Committee for Earthen Architecture, Great Britain*
Abd Al-Qader Hariri, *Aleppo University, Faculty of Architecture, Syria*
Alexis Castro, *Culture Lab, Belgium*
Mario Cygielman, *Superintendence for the Archaeological Heritage of Tuscany, Italy*
Borut Juvanec, *University of Ljubljana, Slovenia*
Sabina Hajiyeva, *Azerbaijan University of Architecture and Construction, Azerbaijan*
Mohamed Al Dbiyat, *Institute Française du Proche-Orient, Damascus, Syria*
Marion Rivoal, *Institute Française du Proche-Orient, Damascus, Syria*
Mohammed Dello, *Directorate of Antiquities and Museums of Aleppo, Syria*

Photographer: Luca Lupi

Photographs: Sicily, Ivan Alicata; Abruzzi, Alessandro De Ruvo

Guidance and logistical support: Mohammad Haj Ali, Mohamed Meftah

Graphic Design: Susanna Cerri

Graphic, maps and drawings: Letizia Dipasquale, Emmanuelle Devaux, Natalia Jorquera Silva, Silvia Onnis

English Review: Ben Birdsall

Photographic documentation:

Borut Juvanec, Mohammed Dello, Saverio Mecca, Letizia Dipasquale, Silvia Onnis, Emmanuelle Devaux, Flavio Ridolfi, Fernando Vegas, Nazir Awad

Graphic documentation:

Borut Juvanec, Mohammed Dello, Valentina Cristini, Sabina Hajiyeva, Maria Arakadaki, Clairly Palyvou, Nazir Awad, Antoine Suleiman, Fadia Abou Sekeh, Mohamed Al Dbiyat, Adolfo Alonso Durá, Arturo Martínez Boquera, Verónica Llopis Pulido, Valentina Bonora, Alessia Nobile, Dalia Omar Sidik, Mirta Paglini, Elena Peducci, Flavio Ridolfi

