CROSSING HERITAGES: DRYSTONE WALLS IN CULTURAL TOURISM AND GEO-TOURISM

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Abstract

The aim of cultural tourism is the cultural heritage. This heritage can consist of monuments in cities, for instance, and also of vernacular heritage which is found in rural areas. The drystone walls, often existing in regions where slopes prevail, are splendid examples of this group of heritage. Their role in cultural vernacular heritage is that they are made by man to make agriculture possible in difficult terrain creating plane areas in slopes, to retain surface and subsurface water as a reserve e.g. for the plantation and protection against wildfires, to protect agricultural areas in lower places against falling rocks and erosion by torrents, and so on. On the other hand, they also belong to the natural geological heritage because they are made of local stones, the geological setting of an area determines if such a wall is necessary or not, they interfere with the surface and subsurface water flows, they slow down erosional processes, they mould typical landscapes, and they create a lot of ecological niches and habitats for animals and plants. Therefore, drystone walls represent a link between cultural-vernacular and natural-geological heritage. Stone wall terraces are an expression of the history and the culture of the local people and present environmental, social and economic benefits. They may offer touristic opportunities, contributing to their renewal and survival. Their cultural value was recognized by the UNESCO in 2018 by the declaration of the "art of drystone walling, knowledge and techniques" as Intangible Cultural Heritage of Humanity.

Keywords: Drystone walls, vernacular heritage, geological heritage, cultural tourism, rural landscape.

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PATRIMONIOS CRUZADOS: MUROS DE PIEDRA SECA EN EL TURISMO CULTURAL Y GEOTURISMO

Resumen

El objetivo del turismo cultural es el patrimonio cultural. Este patrimonio puede consistir en monumentos en ciudades, por ejemplo, y también en patrimonio vernáculo que se encuentra en áreas rurales. Los muros de piedra seca, a menudo existentes en regiones donde predominan las pendientes, son espléndidos ejemplos de este conjunto de patrimonio. Su papel en la herencia cultural vernácula es que fueron hechos por el hombre para hacer posible la agricultura en terrenos difíciles creando áreas planas en las laderas, para retener el agua superficial y subterránea como reserva, p. ej. para la plantación y protección contra incendios forestales, para proteger áreas agrícolas en lugares más bajos contra caída de rocas y erosión por torrentes, etc. Por otro lado, también pertenecen al patrimonio geológico natural porque están hechos de piedras locales, el entorno geológico de un área determina si dicho muro es necesario o no, interfieren con los flujos de agua superficiales y subsuperficiales, ralentizan procesos erosivos, moldean paisajes típicos y crean muchos nichos ecológicos y hábitats para animales y plantas. Por lo tanto, los muros de piedra seca representan un vínculo entre el patrimonio cultural-vernáculo y natural-geológico. Las terrazas con muros de piedra son una expresión de la historia y la cultura de la población local y presentan beneficios ambientales, sociales y económicos. Pueden ofrecer oportunidades turísticas, contribuyendo a su renovación y supervivencia. Su valor cultural fue reconocido por la UNESCO en 2018 mediante la declaración del "arte de los muros, conocimientos y técnicas de piedra seca" como Patrimonio Cultural Inmaterial de la Humanidad.

Palabras Clave: muros de piedra seca, patrimonio vernáculo, patrimonio geológico, turismo cultural, paisaje rural.

1. INTRODUCTION

The construction of drystone wall terraces is one of the most ancient techniques to improve agriculture, creating more plain surfaces in hillsides to increase the crops and to ensure the survival of the community. Besides the improvement of agricultural production, there are other ecological, geotechnical and hydraulic effects originated by these walls which will be presented in this article. The aim of this work is to show that a landscape moulded by drystone walls and their accompanying buildings has a high cultural value, being part of the vernacular heritage of a region, which should be considered as a destination of touristic activities, both cultural and natural. The emerging branch of geotourism joins cultural and natural tourism (Rosendahl & Gonçalves, 2019), so the drystone walls may be adequate objects of this kind of tourism.

The following methodology was used for the elaboration of this article: research of bibliography and webography, scrutiny of topographic, geological and land use maps, as well as aerial and satellite views, photogrammetrical analysis, comparison of old and recent photographies of the areas, exchange of ideas with specialists and colleagues, and study trips in the fields and to museums. This work was completed by the organization of guided visits in the field, whose participants were specialists and tourists with interest in cultural heritage and geology, and by related experiences. A case study in this article will show some of the methods used to explore and to register the drystone walls and constructions in Catalonia (Spain).

