

Traditional buildings for tobacco processing in Val Tiberina (Tuscany-Italy)

Original

Traditional buildings for tobacco processing in Val Tiberina (Tuscany-Italy) / Mattone, Manuela; Fratini, Fabio; Rescic, Silvia; Camaiti, Mara. - STAMPA. - 1:(2022), pp. 349-356. ((Intervento presentato al convegno Heritage 2022 - Vernacular heritage: culture, people and sustainability tenutosi a Valencia nel 15/09/2022-17/09/2022.

Availability:

This version is available at: 11583/2971760 since: 2022-09-27T08:02:18Z

Publisher:

Univesidad Politecnica de Valencia

Published

DOI:

Terms of use:

openAccess

This article is made available under terms and conditions as specified in the corresponding bibliographic description in the repository

Publisher copyright

(Article begins on next page)

HERITAGE 2022 INTERNATIONAL CONFERENCE VERNACULAR HERITAGE: CULTURE, PEOPLE AND SUSTAINABILITY

Eds. C. Mileto, F. Vegas, V. Cristini, L. García-Soriano



VERNACULAR HERITAGE: CULTURE, PEOPLE AND SUSTAINABILITY

Eds. C. Mileto, F. Vegas, V. Cristini, L. García-Soriano



Universitat Politècnica de València

Colección Congresos UPV

The contents of this publication have been approved by the Congress Scientific Committee and in accordance to the procedure set out in
<http://ocs.editorial.upv.es/index.php/HERITAGE/HERITAGE2022>

First edition, 2022

Scientific Editors

C. Mileto
F. Vegas
V. Cristini
L. García-Soriano

© of the contents: the authors

Publisher

Editorial Universitat Politècnica de València
www.lalibreria.upv.es / Ref.: 6117_01_01_01

DOI: <https://doi.org/10.4995/HERITAGE2022.2022.15942>

ISBN: 978-84-1396-020-3

Print on-demand

Printer

Byprint Percom, S.L.

Printed in Spain



HERITAGE 2022

International Conference on Vernacular Heritage: Culture, People and Sustainability

This book is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike-4.0 International license. Editorial Universitat Politècnica de València
<http://ocs.editorial.upv.es/index.php/HERITAGE/HERITAGE2022>

Preface

C.Mileto, F. Vegas, V. Cristini, L. García-Soriano

Research Centre for Architecture, Heritage and Management for Sustainable Development (PEGASO),
Universitat Politècnica de València, Valencia, Spain

“HERITAGE2022, International Conference on Vernacular Heritage: Culture, People and Sustainability” is organized in the framework of the “VerSus+ | Heritage for PEOPLE” project, co-funded by the Creative Europe Program of the European Union (grant 607593-CREA-1-2019-1-ES-CULT-COOP1) and led by Universitat Politècnica de València (Spain) in partnership with Università degli Studi di Firenze and Università degli Studi di Cagliari (Italy), CRATERre – ENSAG (France) and Universidade Portucalense - Departamento de Arquitetura e Multimédia Gallaecia (Portugal). The “VerSus+ | Heritage for PEOPLE” project focuses on the transmission of knowledge to communities and the general public. It pays special attention to the society of the future (children and young people), as well as local, regional and national authorities in charge of heritage management, and includes specialists and experts in the field of architecture (architects, engineers, cultural managers, historians, ethnographers, university students, etc.) together with craftsmen and companies in the construction and tourism sectors, cultural and social associations, and educational institutions.

Vernacular heritage is a tangible and intangible heritage of great importance to European and global culture. This architecture, born from the practical experience of local inhabitants, makes use of local materials to erect buildings taking into consideration the climate and geography, developing cultural, social and constructive traditions based on the conditions of the surrounding nature and habitat. Above all, it plays an essential role in contemporary society as it is able to teach us important principles and lessons for a respectful sustainable architecture. These lessons from vernacular heritage for contemporary architecture have been extensively studied in the “VerSus: Lessons from Vernacular Heritage in Sustainable Architecture (grant 2012-2792/001-001 CU7 COOP7)” project, co-funded by the European Union between 2012 and 2014, and the “VerSus+ | Heritage for PEOPLE” (2019-2023) project, which follows on from the previous project, focusing on the transmission of this knowledge to society, as seen earlier. The wisdom of vernacular architecture in the field of environmental, sociocultural and socioeconomic sustainability is increasing both in interest and significance in the world today. Climate change, depopulation and the pressure of tourism all pose major challenges, as do the increasingly rapid social changes and loss of traditional trades resulting from the industrialization of the construction process. These challenges alert us to the pressing and growing need for education and increased awareness in society and for the documentation and conservation of architecture within a framework of up-to-date integration into contemporary life, managing territory and heritage assets for the sustainable development of society in the future.

The second project involved in this conference is “RISK-Terra. Earthen architecture in the Iberian Peninsula: study of natural, social and anthropic risks and strategies to improve resilience” (RTI2018-095302-B-I00) (2019-2022), funded by MCIU (Ministerio de Ciencia, Innovación y Universidades), AEI (Agencia Estatal de Investigación), FEDER - UE (Fondo Europeo de Desarrollo Regional, Unión Europea). This project is geared towards the conservation of earthen architecture in the Iberian Peninsula, both monumental and vernacular, which continues to be undervalued and barely recognized. The RISK-Terra project aims to provide scientific coverage of the study of natural threats (floods, earthquakes, climate change), social threats (abandonment, social discredit, demographic pressure, tourist development), and anthropic threats (neglect, lack of protection and maintenance), as well as the mechanisms for deterioration

and dynamics and transformation (replacement, use of incompatible techniques and materials, etc.) to which architecture is exposed. The objective of the project is to establish strategies for conservation, intervention and rehabilitation which allow the prevention and mitigation of possible damage through compatible actions and/or actions to increase resilience.

As these two projects have major points of contact, particularly in relation to the challenges mentioned above, with potential for common reflection, their main themes have been combined in this Heritage2022 conference. The topics established for the conference are: 1. vernacular architecture: matter, culture and sustainability (study and cataloging of vernacular architecture; urban studies of vernacular architecture; studies of traditional techniques and materials; sustainability of vernacular architecture); 2. heritage education (research in heritage education; heritage education and social inclusion; heritage communities; creativity and heritage education); 3. artisans and crafts of traditional construction (intangible heritage: the management of know-how and local construction culture; training in traditional construction crafts; tradition and innovation in traditional construction crafts; plans and experiences for the recovery and maintenance of construction crafts); 4. conservation, restoration and enhancement of vernacular architecture (conservation and restoration projects of vernacular architecture; materials and intervention techniques for vernacular architecture; difficulties and possibilities of using traditional crafts in conservation; management and maintenance of vernacular architecture).

The scientific committee was made up of 102 outstanding researchers from 24 countries from the five continents, specialists in the subjects proposed. All the contributions to the conference, both the abstracts and the final texts, were subjected to a strict peer-review evaluation system by the members of the scientific committee. Out of the 200 proposals submitted, 134 papers by 254 authors from 25 countries from the four continents were chosen for publication. All the articles have been published in print and online in the two-volume book “Vernacular Heritage: Culture, People and Sustainability”.

“HERITAGE2022 (Versus+ | RISK-Terra), International Conference on Vernacular Heritage: Culture, People and Sustainability” was held from 15 to 17 September 2022 in in-person and online modality at the Universitat Politècnica de València. The conference was under the aegis of: ICOMOS-CIAV (International Scientific Committee of Vernacular Architecture); ICOMOS-ICICH (International Scientific Committee on Intangible Cultural Heritage); IEB (Instituto Español de la Baubiologie). The organization, publication and implementation of the conference have been made possible thanks to co-funding of the Creative Europe Programme of the European Union for the project “VerSus+ | Heritage for PEOPLE” (grant 607593-CREA-1-2019-1-ES-CULT-COOP1); and the MCIU, AEI and FEDER - UE for the research project “Risk-Terra. Earthen architecture in the Iberian Peninsula: study of natural, social and anthropic risks and strategies to improve resilience” (ref.: RTI2018-095302-B-I00). Furthermore, Escuela Técnica Superior de Arquitectura and PEGASO - Research Centre for Architecture, Heritage and Management for Sustainable Development of Universitat Politècnica de València have also contributed to the whole project.