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Earthen Domes and Habitats

Villages of Northern Syria

An architectural tradition shared by East and West

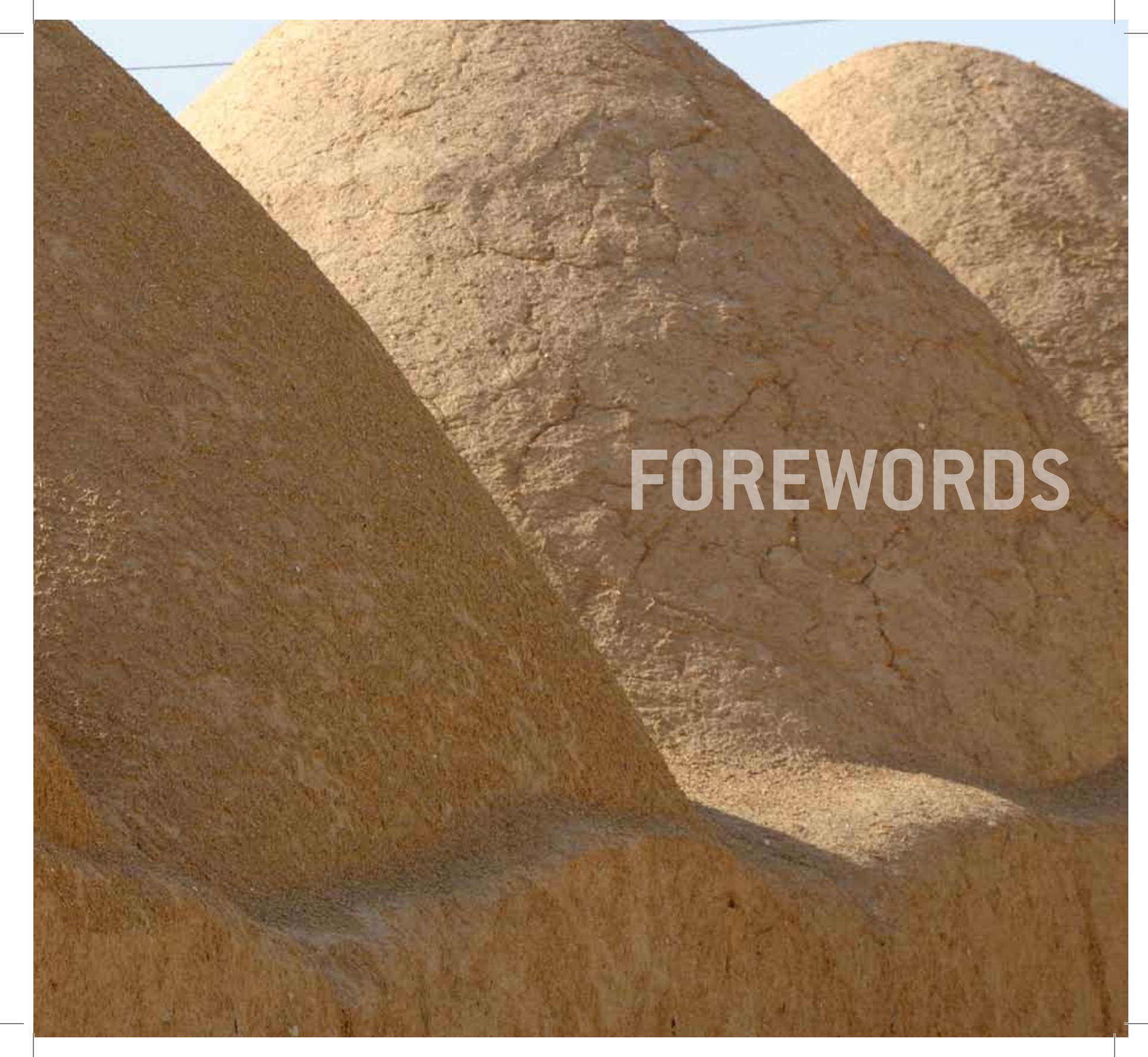
editors

Saverio Mecca, Letizia Dipasquale

authors

Fadia Abou Sekeh, Jean-Jacques Algros, Adolfo Alonso Durá, Maria Arakadaki, Nazir Awad,
Valentina Bonora, Alexis Castro, Valentina Cristini, Mario Cygielman, Mohamed Al Dbiyat, Mohammed Dello,
Emmanuelle Devaux, Letizia Dipasquale, Fabio Fratini, Sabina Hajiyeva, John Hurd, Bassam Jammous,
Natalia Jorquera Silva, Borut Juvanec, Vassilis Koniordos, Verónica Llopis Pulido, Giuseppe Lotti,
Michel al-Maqdissi, Arturo Martínez Boquera, Saverio Mecca, Camilla Mileto, Patrice Morot-Sir,
Alessia Nobile, Dalia Omar Sidik, Silvia Onnis, Mirta Paglini, Clairy Palyvou, Elena Peducci, Abd Al-Qader Hariri,
Flavio Ridolfi, Marion Rivoal, Luisa Rovero, Katrien Rutten, Antoine Suleiman, Konstantinos Tokmakidis,
Ugo Tonnietti, Grazia Tucci, Önhan Tunca, Fernando Vegas



The image shows three large, conical mounds of earth or sand, likely ancient structures, under a clear blue sky. The mounds are arranged in a row, with the largest one in the center and two smaller ones on either side. The surface of the mounds is textured and shows signs of weathering, with some cracks and unevenness. The lighting is bright, suggesting a sunny day. The word "FOREWORDS" is overlaid in white, bold, sans-serif capital letters on the right side of the image.

FOREWORDS



Foreword to Earthen Domes and Habitats of North Syria, a shared Heritage between East and West

John Hurd

President of ICOMOS International Scientific Committee for Earthen Architecture, Lincolnshire, Great Britain

Since earth is the world's most accessible building material, it is no surprise that about one half of humankind live, work or worship in structures made with unfired clay subsoils. As recently as the mid nineteenth century this proportion was significantly larger.

Earthen buildings are represented across the globe in a range of forms, styles, and technologies that often contain an intangible tradition that has in many cases been continued through countless generations. The empirical wisdom of the builders, through the ages, has improved earthen building technologies into a sophisticated understanding of the evolution of structures appropriate to local cultural, climatic and even seismic conditions, from which we all have much to study and learn.

In recent times the traditions of earthen building have been in some decline as 'modern' materials replace traditional systems, partly because of global 'fashion' trends, but also because of the search for low maintenance solutions in modern society. Earth is fragile and without proper and regular maintenance, structures decay and disappear, now a worldwide trend. This decline has given urgency to the matter of recording and documenting the many traditional and local typologies and their decoration, their 'language' if you will.

Earthen traditions are far too valuable to dismiss as irrelevant to the modern world and indeed future generations, they must remain as an example to the caring and ecologically aware architects and builders that are emerging around the world. The importance of the conservation of

the traditions of earthen structures is reflected in a recent UNESCO World Heritage Centre, ten year initiative to deepen research and understanding in these traditions.

Often, ensembles of earthen buildings within the macro or micro environment, as they emerge from the mother soil, present cultural landscapes of great beauty and strong complexity. The interaction of the population within this cultural landscape completes the stage, a stage set for the evolution and conservation of cultural tradition and identity.

This European Union Project, and this book, have been achieved through a successful co-operation between the University of Florence, several European Universities and Institutions and the General Directorate of Antiquities and Museums in Syria, adds a valuable window, shedding light on the northern Syria tradition of striking domed houses.

The ICOMOS Scientific Committee for Earthen Architectural Heritage applauds and encourages such excellent publications in the search for an accurate and useable worldwide typology and description of earthen buildings. This book contributes a great deal to these goals.

I thank the Authors and editor and congratulate them, together with all those people who contributed to this book, for the production of a most valuable volume and of great international interest. This book offers an example to others around the world and I hope that this example will be widely replicated as an approach to the documentation of regional earthen buildings.