Since several years, drystone walls and buildings as vernacular heritage experience a growing interest. Although there is still a low number of works about drystone walls, heritage and tourism, the authors have published some articles about this theme (Gonçalves, Cano, & Stefan Rosendahl, 2019; Gonçalves, Prates, Pérez-Cano, & Rosendahl, 2020; Malafrè-Balsells et al., 2019; Rosendahl & Gonçalves, 2019), where further citations can be found.

2. DRYSTONE WALLS AS A CULTURAL HERITAGE

The drystone walls, also called loose stone walls, are walls made up of stones that are assembled without the use of any mortar. The walls are built taking advantage of the shapes of the stones found on the site and the art of the builder, who decides how the stones will be arranged to better fit, constituting a puzzle offered by Nature whose solution depends on the builder's experience. Its origin is due to the need to change the orography, creating more space for agriculture, on which human survival depends (Gonçalves, Pérez Cano, Rosendahl, & Prates, 2018).

The vernacular heritage, "*recognized as a characteristic and genuine creation of society, manifests itself in an apparently irregular way, although it has its own logic. It is utilitarian and, at the same time, interesting and beautiful. It reflects contemporary life and is, at the same time, a testimony to the History of society*" (ICOMOS, 1999). Although this type of heritage has been

recognized since 1999, many people still ignore its designation and its heritage classification. It is a heritage that results from the need of Man to adapt the environment that surrounds him for his survival, not resulting from the intervention of any graduate, such as an engineer or architect (Gonçalves, Pérez Cano, & Prates, 2020). Therefore, it is considered a "minor heritage" and arouses little attention. Nevertheless it remains an emerging heritage that, little by little, becomes known and valued, slowly opening the way to consider many more elements as heritage assets (Gonçalves & Pérez Cano, 2012; Gonçalves et al., 2018; Gonçalves, Prates, & Rosendahl, 2017; Rosendahl & Gonçalves, 2019).

Heritage, especially the vernacular, plays a very important role in defining the sense of identity and belonging to a place, and the link between the past, the present and the future defines and improves the inherent values of heritage (Díaz Iglesias & Guerra Iglesias, 2010; Petronela, 2016; Rosendahl & Gonçalves, 2019; Villacis-Mejía, Torres-Matovelle, Pons-García, & Tanda-García, 2016).

The drystone walls belong to the cultural vernacular heritage, because they are made by man to increase the number of plain areas for agriculture in slopes, they slow down the speed of running water, thus reducing the erosion and loss of the vital soil cover, they may contain shelter areas for man, livestock and tools, they are often used to identify the properties' limits, and the stones for their construction usually are removed from the agricultural areas, so they are no longer a problem when ploughing, being an example of a practical application of otherwise obstructive elements. In many places the walls are associated with other drystone constructions like cabins, shelters and fountains, for example.

In the drystone wall constructions, the stones appear to be randomly fitted. However, they exhibit an astonishing durability which demonstrates a strong sense of balance and a very refined art of selecting and rigging the stones, a skill which is not simple at all (Châtelain, 2009; Gonçalves et al., 2017). Once the terraces are abandoned and the drystone walls have no more agricultural function, it is necessary to maintain the drystone walls carefully to secure the protection of the slope, because they deteriorate increasingly. This is a difficult task, because there is a shortage of skilled artisans (Gonçalves, 2016; Rebelo et al., 2006).

As Bellmunt I Chiva & Sogbe Mora (2010) *apud* Rosendahl & Gonçalves (2019) say: "*terraces are excellent representations of man-made nature, being an expression of the history and culture of the people of these places, and can also be interpreted as evocative and inspiring places, offering tourist opportunities that can foster their renewal and survival. They also allow the coexistence of new activities and agricultural activity, while allowing utilitarian alternatives that can ensure their survival, being plural and efficient*". Cultural tourism can be one of those alternatives, taking advantage of this immense potential.

The drystone walls also have several environmental benefits, such as increased biodiversity, economic advantages, favouring new economies, and social advantages, because they also raise the sense of belonging. These aspects boost the cultural significance of the heritage, as well as the importance of a site (Rosendahl & Gonçalves, 2019). The places are recognized and protected, for example, by the Charter of Burra (ICOMOS, 2013), which explains how to manage cultural sites.