Finally, we would like to thank all the authors who contributed to the quality, range, diversity and richness of these publications with their articles. We give special thanks to all the partners of the European project “VerSus+ | Heritage for PEOPLE” and the national research project “Risk-Terra” for participating in the conference and helping to spreading the word about it worldwide. We are grateful for the aid of all the members of the advisory committee and the scientific committee for their work throughout the process of revising the abstracts and papers. And, above all, we thank the organizing committee for the complex setting up of the whole conference, the style and language reviewers for their corrections, and all the collaborators for their invaluable work in the management and organization of all stages of the process.

Organization and Committees

ORGANIZING COMMITTEE

Camilla Mileto (Chair) – *Universitat Politècnica de València, Spain*
Fernando Vegas López-M. (Chair) – *Universitat Politècnica de València, Spain*
Lidia García Soriano – *Universitat Politècnica de València, Spain*
Valentina Cristini – *Universitat Politècnica de València, Spain*
María Lidón De Miguel – *Universitat Politècnica de València, Spain*
Alicia Hueto Escobar – *Universitat Politècnica de València, Spain*
Vincenzina La Spina – *Universidad Politécnica de Cartagena, Spain*
Sergio Manzano – *Universitat Politècnica de València, Spain*
Francesca Trizio – *Universitat Politècnica de València, Spain*
Matilde Caruso – *Universitat Politècnica de València, Spain*
Marina Elia – *Universitat Politècnica de València, Spain*
Stefania Farina – *Universitat Politècnica de València, Spain*
David Eduardo Morocho-Jaramillo – *Universitat Politècnica de València, Spain*
Eva Tortajada Montalva – *Universitat Politècnica de València, Spain*

ORGANIZED BY

UPV – *Universitat Politècnica de València*
UPT-DAMG – *Universidade Portucalense, Departamento de Arquitetura e Multimédia*
Gallaecia
UNIFI – *Università degli Studi di Firenze*
UNICA – *Università degli Studi di Cagliari*
CRATERRE-ENSAG – *École Nationale Supérieure d'Architecture de Grenoble*
PEGASO – *Research Center Architecture, Heritage and Management for Sustainable*
Development, UPV, Spain
Departamento de Composición Arquitectónica, Spain

CO-FUNDED BY

VERSUS+/Heritage for PEOPLE Project
Creative Europe – *Creative Europe Programme of European Union*
RISK – *terra Project*
MICIU – *Ministerio de Ciencia, Innovación y Universidades*
AEI – *Agencia Estatal de Investigación*
FEDER, UE – *Fondo Europeo de Desarrollo Regional, Unión Europea*

UNDER THE AEGIS OF

ICOMOS-CIAV – International Scientific Committee for Vernacular Architecture –

International Council on Monuments and Sites

ICICH – International Committee on Intangible Cultural Heritage

ICOMOS-ISCEAH – International Scientific Committee on Earthen Architectural Heritage

SCIENTIFIC COMMITTEE

Adolfo Alonso Durá – *Universitat Politècnica de València, Spain*; Ahmed Alaidaroos – *King Saud University, Riyadh, Saudi Arabia*; Alejandro García Hermida – *Universidad Alfonso X el Sabio, INTBAU-España, Spain*; Alessandro Merlo – *Università di Firenze, Italy*; Alessio Cardaci – *Università di Bergamo, Italy*; Alicia Hueto Escobar – *Universitat Politècnica de València, Spain*; Amparo Graciani García – *Universidad de Sevilla, Spain*; Ana González Serrano – *Universidad de Sevilla, Spain*; Ana Yañez Vega – *Universidad Complutense de Madrid, Spain*; Andrea Pane – *Università Federico II di Napoli, Italy*; Angela Squassina – *Istituto Universitario di Architettura di Venezia, Italy*; Antonella Versaci – *Università Kore di Enna, Italy*; Apolonia Begoña Serrano Lanzarote – *Universitat Politècnica de València, Spain*; Arianna Guardiola Villora – *Universitat Politècnica de València, Spain*; Arturo Zaragoza Catalán, Generalitat Valenciana, **Spain**; Bakonirina Rakotomamonjy – *CRATERRE-ENSAG, France*; Borut Juvanec – *University of Lubiana, Slovenia*; Camilla Mileto – *Universitat Politècnica de València, Spain*; Chiho Ohiai – *Kyoto National University, Japan*; Claudia Cancino – *The Getty Conservation Institute, USA*; Cristina Vidal Lorenzo – *Universitat de València, Spain*; Daniela Esposito – *Università La Sapienza Roma, Italy*; David Eduardo Morocho-Jaramillo – *Universitat Politècnica de València, Spain*; Donatella Fiorani – *Università La Sapienza Roma, Italy*; Eva Tortajada Montalva – *Universitat Politècnica de València, Spain*; Fabio Fatiguso – *Università di Bari, Italy*; Fabio Fratini – *CNR-ICVBC, Sesto Fiorentino (FI), Italy*; Faissal Cherradi – *Ministerio de Cultura, Morocco*; Félix Jové Sandoval – *Universidad de Valladolid, Spain*; Fernando Vegas López-M. – *Universitat Politècnica de València, Spain*; Fernando Vela Cossío – *Universidad Politècnica de Madrid, Spain*; Francisco Javier López Martínez – *Universidad Católica de Murcia, Spain*; Francisco Javier Torrijo Echarri – *Universitat Politècnica de València, Spain*; Francesca Trizio – *Universitat Politècnica de València, Spain*; Francesco Trovó – *Istituto Universitario di Architettura di Venezia, Italy*; Frank Matero, *University of Pennsylvania, USA*; Gaspar Muñoz Cosme – *Universitat Politècnica de València, Spain*; Gilberto Carlos – *Escola Superior Gallaecia, Vila Nova Cerveira, Portugal*; Gisle Jakhelln – *ICOMOS-CIAV, Norway*; Guillermo Guimaraens Igual, *Universitat Politècnica de València, Spain*; Hirohide Kobayashi – *Kyoto National University, Japan*; Hossam Mahdy – *ICOMOS-CIAV, Great Britain*; Hubert Guillaud – *CRATERRE-ENSAG, ISCEAH, France*; Humberto Varum – *Universidade de Porto, Portugal*; Isabel Kanan – *ICOMOS-ISCEAH, PROTERRA, Brazil*; Ivan Enev – *Arquitecto, ICOMOS-CIAV, Bulgaria*; Javier Ors Ausin – *World Monument Fund, United States*; Jorge Luis García