In Syria: earthen architecture, mother architecture

Michel Al-Maqdisi
*Directorate General of Antiquities
and Museums DGAM
Ministry of Culture, Damascus, Syria*

Earthen architecture has very deep roots in the Syrian tradition. Excavations of ancient times have shown that in Mureybet, a Neolithic site in the middle valley of the Euphrates, the population used earth in combination with pebbles and elements of wood and straw to build the oldest type of circular houses of the region and probably in the world.¹

If we try to see the development of these techniques during this period, which culminates in the site of Jerf el-Ahmar with its community house, we can also attest to the presence of stone sculptures decorating the interior of this type of circular architecture.²

Similarly, the two cultures Halaf and Obeid, of the sixth and fifth millennia BC, will provide technical development, and it is due to the masterly study published in 1980 by the great scholar of Lyon, Olivier Aurenche, that we can appreciate the architecture of the prehistoric period.³

In the fourth and third millennium BC,⁴ earthen construction techniques were improved and the use of mud-brick walls and pisè spread almost everywhere among the most famous sites in Syria, such as Habuba Kabira-South⁵, Tell-Mardikh Ebla⁶ at Tell Hariri-Mari,⁷ at Tell-Beydar Nabada.⁸ This at times magnificent architecture was presented by Jean-Claude

Margueron in his thesis published over 20 years ago, which has helped to reveal the secrets, and extraordinary techniques for achieving several elements of the building, namely: foundation, use of plaster for the walls, roofs, development of the floors and certain other very important elements.⁹

We are not aware of the oldest attestation of the domes in this type of architecture, but the available data allows us to visualise the dome structures that have been discovered, dating from the period known as "Halaf".¹⁰

In the third millennium BC the presence of steps inside the rooms and the general shape of the corbelling can confirm that, subsequent to the former technique of the Bronze Age, this method was widely used and developed over several millennia until it took on its most complete shape.¹¹ The discussion on earthen architecture and dome construction is thus becoming evermore fascinating and the several Syrian and European teams mentioned in this volume confirm that this system has a particular presence in our architecture, presenting us with the opportunity to work towards the most effective methods for its conservation.¹²

¹ Cauvin 1978, Aurenche 1980.

² Stordeur 1998, Stordeur 1999 and Stordeur 2000.

³ Aurenche 1981.

⁴ See for religious architecture: Tunca 1984.

⁵ Vallet 1997

⁶ Matthiae, Pinnock & Scandone Matthiae (eds) 1995.

⁷ See the excellent work on this site: Margueron 1995.

⁸ See most recently: Lebeau & Suleiman (eds) 2007.

⁹ Margueron 1982.

¹⁰ These are the structures of the type called 'tholos', see: Pelon 1976.

¹¹ See for example: Quenet & Souleiman 2003.

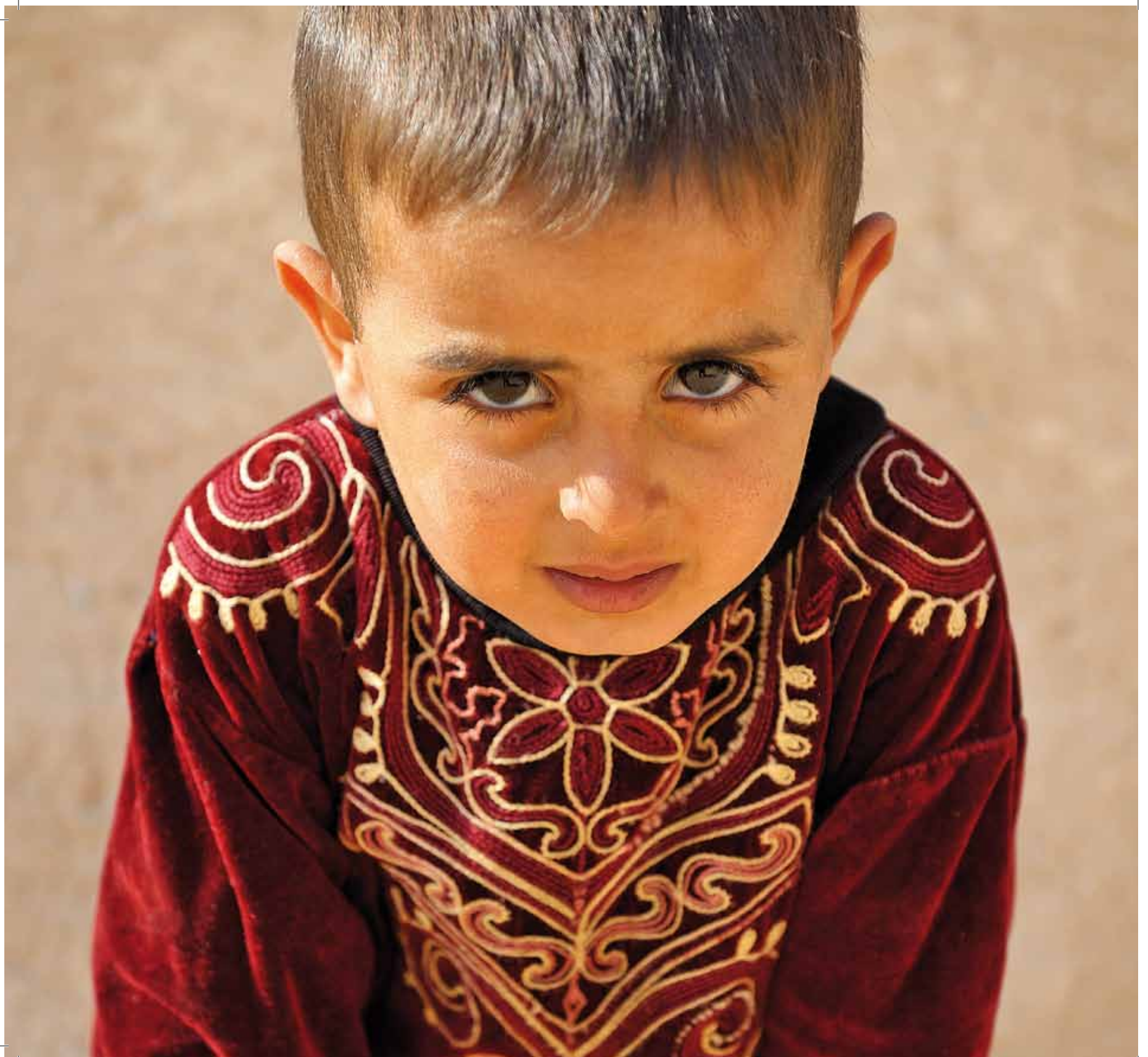
¹² See especially Tunca 1991 and Bendakir 2008.