When the FAO (Food and Agriculture Organization) introduced the concept of Globally Important Agricultural Heritage Systems (GIAHS; FAO, n.d.) and, in 2005, classified the Rice Fish Culture in China as a World Agricultural Heritage, the way for classification of agricultural heritage was open, as is the case of agricultural heritage with a system of terraces and drystone walls. Of the 61 classifications worldwide, about 20 contain terraced landscapes and in about 10 of them drystone walls are part of this classified agricultural heritage.

Additionally to this FAO classification, UNESCO also classified landscapes of terraces and drystone walls as World Heritage, such as the Alto Douro Whine Region (2001) and the Landscape of the Pico Island Vineyard Culture (2004), both in Portugal (UNESCO, n.d.-b). Moreover, the same institution, in 2018, classified "*the art of drystone walling, knowledge and techniques*" as Intangible Cultural Heritage of Humanity (UNESCO, n.d.-a, 2018). This last classification leveraged the theme of drystone walls in such a way that, for example, in Portugal, the drystone walls of the county of Porto de Mós, Leiria, competed in the "artefacts" category ("7 Maravilhas de cultura popular," 2020) in the 7 Wonders of Portugal contest. With the media dissemination that this contest had, people started to value this heritage, strongly boosting the interest on this topic.

From what is exposed in this point, it is understood that the drystone walls and the terraced landscape formed by these, are vernacular cultural heritage, which can be inserted in several patrimonial classifications: intangible heritage of Humanity, World Heritage and GIAHS. Thus, this type of heritage has immense potential, allowing its use for various purposes, such as cultural tourism and geotourism. For all these reasons, this heritage should be given more evidence, support and protection.

3. CULTURAL TOURISM AND GEO-TOURISM

In 2017, the General Assembly of the UNWTO (United Nations World Tourism Organization) defines that *"cultural tourism is a type of tourism activity in which the visitor's essential motivation is to learn, discover, experience and consume the tangible and intangible cultural attractions/products in a tourism destination. These attractions/products relate to a set of distinctive material, intellectual, spiritual and emotional features of a society that encompasses arts and architecture, historical and cultural heritage, culinary heritage, literature, music, creative industries and the living cultures with their lifestyles, value systems, beliefs and traditions"* (UNWTO, 2018b).

Despite the actual crisis in tourism due to the COVID-19 pandemic, cultural tourism has an important share in global tourism. In 2017 the UNWTO estimated that more than 39% of all international touristic voyages had the purpose to enjoy cultural heritage (UNWTO, 2018a). However, there is a change of paradigm from the tangible heritage like historical buildings towards the participation and consumption of immaterial cultural practises like gastronomy, traditions, "adventure trips", "experiences", and so on (Richards, 2018). The same author observed that cultural tourism has turned into a mass tourism event with a wide range of participants.

On the other hand, geotourism is a branch of tourism which aims the geological heritage. It may be defined in several ways. One of them (Rodrigues, Machado, & Freire, 2011, p. 283) recognizes in a broad sense that geotourism is a tool which joins natural and cultural subjects in tourism: *"a tourism segment mainly focused on the sustainable usufruct (by geotourists and local communities) of the geoheritage fruition, which can be added the cultural heritage (tangible and intangible) of the areas".* This concept joins cultural and geological heritage and may be used as a sustainable way to ensure the promotion, protection and development of areas which possess a rich and diversified heritage.

Geotourism can be interpreted as a link between natural (geological) and cultural tourism (Rosendahl & Gonçalves, 2019). This is emphasized by the ABC approach of geotourism (Dowling 2013 *apud* Olson & Dowling, 2018), which includes the Abiotic (geology, soils, climate), Biotic (fauna, flora) and Cultural (human) components of an area. This approach makes it easier for a visitor to understand the context of a region (Rosendahl, 2014) and to interiorize the *genius loci* (Chylińska & Kołodziejczyk, 2018), in a rural as well as in an urban space: regional building materials, the kind of stone treatment, the soils which enable agriculture, the typical kind of livestock, the local and regional gastronomy, the availability of water resources, the way of implantation of drystone walls, and so on.