Valdecabres – *Universitat Politècnica de València, Spain*; Jorge Tomasi – *CONICET, Instituto Interdisciplinario Tilcara, Argentina*; José Luis Baró Zarzo – *Universitat Politècnica de València, Spain*; José Manuel López Osorio – *Universidad de Málaga, Spain*; Juan Bravo Bravo – *Universitat Politècnica de València, Spain*; Juan María Songel González – *Universitat Politècnica de València, Spain*; Juana Font Arellano – *Fundación Antonio Font de Bedoya, PROTERRA, Spain*; Julieta Barada – *CONICET, Instituto Interdisciplinario Tilcara, Argentina*; Letizia Dipasquale – *Università di Firenze, Italy*; Lidia García Soriano – *Universitat Politècnica de València, Spain*; Luis Fernando Guerrero Baca – *Universidad Metropolitana Autónoma, Mexico*; Luisa Basset Salóm – *Universitat Politècnica de València, Spain*; Maddalena Achenza – *Università di Cagliari, ICOMOS-ISCEAH, Italy*; Marcel Vellinga – *Oxford Brookes University, ICOMOS-CIAV, United Kingdom*; María Concepción López González – *Universitat Politècnica de València, Spain*; Maria Ines Subercaseaux – *Metropolitana de Santiago, ICOMOS-CIAV, Chile*; María José Viñals Blasco – *Universitat Politècnica de València, Spain*; María Lidón de Miguel – *Universitat Politècnica de València, Spain*; Mariana Correia – *Escola Superior Gallaecia, Vila Nova Cerveira, Portugal*; Marina Elia – *Universitat Politècnica de València, Spain*; Marwa Dabaieh – *Lund University, Lund, ICOMOS-CIAV, Sweden*; Matilde Caruso – *Universitat Politècnica de València, Spain*; Mikel Landa Esparza – *Arquitecto, ICOMOS-IIBC, Spain*; Min Hall – *architect, Unitec Institute of Technology, Auckland, Nueva Zelanda*; Mónica Luengo Añón – *Arquitecto paisajista, ICOMOS-IFLA, Spain*; Naima Benkari – *Sultan Qaboos University, Omán*; Natalia Jorquera – *Universidad de Chile, Santiago, Chile*; Ona Vileikis Tamayo – *University Collage London, Reino Unido*; Pamela Jerome – *Columbia University, ICOMOS-ISCEAH, United States*; Pablo Rodríguez Navarro – *Universitat Politècnica de València, Spain*; Paolo Vitti – *University of Notre Dame, United States*; Pasquale De Dato – *Universitat Politècnica de València, Spain*; Paulo B. Lourenço – *Universidade do Minho, ICOMOS-ISCARSAH, Portugal*; Pere Roca Fabregat – *Universitat Politècnica de Catalunya, ICOMOS-ISCARSAH, Spain*; Plácido González Martínez – *Tongji University Shanghai, China*; Rawiwan Oranratmanee – *Chiang Mai University, Thailand*; Renata Picone – *Università Federico II di Napoli, Italy*; Saverio Mecca – *Università di Firenze, Italy*; Sébastien Moriset – *CRATERRE-ENSAG, France*; Sergio Manzano – *Universitat Politècnica de València, Spain*; Sergio Ortín Molina – *Universitat Politècnica de València, Spain*; Shao Yong – *Tongji University Shanghai, China*; Simone Ricca – *WHITRAP, Shanghai, China*; Stefan Balici – *Ion Mincu University, Romania*; Stefania Farina – *Universitat Politècnica de València, Spain*; Teresa Gil Piqueras – *Universitat Politècnica de València, Spain*; Thierry Joffroy – *CRATERRE-ENSAG, France*; Valentina Cristini – *Universitat Politècnica de València, Spain*; Valentina Russo – *Università Federico II di Napoli, Italy*; Valeria Prieto – *Arquitecta, ICOMOS-CIAV, Mexico*; Vincenzina La Spina – *Universidad Politècnica de Cartagena, Spain*; Yolanda Hernández Navarro – *Universitat Politècnica de València, Spain*; Wenhao Ji – *China Academy of Art, Hangzhou*; Youcef Chennaoui – *École Polytechnique d'Architecture et d'Urbanisme d'Alger, Algeria*; Zuzana Syrová – *National Heritage Institute, Czech Republic*.

COLLABORATION IN THE PUBLICATION

Marina Elia (coordinator)

Stefania Farina

Lidia García Soriano

María Lidón De Miguel

Alicia Huetos Escobar

Sergio Manzano Fernández

Francesca Trizio

Matilde Caruso

David Eduardo Morocho-Jaramillo

Eva Tortajada Montalva

Conference support

ORGANIZED BY



UNIVERSITAT
POLITÈCNICA
DE VALÈNCIA



UNIVERSIDADE PORTUCALENSE
DEPARTAMENTO ARQUITETURA E MULTIMÉDIA GALLAECIA



UNIVERSITÀ
DEGLI STUDI
FIRENZE



UNIVERSITÀ
DEGLI STUDI
DI CAGLIARI



NS/
AG



Centro de Investigación
Arquitectura, Patrimonio y Gestión
para el desarrollo Sostenible



DEPARTAMENTO DE
COMPOSICIÓN ARQUITECTÓNICA

CO-FUNDED BY



Co-funded by the
Creative Europe Programme
of the European Union

RISK_Terra



UNDER THE AEGIS OF



ICOMOS CIIV
International Committee
on Vernacular Architecture
International Council on
Monuments and Sites



ICOMOS - ISCEAH
International Scientific Committee
on Earthen Architectural Heritage

Table of contents

Preface.....	I
Organization and Committees	IV
Conference Support.....	VIII

PLENARY LECTURES

A Vision for CIAV. Addressing the challenges facing the ICOMOS International Scientific Committee on Vernacular Architecture	3
<i>H. Mahdy</i>	
The National Plan for Traditional Architecture as a safeguarding tool. Action programmes and projects	11
<i>M. P. Timón Tiemblo, E. Agromayor Navarrete</i>	

VERNACULAR ARCHITECTURE: MATTER, CULTURE AND SUSTAINABILITY

STUDY AND CATALOGING OF VERNACULAR ARCHITECTURE

The standardisation of vernacular architecture. Wine buildings in Andalusia	23
<i>J. Aladro-Prieto, F. J. Ostos-Prieto, M. Murillo-Romero</i>	
Vernacular architecture in Brazilian semiarid region: survey and memory in the state of Sergipe	31
<i>D. Felix Andrade, M. A. Penido de Rezende, S. Araújo Lima Bessa</i>	
Knowledge and conservation of Mediterranean spontaneous architecture: some of the villages of the northern Tyrrhenian coast of Calabria	39
<i>B. Canonaco, F. Bilotta</i>	
Architectural and constructive characteristics of vernacular settlements in southern Italy: the Esaro's valley and the popular identity of some exemplary cases.....	47
<i>B. Canonaco, F. Castiglione</i>	
Spanish traditional architecture abandonment and destruction: an initial analysis of social risks, phenomena, and effects in earthen architecture.....	55
<i>M. Caruso, C. Mileto, F. Vegas, V. Cristini</i>	
A taxonomy of vernacular heritage in the mid-Adriatic: Landscape relations and architectural characteristics of the farmhouses in Tronto Valley (Italy).....	63
<i>S. Cipolletti</i>	
Traditional houses in the South-Western Iberian Peninsula: Themes for a cross-border comparative typological study	71
<i>A. Costa Rosado, V. Gómez Martínez, M. Reimão Costa, M. T. Pérez Cano</i>	

The Hameau de la Reine at Versailles and the reproduction of vernacular architecture.....	79
<i>D. Crispino</i>	
Vernacular architecture of the Amalfi coast: a medieval domus in Villa Rufolo in Ravello (Italy)	87
<i>E. De Feo</i>	
Architectural survey, realized with integrated methodology, of the complex of Walser houses in Alagna Valsesia, Italy	95
<i>A. Di Paola, S. Vecchio, G. Frosini, B. Verona, S. Garuglieri</i>	
Modern attitudes towards vernacular architecture. Works by the Italians Luigi Angelini, Alberto Alpago Novello, Ottavio Cabiati, Alessandro Minali	103
<i>M. M. Grisoni</i>	
Wind and the villages in Rincón de Ademuz, Spain	111
<i>W. Ji, C. Mileto, F. Vegas</i>	
Vernacular features in eclectic architecture from the tropics. An analysis by means of architectural survey	119
<i>M. Leserri, G. Rossi, M. Chaverra Suarez, S. Gómez Mejía</i>	
Configuring, building and inhabiting the house from a gender perspective	125
<i>M. Lidón de Miguel, C. Mileto, F. Vegas, A. Hueto-Escobar</i>	
Rediscovering tradition through representation: the vaulted house of the Amalfi Coast.....	133
<i>B. Messina, S. Morena, C. Ferreyra</i>	
Traditional dwellings and techniques of the First Indigenous Peoples of South Africa in the Eastern Cape.....	141
<i>M. Minguzzi, Y. Hernández Navarro, L. Vosloo</i>	
Rediscovered earth heritage becomes motor for local change The Guérande Peninsula (France)	149
<i>M. Miranda Santos, A. Hilton, P. Poullain, E. Hamard, C. Mouraud</i>	
Tradition and semantics: the case of Aeolian architecture.....	157
<i>S. Mollica</i>	
The Italian case of Leopoldine in Tuscany: methods and issues for the cataloguing of rural building heritage	165
<i>I. Nocerino</i>	
Highlighting the Heritage of Meseta Ibérica.....	173
<i>J. Pinto, A. Paiva, D. Almeida, S. Pereira, A. Antunes, R. Bento</i>	
A heritage to reveal and protect. Historical water-based paper mills and ironworks in Campania (Italy)	181
<i>S. Pollone</i>	
Architecture and Proto Industry. Watermills in the historic peri-urban landscape of Benevento (Italy).....	189
<i>L. Romano</i>	