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Corbelled earthen dome villages of Syria: from past to sustainable future

Saverio Mecca

*Project coordinator, University of Florence,
Italy*

The chief scientific problem related to vernacular architectures, undervalued for the past century or so on account of the difficulty of managing them from a standardized industrial and commercial point of view, lies in the reconstruction of value chains, knowledge and local production. The process of valorisation of earthen architectural cultures is an exemplary case, started many years ago and sustained by important international committees such as UNESCO and ICOMOS, founded partly on the elicitation of constructional knowledge, in compliance with the original contexts, and partly on the innovation of this knowledge through an evolutionary framework organized on the basis of social, economic, and technical expectations and requirements. The core goal of the 'Coupoles et habitats' project¹, of which we present the results, is:

- to document the unique historical landscape of earthen dome villages in northern Syria that has continued to express the complex relationship between the environment, people and architecture over thousands of years;
- to examine the common roots between East and West demonstrated by the astonishing diffusion of corbelled architectural and building culture all over Europe and the Mediterranean;
- to experiment and test an interdisciplinary approach to the analysis and valorisation of knowledge systems that we call Vernacular Architectural Heritage.

Vernacular Architectural Heritage (VAH) is important for our own future because such architectures are characterized by:

- a high level of technical variability and integration in geographical and cultural environments together with their traditionally ecological and effective energy performances, which is of the utmost relevance;
- consistent levels of "tacit" and local knowledge, of technical and procedural competence and of information on local materials, resources and practices;
- criticism, however, related to the durability (in the chemical and physical sense), to mechanical weakness and seismic vulnerability.

Syrian earthen corbelled dome architecture expresses these characteristics at the highest level: the project offers to Syrian and international communities an analysis of its constructional system, based on a deep knowledge of local building culture, on local technical heritage and on experimental research into the physical, energy-related and structural behaviour of 'earth', stones, and 'poor' wood as building materials.

The final goal of the project is, therefore, to increase the perception and consciousness of the value of this local earthen architectural heritage in an effort directed towards the sustainable development of this region.

The complexity and the cultural, social and technical variability of Syrian EAH, together with insufficient levels of scientific knowledge of the cause-effect relationships between specific characteristics and total performances, is linked to a decay in the perception of this way of living and its social value, and to the loss of local and 'tacit' technical knowledge: the final result is a non-satisfactory qualitative and quantitative model of performances of earthen architecture.

The conservation and valorisation of this heritage can be successful only if

¹ Culture 2000, Third Countries : Coupoles Et Habitats, Une tradition constructive entre Orient et Occident. Contract n.2007-1134/001-001 CTU COHANT



such architecture is one of the building technologies of the future: we shall safeguard the values of diffused quality in a widespread architectural heritage only if they become a 'living' architectural culture.

In this sense, even the conservation issue has to be faced through methodologies and tools concerning design and project management. The conscious design of new architectures and heritage conservation requires a combination of specific scientific and experimental knowledge, along with both the local and tacit knowledge systems that are at present dispersed, unconnected and, in some respects, lacking.

Insufficient social value and a lack of knowledge is, in fact, at the base of the perceived poorness, inadequacy and unreliability of earthen technology, an 'old' material but, nevertheless, an indomitable expression of cultural diversity, variable in relation to the cultural and natural characters of places, capable of being a strategic material for the future of architecture and human settlements.