In Portugal, the geological heritage is defined by the Portuguese Law on Nature Conservation and Biodiversity (Decreto-Lei 142/2008, from July 24th) as *"set of geosites that occurs in a certain area and that includes the geomorfological, paleontological, mineralogical, petrological, stratigraphical, tectonic, hidrogeological and pedological heritage, among others"*. The same law defines a geosite as an *"area of occurrence of geological elements with recognized scientific, educational, esthetical and cultural value"* and protects a classified geosite, considering its damaging as a felony subject to penalties.

Geoconservation is an important aim of geotourism and is defined (Hose, 2012) as *"the act of protecting geosites and geomorphosites from damage, deterioration or loss through the implementation of protection and management measures"*. The conservation of a site is improved by its better knowledge. Here, the local residents play an important role: once they know its value, they can improve their sense of belonging and will be able to defend the site (Rosendahl, 2014).

Important tools for the protection and dissemination of knowledge are the internationally widespread Geoparks (UNESCO, 2017).

This kind of tourism is sustainable and may be improved by the use of digital technologies like QR codes, videos, geoapps, video games, and so on. There are several geotouristic trails with digital support like the one in Monsagro, Salamanca province, Spain (Martínez-Graña, Serrano, González-Delgado, Dabrio, & Legoinha, 2017). On a field trip, even creative techniques may be applied (Rosendahl & Gonçalves, 2020).

Geotourism is not restricted to seasonal variations and, as fossils cannot run away, it does not depend on the fauna's habits. Moreover, it is a complement of the offer in touristic areas, it may help to relieve popular touristic sites, and it may promote the local economy creating new motives related to the local geological features (Brilha, 2005).

Because of their natural and cultural importance, geotourism and geoparks attract people to visit sites which they cannot see in the cities. Near the locations, the demand for guided tours, interpretation, food and accommodation may grow. Therefore it will be necessary to create new jobs and economic support, increasing the local businesses (Dowling, 2009). Besides the creation and selling of souvenirs, books, brochures and other geo-related ventures and products, workshops may help to preserve ancient skills like, for instance, the knowledge of how to build a drystone wall.

4. DRYSTONE WALLS AND TOURISM

As geotourism may be considered as a link between natural geological and cultural tourism, the walls made of stones without mortar represent an interface between natural and cultural vernacular heritage.

They represent natural and geological heritage, because they are made of local stones, their installation depends on the geological setting of an area, they hold back subsurface water, they control surface water flows, they reduce erosion processes, and they shape typical landscapes. The empty spaces between the stones create a lot of ecological niches and habitats for animals and plants. The role of the drystone walls in cultural heritage was referred in the chapter 2 of this article (Drystone walls as a cultural heritage).

Drystone constructions, walls and their terraces are excellent examples of man-made nature. They express the history and culture of the people who created them and lived with them. Besides, they allow alternative utilizations, as they are plural and efficient (Bellmunt i Chiva & Sogbe Mora, 2010). They offer great touristic opportunities which may contribute to their preservation, renewal and survival, because they can be considered as evocative and inspiring places which radiate their own specific *genius loci*. Touristic activities will facilitate the transmission and highlighting of the

cultural and natural heritage (Gonçalves et al., 2017; Rebelo et al., 2006). For instance, drystone walls might be included in guided geotouristic field trips to help to understand the geological and geomorphological settings of the region and to show the context with the rural way of life (Rosendahl & Gonçalves, 2019).

The intended sustainable and multi-purpose tourism (Rebelo et al., 2006) has to be an activity that maintains the cultural and natural identity of the territory. Drystone constructions, walls and their terraces are potential leaders on the way to sustainable tourism, as they comply the requirements for tourism to be sustainable: They preserve and express the cultural and natural identity of the territory and their use originates little impact on their environment, as it is usual in vernacular constructions (Gonçalves, 2016).

5. DRYSTONE WALL CONSTRUCTIONS IN EUROPE – SOME EXAMPLES

Leaving aside the famous terrace landscapes like the Douro valley (Portugal), there are some locations in Europe where drystone walls and buildings may have a high touristic potential. The following examples show some sites which already have touristic support or where a touristic development may be successful. All of them have easy access and can be visited without long and exhausting hikes.