An architectural catalogue for the study of traditional building features from their seismic behaviour in the 2016 Central Italy earthquake	197
<i>L. Sbrogiò, Y. Saretta, M. R. Valluzzi</i>	
Earthen vernacular architecture in flood-prone areas: characteristics and typologies in the Ebro basin.....	205
<i>F. Trizio, F.J. Torrijo Echarri, C. Mileto, F. Vegas</i>	
New studies for the knowledge of the vernacular characters of the ancient water mills in central Sicily	213
<i>A. Versaci, A. Cardaci, L. R. Fauzia, M. Russo</i>	
Identification and safeguarding of Central Sicily's forgotten vernacular heritage: elements of identity and memory	221
<i>A. Versaci, A. Cardaci</i>	
The particular ensemble of Mas d'en Segures: Functional and constructive analysis of a house and a barn in Tinença de Benifassà (Castellón, Spain).....	229
<i>J. Villasante Claramonte</i>	
In the shadow of Vesuvius. Sustainable and bioclimatic lessons from a vernacular heritage	237
<i>E. Vitagliano</i>	
URBAN STUDIES OF VERNACULAR ARCHITECTURE	
The rural founding villages of the Italian Agrarian Reform in Basilicata (1950-1970): urban planning and 'modern' vernacular architecture to the test of contemporaneity. The case of Borgo Taccone (MT)	247
<i>C. Achille, S. Bortolotto, E. Ciocchini, M. C. Palo</i>	
Vernacular architecture and written sources: the case study of the Tronto Valley	255
<i>E. Facchi, A. Grimoldi, A. G. Landi</i>	
Urban vernacular architecture in the Middle Ages in Galicia, Spain.....	263
<i>A. Fernández Palicio</i>	
Binibeca Vell. Interpreting tradition	271
<i>J. J. Ferrer Forés</i>	
Mapping spatial social aspects of urban recovery in contested cities: a case of the historic commercial center of the ancient city of Aleppo	279
<i>S. Ibrahim</i>	
Contributions of the vernacular heritage in the current city. Case study: Santo Domingo Neighborhood, Tuxtla Gutiérrez, Chiapas, Mexico	287
<i>A. Parra Zebadúa, M. Genís Vinyals, L. Ocampo García, R. Villers Aispuro, M. A. Zenteno Hernández, L. F. Escamiroso Montalvo, S. N. Zebadúa Velasco</i>	
The town of Collodi: the vernacular heritage.....	293
<i>F. Pisani</i>	

Between landscape and fortified architecture: traces and memory of rural civilization in the territory of Pesche in Molise	301
<i>M. P. Testa</i>	
Light Touch on the land – continued conversations about architectural change, informality and sustainability.....	309
<i>D. Whelan</i>	
STUDIES OF TRADITIONAL TECHNIQUES AND MATERIALS	
The stone as constant presence: vernacular structure of the cultural heritage of Porcuna (Andalusia, Spain).....	319
<i>S. Belmondo, P. Millán Millán</i>	
From natural to artificial: vernacular housing in the Spanish Caribbean	327
<i>B. del Cueto</i>	
Designing with water for climate change adaptation and cultural heritage preservation.....	335
<i>A. Elnokaly, W. Pittungnapoo</i>	
La Vera´s vernacular architecture. Structural design and climate protection in timber frame wall houses using constructive systems and local materials.....	341
<i>E. Franco Rodríguez, M. Bujalance</i>	
Traditional buildings for tobacco processing in Val Tiberina (Tuscany-Italy)	349
<i>F. Fratini, S. Rescic, M. Camaiti, M. Mattone</i>	
The parish church of San Michele Arcangelo in Metelliano: the path of knowledge of a vernacular architecture	357
<i>G. Ghelfi</i>	
Indoor air quality for sustainability, occupational health and classroom environments through the application of earth plaster	363
<i>M. I. Gomes, T. Miranda</i>	
The importance of water in traditional gypsum works.....	369
<i>B. González-Sánchez, W. Salazar Chuquimarca, J. R. Rosell Amigó, A. Navarro Ezquerria</i>	
State of conservation of half-timbered walls in Burgos (Spain): Quantitative analysis of material and structural degradation.....	377
<i>A. Hueto-Escobar, F. Vegas, C. Mileto, M. Lidón de Miguel</i>	
Adobe Constructions – Colonial Chilean House.....	385
<i>M. G. Jofré Troncoso</i>	
Favignana bio-calcarenite: technological culture, knowledge and recovery.....	393
<i>A. Mami, E. Caleca, E. Nicolini</i>	
Examination of earthen construction in archaeological sites of the Iberian Peninsula for risk analysis	401
<i>S. Manzano Fernández, C. Mileto, F. Vegas, V. Cristini</i>	

Traditional mortars with chucum in Yucatan, Mexico, as biocultural heritage	409
<i>M. M. Martínez-Barreiro, L. F. Guerrero-Baca</i>	
Dry Stone Wall Relics as a Part of Cultural Landscapes: A Case Study from the Foot of Mt. Hira Region in Japan	417
<i>C. Ochiai, J. Wang</i>	
The paving of ancient paths, testimony of an ancient culture: recovery of a traditional route in Genoa (Liguria, Italy)	425
<i>D. Pittaluga, S. Rescic, F. Fratini</i>	
Constructive and earthquake-resistant aspects of modelled-earth, a technique in ancient Peru	433
<i>H. E. Torres Peceros</i>	
Research on technique “Banzhu” used in traditional dwellings in China from the perspective of formwork	441
<i>Q. Zhou</i>	
SUSTAINABILITY OF VERNACULAR ARCHITECTURE	
Traditional Bukharian Houses and Mahallas: a shared vernacular heritage at risk.....	451
<i>N. Aituganova, O. Vileikis, S. Babaev, J. Ors Ausin</i>	
A look on the intrinsic sustainability of Aeolian vernacular architecture	459
<i>R. Caponetto, G. Giuffrida</i>	
The Z Free Home – inspired by vernacular architecture	467
<i>M. Dabaieh</i>	
Proposals for the sustainable recovery of dry stone buildings in Puglia, Italy.....	475
<i>S. Farina</i>	
Casa Nautilus Solar – Organic contemporary Architecture based on Vernacular Heritage.....	483
<i>P. Jebens-Zirkel Imm, A. J. Zirkel Zirkel</i>	
Making our Rural Landscape visible. A way to defend Anonymous Cultural Heritage.....	491
<i>A. Martínez Duran, M. Villaverde Rey</i>	
Shuar architecture as a model of sustainability	499
<i>D. E. Morocho-Jaramillo</i>	
Dry stone architecture: the survey as a tool to safeguard the risk of morphological or formal homologation	507
<i>G. Rossi, M. Leserri, A. Benitez Calle</i>	
At the roots of sustainability: Mediterranean vernacular architecture	513
<i>S. Talenti, A. Teodosio</i>	
Lessons from the past, architecture for the future. Coupling historic preservation with sustainable architecture	521
<i>P. Vitti</i>	

HERITAGE EDUCATION

RESEARCH IN HERITAGE EDUCATION

Community School Museums as a tool for education.....	537
<i>P. Alonso-Monasterio, L. Uixer Cotano</i>	
The interpretation of the vernacular in the modern work of Gherardo Bosio: the Albanian experience.....	545
<i>C. Castagnaro</i>	
“For sale: empty Spain” Raising awareness on abandoned buildings and depopulated villages	553
<i>V. Cristini, J. L. Baró Zarzo, C. Mileto, F. Vegas, M. Caruso, E. Tortajada Montalva</i>	
Qualitative, historical, spatial, stylistic, and social assessment of heritage buildings in Arequipa for Cultural Heritage teaching in Schools of Architecture	559
<i>T. B. Medina-Sánchez, D. L. Mayta-Ponce, D. Málaga-Montoya, S. Coll-Pla, F. A. Cuzziramos-Gutiérrez, A. Costa Jover</i>	
Vernacular architecture and art. The representation of traditional buildings in Lorenzo Ghiberti's Gates of Paradise in the Baptistery of Florence.....	567
<i>A. Merlo, G. Lavoratti</i>	
Defensive architecture and heritage education: analysis of the National Park Service and Parks Canada actions	575
<i>J. A. Mira Rico</i>	