Building in earth: cultural plasticity and sustainability

Earth is an essentially original and misunderstood raw material with great potential ranging from its positive environmental/energy ratio, to its admirable capacity to integrate other materials such as stone, wood, brick, lime

and vegetable fibres, etc., capable also of constituting the sole material for whole buildings in climatically and geographically extreme situations.

The technique of building with earth developed independently in all areas of economic and cultural development: in Mesopotamia in the Valley of the Tigris and the Euphrates (Syria, Iraq and Iran), in the Valley of the Nile (Egypt), in the Jordan Valley (Palestine and Jordan), in India and China, in Maghreb and Sub-Saharan Africa, in Central America and Peru. In particular, in regions with a hot/dry climate it boasts the considerable advantages of quick manufacture and ease of drying, with good resistance to fire and, when properly protected, even to the elements. It also has the capacity to keep buildings cool in summer and warm in winter through thermal insulation and inertia. Since the first Neolithic civilizations with the development of agriculture, we have seen the beginning of stable architectures in all fertile regions, often with both resources present: the alluvial deposits of clay and sand, and straw from fields of cereal cultivation, which facilitate the production of the most widespread key material in the world: the clay mixture that we call 'earth'.

'Earth' possesses the great capacity to respond to the housing needs of millions of human beings, not only quantitative needs compatible with limited environmental harmony and resources, but also qualitative cultural requirements, as a result of its high cultural 'plasticity' and its ability to change and



Oum Aamoud Seghir

adapt in response to variations in the natural and human environment, being an expressive language of identities and differing histories.

With fresh attention to the environment, we can return to earth as a new technology of architecture for the twenty-first century.

In the most vulnerable regions, earthen building is the most effective and sustainable technology with which to produce volumes of houses and buildings in the short-term, capable of encouraging the development of local resources, materials and craftsmanship, of increasing technical and professional competence, and of reducing the share of imported goods and technologies related to building activities.

In this era of globalization there is the definite need to enhance local cultures and earthen architecture, for which we should develop research and testing processes, and investment in the pursuit of knowledge, in order to explore and develop the significant strategic potential of the material, as was the case with reinforced concrete in the twentieth century.