5.1 Le Village des Bories (Community of Gordes, Vaucluse, Provence, France)

The drystone heritage in the Vaucluse region in southern France includes property limit walls, terraces, support walls, cabins and others. In the 17th and 18th centuries, small farmers, farm workers and other poor people occupied free and not cultivated areas to develop agricultural activities. The village of Bories, with nor a cemetery neither a church, was made of local limestone blocks, and is an example for a temporary settlement, which gave place to the farm workers during spring and summer (figure 1). Besides, there were stables for the livestock (sheep, goats and pigs), as well as stores for supplies and harvest. The major cabins and their architecture were the work of professional masons, whose names are lost, but who were authentic masters of the art of drystone, and who left magnificent works to today's visitors (Commune des Gordes, 2015).

After its use, the village of Bories was forgotten during a century and served as a refugee for hunters or as a quarry for building stones. In the 1960ies it was rediscovered and restored. This restoration was awarded by the Académie de l'Architecture, and the site was classified as Historic Monument in 1977. Today it is one of the most visited sites of the Vaucluse region (Commune des Gordes, 2015) and has touristic facilities like an exposition of information posters, a souvenir and book shop, as well as a video room with regular projections of a documentary film.

Figure 1. Drystone constructions in the village of Bories. On the left: view of a part of the village. On the right: inside view of a cabin.

Source: Authors.

5.2 Les Cabanes de Breuil (Dordogne, Périgord, France)

Halfway between Sarlat-le-Canéda and Les Eyzies-de-Tayac, the cabins of Breuil are localized in a forest where they present a remarkable architectonic unity (figure 2). Because of their picturesque setting, they served as scenery of several movies. Their origin is enigmatic, they are thought to have been used as a rural settlement of the Benedictine order of Sarlat, until the middle of the 15th century. During the 18th and 19th centuries they became craft workshops. Actually, they belong to a small farm which is still in activity (Office de Tourisme Sarlat, n.d.).

Figure 2. Les Cabanes de Breuil. On the left: view of a part of the cabins. On the right: triple cabin.

Source: Authors.

The cabins were made of local limestone blocks and served as homes for the people who worked in the fields and their livestock. They were restored and are maintained by the owners of

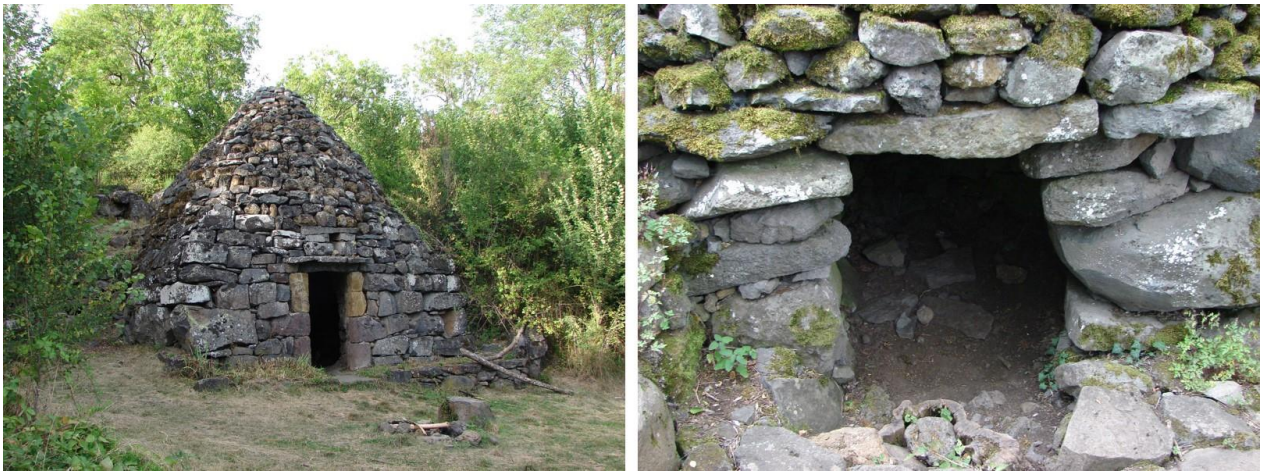
the farm, who organize expositions around the cabins ("Les cabanes de Breuil," n.d.). Some of the most interesting constructions are twin and multiple cabins, as well as the remnants of a bread oven. Posters inform the visitors about the use of the construction and the way they were built. Furthermore, there is a place where visitors can build their own drystone constructions and a small souvenir shop.