HERITAGE EDUCATION AND SOCIAL INCLUSION

<i>Gibellina and the identity of community. Brandi, Burri and the conservation of the 'ruins'</i>	585
<i>C. Accetta</i>	
The perceptive experience of the heritage landscape.....	593
<i>A. Barranco Donderis</i>	
The Role of University in Local Cultural Development Through Vernacular Architectural Conservation Education: The Case of Havran, Turkey.....	599
<i>D. U. Binan, H. İ. Alatlı</i>	
The role of cultural heritage in urban reuse	607
<i>M. Domènech Rodríguez, D. López López, C. Cornadó Bardón</i>	
Involving society in the enhancement of old city centres	615
<i>A. Guardiola-Villora, L. Basset-Salom</i>	
3D Heritage as a catalyst for social participation in safeguarding cities in conflict. A Case study of Damascus in Syria.....	623
<i>S. Ibrahim</i>	

Heritage education as an effective approach to enhance community engagement: a model for classifying the level of engagement	631
<i>T. W. Lao</i>	
Preservation and promotion of the cultural heritage through University, public administration, and community engagement.....	639
<i>M. Mattone, N. Frullo</i>	
‘Acupuncture of Awareness’: a possible path for vernacular heritage preservation.....	647
<i>L. Rossato</i>	

HERITAGE COMMUNITIES

Overlooked heritage of Albania: chronicle of rescue, conservation and community involvement at Great Prespa Lake	657
<i>V. Cristini, B. Ludwig</i>	
The appropriation of traditional houses in Imbros/Gökçeada	663
<i>A. Dinççağ Kahveci</i>	
The SDGs as a useful tool in vernacular architecture management: The case of “17 objectives and a map”	671
<i>A. López Sabater, V. García López de Andújar, X. Laumain</i>	
An Odyssey to Heritage Education: The Inspiring Example of Bergama and Its Communities	679
<i>D. Ulusoy Binan, G. G. Okyay</i>	
The role of heritage communities in local development processes through the reuse of architectural heritage. Some examples in Italian rural areas	687
<i>C. Valiante, A. M. Oteri</i>	

CREATIVITY AND HERITAGE EDUCATION

Strategies for the recognition and the enhancement of the cultural heritage in Sant'Antioco	697
<i>M. Achenza, I. Blečić, L. Dipasquale, S. Mecca, A. Merlo</i>	
A collaborative Web App to foster a knowledge network on vernacular heritage, craftspeople, and sustainability	703
<i>J. Ammendola, L. Dipasquale, E. P. Ferrari, S. Mecca, L. Montoni, M. Zambelli</i>	
Cultural heritage: educating the next generation. Case study analysis of the Center of Preservation Research	711
<i>E. Vlahos</i>	

ARTISANS AND CRAFTS OF TRADITIONAL CONSTRUCTION

INTANGIBLE HERITAGE: THE MANAGEMENT OF KNOW-HOW AND LOCAL CONSTRUCTION CULTURE

The towns of the Popocateptl Volcano. Territorial symbolism, cultural identity and vernacular architecture	721
<i>B. Aguilar Prieto</i>	

Methodology for mapping Intangible Cultural Heritage through webGIS integral platforms. La Fontanalla neighbourhood as a case study	729
<i>F. Conejo-Arrabal, F. J. Chamizo-Nieto, N. Nebot-Gómez de Salazar, C. Rosa-Jiménez</i>	
The struggle for Stone-dry walling: the ambition to protect both processes and products	737
<i>M. M. Grisoni</i>	
From intangible to tangible. Artisan Skills and Traditional Crafts for Preserving Venice's Built Heritage	745
<i>A. Squassina</i>	
TRADITION AND INNOVATION IN TRADITIONAL CONSTRUCTION CRAFTS	
The Craft of Stucco Mihrab carving in Oman in the 13th to 17th AD.....	755
<i>N. Benkari</i>	
From prototypes to monotypes. Neo-craftsmanship in architecture and design	763
<i>J. Bravo Bravo</i>	
PLANS AND EXPERIENCES FOR THE RECOVERY AND MAINTENANCE OF CONSTRUCTION CRAFTS	
Vernacular architecture and seismic risk. The case of Mugello in Tuscany	773
<i>P. Bordoni</i>	
Pinnettas de pedra: a guide for the valorisation of dry-stone artifacts	781
<i>S. N. Cappai, A. V. Sotgiu</i>	
Vernacular architecture and traditional trades. Social innovation and cultural heritage in rural Andalusia	789
<i>G. Carrera Díaz, B. Del Espino Hidalgo, A. Delgado Méndez</i>	
The role of craftsmanship in the conservation of Venice. State of the art and perspective.....	797
<i>F. Trovò, E. Vettore</i>	
CONSERVATION, RESTORATION AND ENHANCEMENT OF VERNACULAR ARCHITECTURE	
CONSERVATION AND RESTORATION PROJECTS OF VERNACULAR ARCHITECTURE	
Is there a future for marginal communities?	807
<i>M. Bocci</i>	
Restoration of the stained glass windows of the British Cemetery of Valencia	815
<i>C. Burguete Gil</i>	
Studies and projects for the archaeological park of the Nuraghe s'Urachi (Sardinia, Italy). From knowledge for heritage conservation to project for the community	823
<i>G. M. Chiri, F. Novelli</i>	
Vernacular heritage protection by the Superintendence of the Aosta Valley	831
<i>C. De La Pierre, D. Martinet, B. Scala</i>	

Of earth, stone and wood: the restoration and conservation of a Buddhist temple in Ladakh, Indian Himalayas.....	839
<i>E. P. Ferrari</i>	
The <i>hórreos</i> in Riaño Mountain, León, Spain. Vernacular architecture between conservation and musealisation.....	847
<i>M. P. García Cuetos</i>	
Restoration project of vernacular architecture affected for ground subsidence: A case study in Juslibol Church (Zaragoza, Spain)	855
<i>A. Gracia, F. J. Torrijo, M. A. Pérez</i>	
Farmhouse interior restoration in bioconstruction	863
<i>V. Li-Puma Sforazzini</i>	
After the earthquake. Design processes for intervention on vernacular heritage in Central Italy.....	871
<i>G. Loffredo, F. Recla, N. Suraci, C. Tosco</i>	
Implementing the lesson of early 20th century traditional buildings for a real sustainability. The examples of Corviale (Rome) and ZEN (Palermo) districts.....	879
<i>E. M. Mazzola</i>	
From rural house to “villa of delights”: knowledge and conservation of Villa Murat in the Sorrento peninsula.....	889
<i>A. Pane, R. Catuogno, M. Parente</i>	
Vernacular earthen architecture. Construction techniques and restoration. From the international setting to some specific Italian regional cases	897
<i>E. Petrucci, R. Mancini, M. G. Putzu</i>	
Rigour, methodology and use, success in heritage conservation: the tower of the St. Mary Magdalene’s church.....	905
<i>P. Rodríguez Cantalapiedra</i>	
Strategies to value the dispersed heritage of rural Andalusia. Lagares, paseros and vineyards: the architecture of the raisin	913
<i>L. Royo Naranjo</i>	
Guidelines for the conservation of the ancient hydraulic mills of the Valle Sabbia, Brescia (Italy).....	921
<i>B. Scala, L. Aliverti</i>	
Bazaars between documentation and conservation. Case studies in Albania and Macedonia.....	929
<i>A. Trematerra, E. Mirra</i>	
Perspectives for the small historical centres at risk of abandonment. A pilot project for the Granfonte district in Leonforte (Italy).....	937
<i>M. R. Vitale, C. Circo, D. Sanzaro, S. Sebastián Franco, I. Cacciatore, M. Massimino</i>	
Repair grants for historic farm buildings in Dartmoor National Park.....	945
<i>N. White</i>	