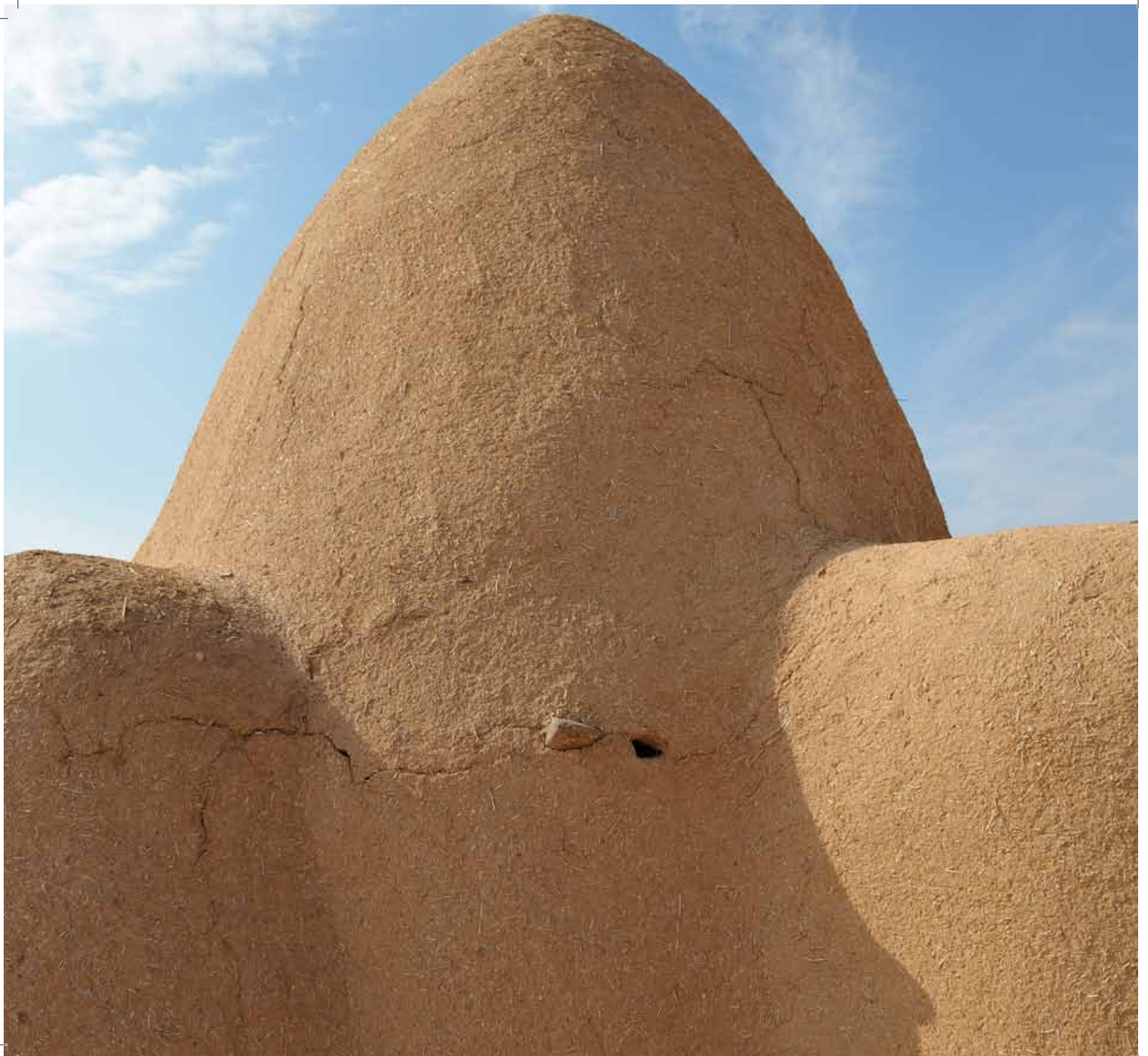
The future of earthen architecture

Knowledge in the broad sense can therefore be identified as the main resource that can be produced, reproduced and disseminated to trigger the processes of self-development and creativity, training of new paradigms,

methods and the design tools of human settlements. Research and experimentation are the main fields of international co-operation among Mediterranean countries, being one of the most powerful tools to rebuild such a Mediterranean community that only in recent centuries has been dismantled.

The same trends of migration and climate change are accentuating the sense of human community, which, starting from the Mediterranean countries, is involving and integrating peri-Saharan and European cultures. These findings urge us to invest in a wider and deeper knowledge of earthen architecture and of all traditional techniques in general, towards a progressive enhancement of their potential performance, not just those traditional and physical, but also those relating to sustainability, till now insufficiently understood.

We need investment in knowledge, in the rebuilding and development of constructional skills, combined with a common language and the sharing of scientific and technical culture regarding earthen construction, not only between technical and professional communities, but also between the peoples of the Mediterranean themselves.



An important new contribution to Syrian architectural heritage

Abd Al-Qader Hariri
*Dean of the Faculty of Architecture,
Aleppo University, Syria*

21

The results of this European Union Culture 2000 project contain some highly significant and valuable information concerning the earthen domes of Syria and related architecture of the Mediterranean countries. We may be grateful for the efforts of all the Syrian and European partners, headed by the University of Florence, in focusing on the importance of this culture of earthen architecture and the conservation of such knowledge, whilst also playing an important role in preserving and protecting against the loss of this whole heritage.

As is well known, earthen architecture existed in Syria many thousands of years ago, and the country has to this day a great wealth of these architectural gems.

The project studied contemporaneously the origins of corbelled dome architecture and 'tholos' in the Mediterranean region (Syria, Greece, Etruria, the Near East, Italy and Portugal), and the Syrian earthen corbelled dome architecture of today in its rich variety of history, architecture, building methods, art and traditions, belonging to a deep-rooted custom of Syrian earthen construction.

Many factors affect the character and distribution of corbelled earthen domes: geographical, climatic, the localization of building earth and water, traditional, social and economic factors. The geography of Syria has also influenced the distribution of corbelled dome architecture, architectural morphology and building details of different areas, while constructional culture and the structural concept have hardly changed over the different regions in thousands of years. The local words (the project presents also an Arabic glossary of architectural terms, of service to foreign researchers and students studying the architecture of this area) testify to this shared architectural heritage.

This project responds to an increasingly important need: the growing necessity to learn from vernacular architecture, especially from earthen domes,

the techniques and materials, not only to register this information as historical knowledge and archival documentation, and to utilize such data and scientific research to protect this patrimony, but also to design and construct new sustainable buildings using what is natural and local as our forefathers and the ancients did long ago. The necessity of learning and transmitting this knowledge to students of architecture and architects themselves arises from the great responsibility we now have, that of addressing issues of environmental pollution to protect the natural world and local culture by a return towards traditional building materials and production, learning to reuse natural materials and techniques.

Our role in these studies (as professors, architects and students) lies in knowing how to apply the best methods and tools for the conservation of earthen architectural heritage, and in knowing how to learn from it practically so as to work directly towards a future architecture in greater equilibrium between humanity and nature.

This knowledge requires primarily a full understanding of the benefits of earth as a building material (being fireproof, durable, easy to maintain, and pleasant to work with) on the one hand, and to distinguish its nature- and climate-friendly characteristics on the other, since this material is an available, renewable and recyclable resource, non-toxic and emission-free, requiring few transport resources, providing high thermal mass, good insulation properties and low energy costs. Earth as a building material also balances indoor climate, regulates air humidity and maintains comfortable surface temperatures.

As this project has done, we need to study and analyze systematically our existing earthen buildings and the heritage of this architectural knowledge in order to arrive at an architecture in the future employing concepts gleaned from this culture, to find a balance between old techniques and new exigencies, between past and future.