5.3 Sentier des Chibottes (County of Vals-près-Le Puy, Haute-Loire, Auvergne, France)

At the south of Vals-près-Le Puy, there is the trail of the chibottes ("Sentier des Chibottes"), inaugurated in 2011, with an extension of 5,7 km. During the hike some cone-shaped cabins ("chibottes") made of basalt blocks in drystone technique (figure 3) may be visited. Probably their existence is due to the vineyards which existed in the region, to give temporary accommodation, shelter or room to store the tools. Other authors attribute the construction of the cabins near the troglodytes' caves to the Ligurian people (Mairie de Vals-près-Le Puy, n.d.).

These constructions and many others found in the municipality represent symbols of the community, and the restoration and preservation of this heritage is a voluntary option of the county's administration. Besides an information table at the parking place and signs with arrows to indicate the trail, there are no other touristic facilities (*ib.*).

Figure 3. "Chibottes". On the left: view of a "chibotte". On the right: detail of the entrance of another "chibotte" with a height of about 50 cm.



Source: Authors.

5.4 Vilafranca (County of Els Ports, Comunidad Valenciana)

Vilafranca, previously named Vilafranca del Cid, is a small town with a population of about 2200 inhabitants. It is located in the easternmost foothills of the Iberian Cordillera, in the region of Alto Maestrazgo, at the height of about 1100 meters above sea level (Turisme Vilafranca, 2017).

The locality was founded in 1239 as a free village named Riu de les Trutes in the place of the actual Pobla del Bellestar. In 1303 it was attributed to Morella, and after about 400 years of struggling against this town, Vilafranca gained its independence in 1691 together with other villages. During the Carlist Wars in the 19th century, the region was the scenery of important battles *(ib.)*.

The cold climate and the mountainous area obliged the farmers to keep the few existing fields free of the limestone blocks and to look for alternative applications of these stones near the places where they were taken. As a result, hundreds of kilometres of constructions like drystone walls, support walls, paved paths, many huts, cabins, troughs, wells, sources, ponds, corrals, terraces, and so on were built (figure 4). It is a cultural vernacular heritage made of stone by anonymous artisans, simple people who had no other means to convey to us their culture and the expression of their way of life (Marín, Miralles, & Monort, 2008).

Figure 4. Vilafranca. On the left: drystone walls in the fields. On the right: model of a drystone wall landscape in the Drystone Museum.

Source: Authors.

In 2006 the Drystone Museum (Museo de la Piedra en Seco) of Vilafranca was inaugurated. It shows the techniques of drystone building, the tools, the construction types and typologies of the huts and cabins and aspects of the humanized landscape, using posters, panels, models (figure 4) and the presentation of a documentary video. So, it helps to interpret the surrounding scenery full with drystone walls and to empathize the efforts of the farmers in the neighbourhood of Vilafranca

to survive in adverse circumstances by transforming the landscape. To complete the visit of the museum, there are some outdoor itineraries where the drystone architecture may be observed directly (Turisme Vilafranca, 2017). There are no touristic facilities in the fields.

5.5 Vineyards of Biscoitos (Island of Terceira, Azores, Portugal)

At the northern coast of the Azorian island of Terceira, the landscape of Biscoitos is traditionally humanized with a high aesthetic and productive value. The area is divided by numerous drystone walls made of basaltic blocks, to protect the vines of Biscoitos from the winds and storms coming from the Atlantic Ocean, creating one of the most peculiar vineyards of Portugal. Usually, the walls divide the terrain with 165 hectares into square-shaped plots ("curraletas") and reach a height of about 50 cm, so the vines rarely grow higher (figure 5). In this scenery, the visitor finds coexisting landscape and cultural values, as well as the local coastal ecosystems, whose flora includes several endemic species (Secretaria Regional da Energia Ambiente e Turismo, 2020).

Figure 5. Biscoitos (island of Terceira). On the left: vineyards in plots with basaltic drystone walls. On the right: abandoned vineyard plots.

Source: Authors.

