

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

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# 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

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## 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.

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## AUTHORS INDEX

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

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**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 20<sup>th</sup> century in Tuscany (province of Arezzo), by studying construction techniques, materials, and preservation issues. Since the 16<sup>th</sup> 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 17<sup>th</sup> 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 17<sup>th</sup> 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.

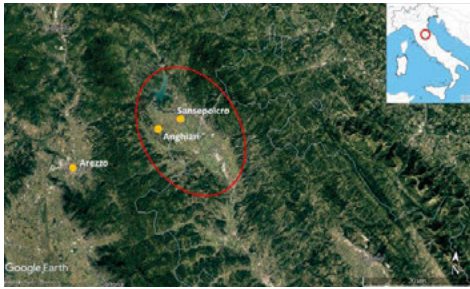


Fig. 1. The Valtiberina, in Central Italy, between Tuscany and Umbria (Source: rom Google Earth, modified).

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 20<sup>th</sup> 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).

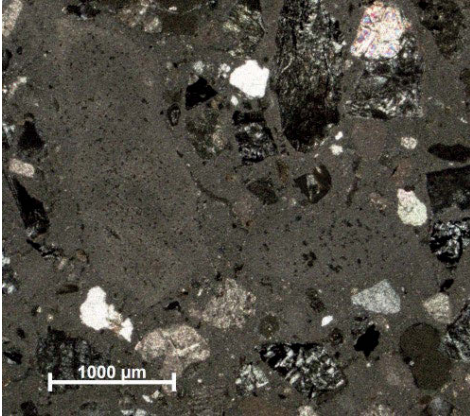


Fig.12. Bedding mortar: lumps referred to the burning of a slightly marly limestone (image at the optical microscope in thin section, polarised light) (Source: Fratini).

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.

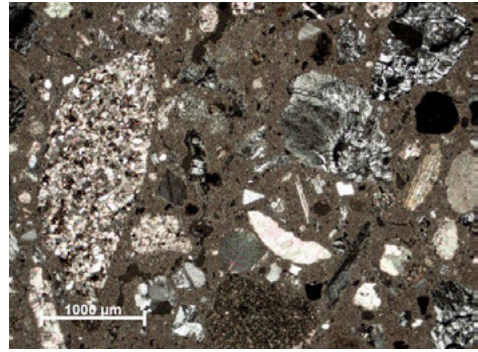


Fig. 13. Rendering mortar: the low binder/aggregate ratio is evident (image at the optical microscope in thin section, polarised light) (Source: Fratini).

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 birefringent groundmass and an abundant framework made of quartz, feldspars, micritic calcite with a grain size of about 400μm- 1mm (Fig. 14). The birefringent 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]

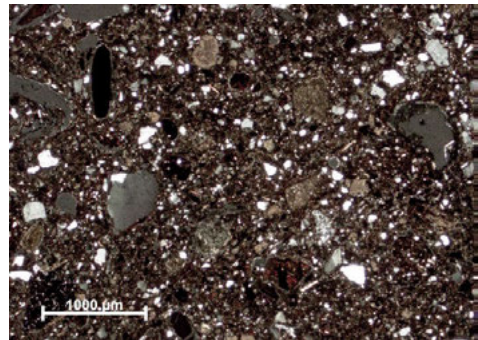


Fig. 14. Brick with an evident birefringent groundmass and an abundant framework (image at the optical microscope in thin section, polarised light) (Source: Fratini).

## 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]

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