MATERIALS AND INTERVENTION TECHNIQUES FOR VERNACULAR ARCHITECTURE

Syrian earthen villages: recovery of construction crafts to revive dome houses.....	955
<i>H. Asslan</i>	
Historic tuff masonry in Naples: different approaches to its conservation	963
<i>B. Balbi, R. Bosso, G. Russo Krauss</i>	
Vernacular architecture on archaeological remains. Conservation and enhancement of the “Villa San Limato” in Cellole	971
<i>L. Cappelli</i>	
Conservation and restoration of timber architecture in the Czech Republic.....	979
<i>M. Cernansky</i>	
Effects of the use of plant mucilage on the physico-mechanical properties of raw earth structures	987
<i>O. M. Medina Lorente, B. Carrascosa Moliner, L. Osete Cortina</i>	
Vernacular architecture and archaeological remains. Direct links in the Phlegraean Fields in Campania (Italy).....	995
<i>R. Picone</i>	

DIFFICULTIES AND POSSIBILITIES OF USING TRADITIONAL CRAFTS IN CONSERVATION

Impediments to Sustenance and Revival of Vernacular Architecture in Rural Madhya Pradesh, India.....	1005
<i>A. Tamhankar, V. Gupta</i>	

MANAGEMENT AND MAINTENANCE OF VERNACULAR ARCHITECTURE

Ghadames, Libya. A traditional earthen settlement, resilient to crises and environmental challenges.....	1015
<i>S. Abdulac</i>	
Architectural Heritage and seismic vulnerability: mapping the available knowledge to reduce damage during an emergency	1023
<i>E. Brusa, C. Chesi, S. Della Torre</i>	
Analysis and regeneration strategies for the abandoned villages of the Santerno valley in Tuscany	1031
<i>M. Coppola, L. Dipasquale, L. Mannucci, L. Rovero</i>	
Learning from the past. The loss of vernacular heritage in the interest of hydropower development in Spain.....	1039
<i>N. Fernández García</i>	
Post seismic intervention strategies over the last fifty years in Italy (1968 – 2016). Initial observations about the vernacular architecture’s conservation	1047
<i>V. Macca</i>	

Close to the volcan. Knowledge, conservation and enhancement of a Vesuvian vernacular heritage.....	1055
<i>B. G. Marino, A. Ragosta</i>	
Heritage and community centre in Matta Sur, Chile.....	1063
<i>A. Rivera Vidal, C. Gómez Maestro</i>	
Local materials and traditions in the conservation of vernacular buildings.....	1071
<i>C. Rodrigues</i>	
Vernacular earthen architectures. Institutionalisation and management models for its conservation in northern Argentina.....	1077
<i>J. Tomasi, J. Barada</i>	
Protection and reuse of a forgotten heritage: the Parmesan cheese buildings. Notes for a widespread museum in the lower Reggio Emilia plain	1085
<i>S. Varvaro</i>	

AUTHORS INDEX

Traditional buildings for tobacco processing in Val Tiberina (Tuscany-Italy)

Fabio Fratini¹, Silvia Rescic², Mara Camaiti³, Manuela Mattone⁴

¹ CNR-ISPC (Institute of Heritage Science), Sesto Fiorentino (Florence), Italy, fabio.fratini@cnr.it; ² CNR-ISPC (Institute of Heritage Science), Sesto Fiorentino (Florence), Italy, silvia.rescic@cnr.it; ³ CNR-IGG (Institute of Geosciences and Earth Resources), Florence, Italy, mara.camaiti@cnr.it; ⁴ POLITO, DAD (Department of Architecture and Design), Turin, Italy; Associated CNR-ISPC (Institute of Heritage Science), Sesto Fiorentino (Florence), Italy, manuela.mattone@polito.it

Topic: T1.3. Studies of traditional techniques and materials

Abstract

This paper focuses on the analysis of buildings used for tobacco processing, built in the first half of the 20th century in Tuscany (province of Arezzo), by studying construction techniques, materials, and preservation issues. Since the 16th century, in Tuscany, the sites involved in the cultivation of tobacco are both the upper Val Tiberina and Val di Chiana (in particular Arezzo and Siena areas). At first, tobacco was used either for medical purposes or as snuff and pipe powder. It soon became the most renowned cultivation throughout the Tiberina Valley, due to the excellent quality of the tobacco produced. The first significant crops date back to the early 17th century. The drying process took place in specific buildings named "tabaccaie", where tobacco leaves were placed over an oak wood fire to dry. This process was adopted until the 1970s. Subsequently, a profound crisis in the agricultural sector determined the falling into disuse and abandonment of numerous "tabaccaie". In some cases, these buildings have been reused as luxury hotels for tourism purposes, but many of them have been demolished or are in a state of ruin. They represent the testimony of agro-industrial vernacular architectures nowadays at great risk. Indeed, most of the recovery interventions have often completely obliterated the original structure to make the former "tabaccaie" able to satisfy housing and comfort requirements. The study aims to deepen the knowledge of these buildings to preserve cultural identities and transfer inherited values.

Keywords: Tobacco processing, construction techniques, building material, preservation issues.

1. Introduction

Tuscany and in particular the areas of Val di Chiana and Valtiberina (Fig. 1) are leaders in the Italian production of tobacco, which also extends to Campania, Veneto and Umbria. The cultivation of tobacco started in Valtiberina in 1574 when Cardinal Nicolò Tornabuoni, ambassador of the Grand Duke of Tuscany in Paris, sent some seeds of this plant, coming from America, to his nephew Alfonso Tornabuoni, Bishop of Sansepolcro. At first, the plant was used for medical purposes and as a snuff and pipe powder (Paoli, 2018). It soon became the most renowned crop

throughout the Valtiberina, characterized by the excellent quality of the tobacco produced. The first significant crops date back to the early 17th century. Sansepolcro was granted the cultivation of 1,000,000 tobacco plants. Later, in 1868, the same concession was also extended to the neighbouring municipalities of Anghiari and Monterchi. Since 1910 the Tuscan Valtiberina has invested in the sector and has made the cultivation of Kentucky tobacco the main crop, becoming the basis of the area's economy as well as a real driving force for the local community's culture.

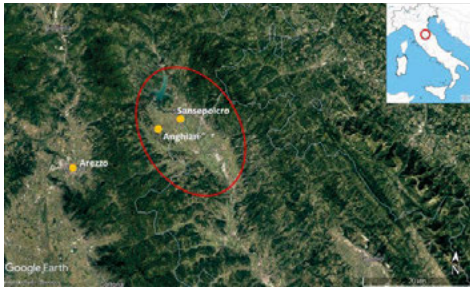


Fig. 1. The Valtiberina, in Central Italy, between Tuscany and Umbria (Source: rom Google Earth, modified).

A century after its introduction, the Kentucky tobacco of this area is known all over the world and is counted among the "Top grades" as regards its fine quality. It is used to produce the external part of the "Tuscan cigar" and in particular of the "Toscano Extravecchio", the only non-food product that "Slow food" has chosen as a *praesidium* and which is annually paired with excellent wines at the salon of taste (Santini, 1996).

The production of this cigar involves drying the tobacco leaves over a direct fire of oak wood. Specific dryers, still visible today in the area, were built by the landowners. They had been in use until the 1970s when a series of structural factors in the agricultural sector led to a profound crisis partially recovered through mechanization of the different production phases. The effects of this crisis were highlighted by the decommissioning and abandonment of the numerous tobacco processing buildings (called *tabaccaie*) in the area. In some cases, these buildings have been used for tourism purposes with the construction of luxury hotels or farmhouses. However, many of them have remained in a state of ruin or have been demolished and rebuilt adopting modern computerized processing systems for the production of tobacco. The interest, then, derives from different issues: on the one hand, the fact that these buildings bear witness to part of the social history of the area, and in particular to working conditions, to the more or less denied rights of a substantial part of the population, mainly female, up to the 1960s/1970s on the other hand, these buildings are examples of agro-

industrial vernacular architecture, evidence of now obsolete construction techniques and industrial processes. They risk disappearing because of reuse interventions which often completely obliterate the original structure to satisfy current housing and comfort requirements. This research aims to deepen the knowledge of this type of buildings related to tobacco processing dating back to the first half of the 20th century, located in the surroundings of Anghiari, by analyzing their construction techniques and materials to preserve their cultural identity while designing reuse interventions. For this purpose, a survey was conducted in the territory of Anghiari. It was thus possible to identify 30 dryers representative of traditional construction techniques. Nearly twenty dryers are still in use, while others have been converted into residential dwellings or are in a state of abandonment. The historic working dryers have been analysed to assess:

- the presence of possible decay phenomena of the stone materials;
 - the cohesion of bedding mortars and renders;
 - the presence of fractures due to use (heat/humidity) or structural problems (stability of foundations, seismic events);
 - the integrity of roofs;
 - the functionality of downpipes and gutters.
- [MC, MM, FF, SR]

2. Productive process

The main type of tobacco produced in Tuscany (Tiberina valley) is Kentucky tobacco, derived by hybridisations of the North American flue-cured type with some local varieties. The favourable environmental conditions of the Tiberina valley (both climatic and soil consistency) and the strict curing and drying process adopted, makes Kentucky tobacco a very typical tobacco, particularly suitable for the production of Tuscan cigars. The production process starts in February-March with the sowing of the very small seeds in the seedbed, followed by transplanting of the 10-15 cm tall plants (in May-June), the harvesting and drying of the leaves (in August-first half of

October), and finally the sorting of the dried leaves before sending them to the machining centres (in November-January). All steps of the production process require adequate procedures and attention to obtain good quality tobacco, but the harvesting and drying phases are the most crucial to obtain leaves with suitable characteristics (substantial and elastic tissue, dark brown colour, good combustibility) (Fig. 2).



Fig. 2. Image of a Kentucky tobacco leaf after drying (about 90 cm in length), suitable as cigar wrapper.

Before flowering, the tobacco plants are tipped leaving 12-20 leaves and eliminating the floral bud and upper leaves. After 40-50 days from the tipping and periodic elimination of the axillary shoots, the upper leaves are increased and ripening begins. Depending on the type of Kentucky tobacco hybrid, ripening occurs from the bottom to the top or from the top to the bottom of the plant, and a change in the colour of the leaves (from dark green to lighter green with yellow-greenish spots) is observed. The harvesting proceeds (from the bottom to the top, or vice versa) with the detachment of 2-4 ripe leaves at a time from the stem every 15-20 days. The leaves are then tied to each other through the stem, placed on a pole, and stored at room temperature and humidity. When the leaves turn yellow (typically after 4-6 days), they are transferred to the dryers for the drying and browning process. During this step, the temperature and humidity of the room

are regulated by fires, typically one in the middle of the room and one or more in the corners, depending on the needs. The fires are mainly obtained with dry oak, which produces smoke without flame. The temperature is kept at around 30 °C for one day, then raised to around 35-40 °C until the leaves turn brown (typically 4-5 days). During this phase, excess moisture in the leaves is eliminated by opening the small windows located in the upper part of the structure. Finally, the temperature is further increased (45-50 °C) to reduce the moisture content in the leaves and activate the bulk fermentation, which gives a particular scent and bouquet to the tobacco (Fig. 3).

After extinguishing the fire and lowering the temperature, the tobacco leaves are transferred to the storage barns until the sorting step. [MC]

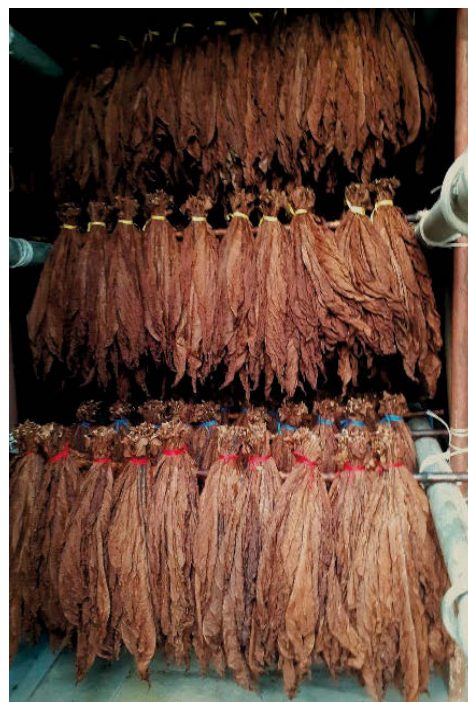


Fig. 3. Tobacco leaves after sorting and prepared for sending to the machining centres. The colour of the ribbon indicates the quality: red (best quality) for Tuscan cigar wrapper, blue for Tuscan cigar filler; yellow (poorer quality) for filler of some kinds of cigarettes.

3. Tobacco dryers in the Anghiari territory: types and construction techniques

In the Anghiari area, tobacco dryers are characterized by the presence of a curing room and shelter spaces for the storage of leaves and tools. The curing room consists of a high empty volume with a hanging system made of wooden beams and poles. During the drying phase, tobacco leaves are hung on the poles to be cured by the fire. (Fig. 4).



Fig. 4. Interior of the treatment room in which there are leaves in the drying phase (credits Manuela Mattone).

The treatment room (a real oven) has an almost square plan with load-bearing walls made of stones or mixed stones and bricks with corners made of dressed stone ashlar or bricks (Fig. 5). In the more recent buildings the walls are made of tuff blocks, sometimes interrupted by a brick course (Fig. 6). The two-pitched roof is characterized by the presence of a structure consisting of a double wooden framework on which a layer of brick slabs and brick tiles are located.

The spaces used for the storage of leaves and tools have a load-bearing structure made up of brick pillars on which the trusses supporting the double row of beams of the roof and the tile covering rest. Where present, the curtain walls are in brick (Fig. 7).

The oven has a small number of openings: a small door to limit the temperature range, a

window on the façade opposite the entrance, and small holes in the top of the side elevations to ensure the necessary ventilation. The openings are generally finished with bricks or elements of natural or artificial stone. [MM]



Fig. 5. Detail of the masonry at the corner of a drying room (Source: Mattone).



Fig. 6. More recent drying rooms in Anghiari (Source: Mattone).



Fig. 7. Ancient drying room in Anghiari (AR) (Source: Manuela Mattone).

4. Dryer building materials

As previously mentioned, the walls of the oldest dryers are in mixed type masonry, made of river pebbles and bricks laid with abundant mortar and rendered. The river pebbles reflect the geology of the surrounding area, being characterized by the presence of arenaceous lithotypes (Cervarola sandstones), marly limestones, and ophiolites (belonging to the External Ligurids Units) (Fig. 8).



Fig. 8. Particular of masonry made of river pebbles and bricks laid with abundant mortar (Source: Fratini).

The corners show dressed sandstone ashlar alternating with bricks (Fig. 5). Stones are not affected by decay. Therefore the research focused in particular on the study of bedding and rendering mortars (which can most influence the durability of the masonry) and bricks of the mixed masonry (Fig. 9, Fig. 10 and Fig. 11).



Fig.9. Analysed rendering (Source: Fratini).



Fig. 10. Analysed bedding mortar (Source: Fratini).



Fig. 11. Analysed ancient brick (Source: Fratini).

These materials have been studied with the following methodologies:

- the mineralogical composition has been determined through X-ray diffraction (X'Pert PRO diffractometer by PANalytical equipped with X'Celerator detector and HighScore software for acquisition and interpretation of data according to the following operative conditions: Cu $K\alpha_1 = 1,545\text{\AA}$ radiation, 40 KV, 30 mA, $2\theta = 3-70^\circ$);
- a petrographical study has been performed on thin sections with optical microscopy under transmitted light (ZEISS Axioscope A1) for evaluating the microstructural parameters (Pecchioni et al., 2014).

The bedding mortars show good cohesion and have been made with a binder/aggregate ratio of about 1/3. The aggregate is well selected with a grain size of less than 1 mm. The granules have a sub-angular to sub-rounded shape and are composed of quartz, fragments of micritic limestones, and serpentinites. The binder is a slightly hydraulic air-hardening lime as evidenced by the

presence of small dark inclusions referable to calcium silicates. There are also numerous lumps. This indicates the lime was produced with a traditional technique, slaking the quick lime to obtain the lime putty. Concerning the raw materials, the aggregate comes from the sediments of the nearby Tiber river while the binder was produced by burning slightly marly limestone as shown by the texture of the lumps, referable to underburnt lime fragments (Fig. 12).