Coupoles et habitats, an EU Culture 2000 project

Alexis Castro
Culture Lab, Belgium
Saverio Mecca
University of Florence, Italy

Corbelled dome architecture is a culture and construction technique common to both East and West. In particular, the corbelled domes or “tholos domes” are an ancient construction technique that produced remarkable urban and rural architectural habitats, from an aesthetic and anthropological point of view: thousands of examples of habitats are found all over the Mediterranean region, such as the *Trulli* of Puglia, the *Specchie* of Salento (Italy), the *Cabanes* of Vaucluse (France), the *Chozos* of Spain and Portugal, the *Bombos* of Castilla La Mancha, (Spain), the *Pinnettas* of Sardinia or the *Qubbas* of Syria.

The corbelled dome reflects the common roots of a heritage, both tangible and intangible, a way of life and expertise shown in a cultural diversity that is exemplary of the balance between knowledge, resources, needs and values, that was developed over literally thousands of years.

In the Mediterranean region, the architectural culture of corbelled domes is an expression of dry-stone building culture mostly connected to sheep-rearing and the related nomadism of shepherds, with only a few exceptions, most notably in Alberobello, Apulia.

In Syria, the culture of corbelled domes is an expression of earthen building culture and of semi-nomadic people living in this arid region.

While the corbelled domes of the Mediterranean have been documented, until now very few studies have investigated the earthen corbelled domes of Syria.

Valorise a cultural heritage shared between East and West

The first goal is to valorise an architectural heritage ultimately at risk, an architectural culture shared between East and West, providing real evidence of the culture of a people at the origins of the Mediterranean identity, and their cultural diversity.

The first action of valorisation is to identify the roots of this culture of construction to which archaeological evidence in Syria, the Aegean Islands and Etruria is testament. Through the documentation the core of the structural knowledge, which enabled people to use such simple resources like clay and limestone and to diffuse it over all the Mediterranean to solve the basic problems of architecture, can be found.

The second action is to analyze and characterize the material and immaterial dimensions of the architectural heritage of earthen corbelled dome habitats in Syria

The project has been based, therefore, on an interdisciplinary approach towards an in-depth study of local architecture and a representation of architectural knowledge, in other words, to increase specific scientific knowledge through an interdisciplinary scientific research.

The scientific research action developed by the project included:

- Geographical analysis of the arid region of Syria where the corbelled dome habitats are found
- Morphological analysis of the urban structure of villages
- Architectural analysis of houses and of domes
- High definition modelling 2D/3D in order to document and realize a

database supporting technical and mechanical analysis;

- Characterization of building culture identifying and codifying building elements and building knowledge, the diversity of dome types and construction processes
- Characterization of the phenomena of degradation of materials by an archaeometric analysis
- Characterization of mechanical behaviour by structural experiments "in situ" and in the laboratory
- Analysis of living culture through the interiors of corbelled dome houses.

Contribute to safeguard a cultural landscape and support an effective approach to sustainable conservation of architectural heritage

The third action is to support awareness to better understand the cultural value, conserve and protect this endangered world heritage through the promotion of training and awareness initiatives in conjunction with the public authorities, and an exchange of actions, experiences and knowledge between Syrian and European university specialists.

Safeguarding vernacular architecture cannot be separated from the grass roots, the lives of the people and their hope of assuring better lives for their children: all strategies and activities of conservation must be tailored to the needs of modern life in a sustainable frame of development. The fourth action is to communicate to Europeans, Syrians and to the whole world the value of this cultural heritage and to disseminate the specific knowledge and skills related to this shared heritage through an exhibition in Europe and Syria, a scientific seminar in Damascus and the publication of this scientific catalogue of the exhibition including the results of research activities.

Planned activities

The project has been developed through a close cooperation and partnership among researchers of 6 countries, Italy, Syria, France, Belgium, Spain and Greece. The profiles of researchers and technical experts have been complementary in terms of archaeology, architecture, building technology, geomatics and mechanics.

The index of the scientific catalogue reflects the structure of the project and the main axes of activities :

Axis 1: State of the art in archaeology and in vernacular architecture

A historical and scientific state of the art assessment in archaeology and in vernacular architecture. The archaeological studies have focused on the corbelled dome in the archaeology of the ancient Near East, on the Prehistoric dome architecture in the Aegean and on the tholos tombs of Etruria, to investigate the origins of corbelled dome culture and its diffusion in the Mediterranean region. The vernacular architecture studies have been oriented towards a general overview of corbelled dome architecture in modern times in the Mediterranean region and to a comparative analysis of corbelled domes in the architecture of Spain and Portugal, in France, in Italy and in Greece, and looking further afield to Azerbaijan, identifying the diffusion of a shared architectural culture and its diversity.

Axis 2: Original scientific research on architectural heritage

Both a field and laboratory research on the corbelled dome villages of the Aleppo region. After an initial mission to select the sites, two missions have been developed for field surveys where several integrated methods and tools have been used by the partners as geomatic methods for a detailed 2D and 3D modelling, also architectural methods for characterising the urban and architectural morphology, either construction techniques, archaeometric methods for characterising the materials and the degradation processes, and mechanical methods for characterising the structural behaviour of earthen domes.