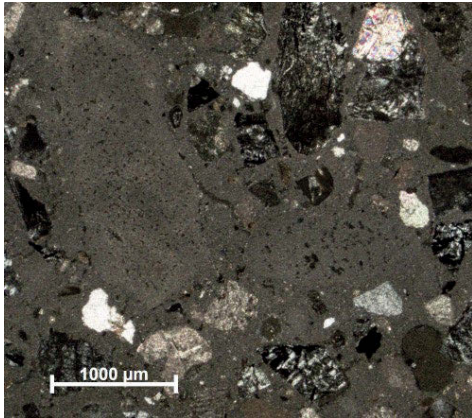


Fig.12. Bedding mortar: lumps referred to the burning of a slightly marly limestone (image at the optical microscope in thin section, polarised light) (Source: Fratini).

The renders are in a bad state of conservation due to the low cohesion of the mortar and the lack of adhesion to the substrate. This can be explained by the too high amount of aggregate (binder/aggregate ratio of about 1/4) (Fig. 13). The aggregate has not been selected and has a coarse grain size. The granules have a sub-rounded shape and are composed of serpentinites, fragments of micritic limestones, and quartz. The binder is similar to that of the bedding mortars. Numerous lumps are also present. The raw materials used to make these mortars are similar to those of bedding mortars.

In summary, the bedding mortars seem to have been made with greater care, compared to the mortars of the renders. One possible explanation is a greater interest in the quality of the structure rather than the aesthetic features of the building.

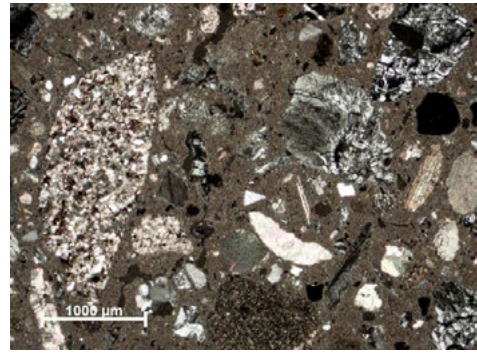


Fig. 13. Rendering mortar: the low binder/aggregate ratio is evident (image at the optical microscope in thin section, polarised light) (Source: Fratini).

The ancient bricks were made with the traditional method of wet pressing and show no signs of decay. The study under the optical microscope in thin section shows a birrefringent groundmass and an abundant framework made of quartz, feldspars, micritic calcite with a grain size of about 400µm- 1mm (Fig. 14). The birifrengent appearance of the groundmass indicates a firing temperature lower than 750 °C, therefore not capable of completely destroying the lattice of clayey minerals and carbonatic grains. [FF, SR]

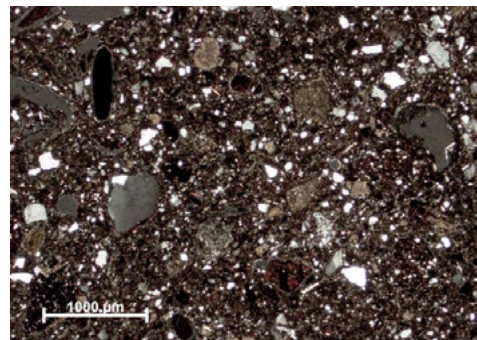


Fig. 14. Brick with an evident birifrengent groundmass and an abundant framework (image at the optical microscope in thin section, polarised light) (Source: Fratini).

5. Preservation issues

Since the 1970s, as a result of the crisis in the tobacco sector, many *tabaccaie* have been closed down. Some have been demolished, many have undergone interventions that have often altered their original layout, while others, deprived of any maintenance work, are in a state of total

abandonment. These buildings are interesting examples of industrial architecture that characterise the rural landscape of some of the Tuscan provinces, bearing witness to the history, production activities and culture of these territories.

In recent years, actions have been taken to promote the knowledge and appreciation of this heritage. In particular, in 1998, the first work of cataloguing the *tabaccaie* in the municipality of San Miniato (province of Pisa) was carried out with the dual purpose of encouraging the acquisition of more widespread awareness of the existence of this heritage and the recognition of its cultural value through the census and cataloguing of the still existing constructions (Cavazza & Cavazza, 1998). More recently, in 2001, as part of the project promoted by the Province of Pisa entitled "The Memory Industry" (Torti, 2005), an attempt was made to promote both knowledge of the tobacco processing buildings (by disseminating drawings, photographs, archival and bibliographical material on the *tabaccaie* in the Province of Pisa) and their use by developing a specific cultural itinerary aimed at enabling tourists to approach this heritage and deepen their knowledge of these places, their history and the transformations they have undergone.

Unfortunately, some of these buildings have been irretrievably lost and with them part of the history of the agricultural activities, while others are at risk because they have been totally abandoned or are destined to undergo highly invasive renovation work. Safeguarding this heritage requires in-depth knowledge of it in terms of construction, structure and materials, and the development of proposals for its preservation by promoting its compatible reuse (Bartali, 2014). Permanence must be ensured not through simple musealisation and immobilism, but the identification of new uses, adapting the buildings to the changed performance and functional requirements, without altering their identity features. Since not everything can be simply maintained or transformed into a museum, cultural space, or exhibition hall, to guarantee a future for this heritage it must be re-introduced into an economic circuit that uses it and lives it,

guaranteeing its maintenance. As Franco Milella points out, "the processes of enhancing the value of minor assets can and must take on the value of contemporary use" (Milella, 2015), the only means by which they can be used. This is the only way to guarantee their permanence over time.

To preserve the material as well as aesthetic features of these buildings, the analyses undertaken provide useful indications on the conservation work to be carried out. In particular, it was possible to verify that the bedding mortars have been made with care and have good cohesion, while the mortars of the renders are of worse quality and have often fallen off, leaving the masonry exposed. Therefore, for the bedding mortars only punctual interventions with mortars based on natural hydraulic lime, compatible with the original ones, should be adopted. As far as plasters are concerned, given their precarious state of conservation and poor quality, it is not advisable to preserve them, but it is recommended to remove detaching plasters and replace them with new ones based on natural hydraulic lime so as to protect masonry from external agents. [MC, MM, FF, SR]

6. Conclusions

The dryers (*tabaccaie*) of the Valtiberina are an interesting testimony to the history of the production activities that characterised and still characterise this area. The analyses conducted so far highlight not only their historical and cultural value but also the close link established with the surrounding territory. Built using local materials, they characterise the landscape. Having recognised their cultural value, their safeguarding requires projects respectful of their building technology and capable of ensuring their continuity of use. The needed and inevitable transformations must be designed with care to maximise the permanence of materials and identity features of this legacy, because "preserving the evidence of our past means picking up the broken threads, mending the broken wefts, weaving new ones, using all this for the future" (Ermentini, 2007).

[MC, MM, FF, SR]

References

- Bartali, B. (2014). *Strategie di recupero delle “ex-tabaccaie” nel comune di San Miniato* [Degree's thesis, Università degli Studi di Firenze].
- Cavazza, S., & Cavazza, E. (1998). *Le tabaccaie nel comune di San Miniato. Valorizzazione e promozione*. Regione Toscana, Giunta regionale.
- Dal Pozzolo, L. (2021). *Il patrimonio culturale tra memoria, lockdown e futuro*. Editrice bibliografica.
- Ermentini, M. (2007). *Restauro timido. Architettura affetto gioco*. Nardini editore.
- Milella, F. (2015, July 15). Aspettando Artlab 15. Beni pubblici patrimoniali: valore economico o valore d'uso?. *Il Giornale delle Fondazioni*. <http://www.ilgiornaledellefondazioni.com/content/aspettando-artlab-15-beni-pubblici-patrimoniali-valore-economico-o-valore-d%E2%80%99uso>
- Paoli, L. (2018). *Il tabacco in Toscana. in un manoscritto del Cinquecento le proprietà curative della divina erba sperimentate a Lisbona da Jean Nicot*. Edito da Pontecorboli Editore.
- Pecchioni, E., Fratini, F., & Cantisani, E. (2014). *Atlas of the ancient mortars in thin section under opticalmicroscope*, Quaderni di Kermes, Nardini Editore.
- Santini, A. (1996). *Il sigaro toscano. Storia, curiosità, personaggi*. Editore Pacini Fazzi.
- Torti, C. (2005). *L'industria della memoria: archeologie industriali in provincia di Pisa*. Editore Tagete.