Axis 3: Communication and dissemination of results

Production of documents devoted to communication and dissemination of the project and awareness promotion of the value of cultural heritage. The strategy of communication is articulated in several coordinated actions:

- a scientific and photographic exhibition to be held in Damascus and then in Aleppo (Syria) and in Florence, Thessaloniki, Valencia, and next year in Paris and other main cities (Europe);
- a scientific seminar to be held in Damascus as an opening to the exhibition ;
- a training seminar to be held in Aleppo at the Faculty of Architecture of the University of Aleppo to promote the documentation, analysis, preservation and enhancement of vernacular architectural heritage, the methods and practices of earthen dome habitat heritage conservation.





Vernacular architecture as a cultural heritage shared by East and West

Vassilis Koniordos
*Hellenic Society,
Thessaloniki, Greece*

The southeast Mediterranean has a millennia-old history and culture. Being the crossroads of the continents and the sea for different civilizations and religious denominations, the region has acted as a natural link between East and West throughout the centuries.

This cultural integrity is unique, pointing back to common historical roots and mutual influences. Thus, cultural corridors recognize no borders, date back to various ages and have been created by diverse civilizations. They start from southern Europe, run through several continents and finish up in Africa.

The word 'vernacular' was originally used by linguists to mean the 'native language of a region' as opposed to a superior (often imposed) language like Latin or Greek. Architectural historians borrowed 'vernacular' to mean the native architecture of a certain region.

Vernacular architecture is a form of building that is distinctive to the region where it is practised, based on local needs and preferences. It is an aspect of cultural expression rooted to a particular place.

Vernacular architecture brings with it an enormous artistic, functional and cultural wealth. This architecture is produced not by specialists, but by the spontaneous and continuing activity of whole peoples with a common heritage, bringing new values to the community experience. This architecture has often been considered as 'primitive', but today we all recognize the art-form in it, as a result of human intelligence related to different human modes of life.

The skill and knowledge of the anonymous builders presents the larg-

est unutilized source of architectural inspiration beyond economic and aesthetic considerations, how to live and how to keep peace with one's neighbours.

Building knowledge in vernacular architecture is often transported by local traditions and groups of technicians, handed down as it is through the generations.

The lifestyles of the occupants and the way they use their shelters is of great influence on building forms.

The size of family units, who shares these spaces, the way people interact and other cultural considerations ultimately affect the layout and size of these constructions.

Social interaction within the family is governed by the separation between the structures in which family members live. Culture also has a great influence on the appearance of vernacular buildings in accordance with local customs and beliefs.

Despite the 'passage' of different nations, these types of houses have survived almost unaltered up to the present day, still serving the inhabitants well.

Vernacular building heritage is important; it is the fundamental expression of the culture of a community, of its relationship with its territory and, at the same time, an expression of the world's cultural diversity.

Vernacular building is the traditional and natural way by which communities house themselves. It is a continuing process including necessary changes and continuous adaptation as a response to social and environmental constraints.

As these buildings and stories show, vernacular heritage constructions are often taken for granted and frequently undervalued. Many of these structures have had close calls and were very nearly demolished. Some hold on to life by a slim thread, ignored and generally forgotten.

Vernacular building heritage occupies a central place in the affection and pride of everyone. It has been accepted as a characteristic and attractive product of society. It appears informal, but nevertheless orderly. It is utilitarian, and at the same time possesses interest and beauty. It is a focus of contemporary life, and a record of the history of society. Although it is the work of man, it is also the creation of time. It would be unworthy of the heritage of man if care were not taken to conserve these traditional harmonies, which constitute the core of a person's very existence.

The survival of this tradition is threatened worldwide by the forces of economic, cultural and architectural homogenisation. How these forces can be met is a fundamental problem that must be addressed by communities and also by governments, planners, architects, conservationists and by a multidisciplinary group of specialists.

They represent a system of cultural values and historical links born out of the cultural exchange and dialogue among communities in the region. These communities are becoming increasingly aware of the need for joint efforts to reveal, conserve, use sustainably and promote the rich cultural heritage of Mediterranean vernacular architecture.

A knowledge of vernacular architecture and the necessary initiatives to be taken for its salvage, is a process which unites people to joint actions in order to contribute concretely to the preservation of the cultural and environmental equilibrium which represents substantially a mission of peace and cultural education.

Taking into consideration all the above the Project "COUPOLES ET HABITATS" is promoting a research for the valorisation of the common architectural cultural heritage between East and West and the development of an interdisciplinary scientific research for the vernacular architecture focusing on the characteristic inhabited complexes with domes in Syria.

The construction of domes represents a common cultural heritage and a constructive method of the larger Mediterranean region. This vernacular architecture of Syria testify the common roots of way of living throughout the region of South Europe till Africa, from Aleppo to Puglia, from Majorca to Sardinia.







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info@edizioniets.com
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