The first plantation of vine is dated between the 16th and 17th centuries. At the same time, sailors named the basaltic stones of the region "biscoitos", because of their similarity with the biscuits they used as provisions on their ships. Now, the vines are threatened because the viticulture demands constant maintenance, both of the vines and of the walls. Many of the vineyards have been abandoned and their terrains were transformed into places for holiday homes and backyards. Only a few vineyards still produce the typical Azorean Verdelho grape, a variety which is known

by its Atlantic and saline character (Lopes, 2017). Besides the viticulture, tourism might be another added value of the place, but no touristic information plates or other facilities or activities were found.

5.6 Cerro de São Miguel (counties of Faro and Olhão, Algarve, Portugal)

The southern slope of the Cerro de São Miguel, the highest elevation in the eastern Algarve region, is covered with drystone walls made of limestone blocks creating terraces used for dryland farming (figure 6). They were built to increase the agricultural area, to control the water flow on the slope, and to reduce soil erosion. Together with the walls, there exist other vernacular drystone constructions like threshing floors and lime kilns. Most of the terraces are out of use, and many walls are decaying due to the lack of maintenance. There is no hint of touristic attractions in the place.

Figure 6. Cerro de São Miguel (Algarve). On the left: drystone walls and terraces. On the right: threshing floor made with a drystone wall.

Source: Authors.

Tourism is the main economic activity of Algarve. The touristic infrastructure is well developed, with hotels and other kinds of accommodations near the beaches and in the rural areas. The offer of outdoor activities like bird watching or hiking tours is large. Many tourists visit Algarve having in mind to participate in cultural or gastronomic events. Therefore, an area like the terraced slopes of Cerro de São Miguel may become a touristic attraction, where the building of drystone walls or a day of country life may be experienced. The owners of the terrain have already shown some interest to collaborate in such events. Besides those projects, there is a beautiful panoramic view from the hill over eastern Algarve until Spain and the Ria Formosa with the upstream islands.

6. CASE STUDY: EL SOLÀ FOUNDATION (LA FATARELLA, PROV. TARRAGONA, CATALONIA, SPAIN)

The village of La Fatarella, which is located in the region of Terra Alta (Catalonia), had its origins in the Middle Age. Its name derived probably from the Arab word "Al-Fatriyya", which means watchtower (Ajuntament de La Fatarella, 2019). After the Christian conquest in the 12th century, the territory was attributed to the Order of the Temple. Les Camposines, an independent town which was annexed to La Fatarella in 1842, received the settlement charter in 1204. In 1228, La Fatarella received its town charter (*ib.*).

The Templar population chart allowed the settlement of a group of smallholders. The town was fortified by ramparts and access portals. In the 17th century, the growth of the population made it necessary to occupy the ground outside the walls. At the beginning of the 20th century, the agriculture activities reached its climax, and in 1920 the population reached its maximum with 2497 inhabitants (*ib.*). The *phylloxera* crisis and the Spanish Civil War, when the region around La Fatarella was the scene of the bloody Battle of the Ebro, caused an economic and demographic decline (*ib.*).

The old town of La Fatarella is crossed by narrow and winding streets, which are typical for a middle age urban settlement. The most characteristic elements are the *"perches*", where sections of the streets are covered by stone arches and wooden beams (figure 7). Other architectonic elements are, for instance, the local headquarter of the Templar Knights with mask-like face sculptures in the wall (figure 7), and ancient manor houses (*ib.*).

Figure 7. La Fatarella. On the left: "perche" in the old town. In the middle: mask-like sculpture in the wall of the local headquarter of the Order of the Temple. On the right: baroque façade of the church of Sant Andreu.

Source: Authors.

The most important religious buildings are the church of Sant Andreu, built in the 17th century in Renaissance style with late Gothic elements and a Baroque façade (figure 7), and the chapel of Our Lady of Mercy, which was established at the end of the 18th century in Neoclassic style. Beside this chapel there is the Terra Alta viewpoint (*ib.*) with a magnificent panoramic view of the surrounding landscape (figure 8).

La Fatarella has always been linked to farming. The main values that characterize the landscape of the Terra Alta are (figure 8) the various mountains, hills, peaks and hills, agroforestry mosaics, vineyards, olive groves, almond and white pine groves, the drystone architecture (walls, margins, huts and other constructions), the vineyards, the places of the Battle of the Ebro (1938) and the set of hermitages that are distributed among the populations (Nogué et al., 2013).

Figure 8. La Fatarella and its surroundings, seen from the Terra Alta viewpoint.

Source: Authors.

An example of the considerable number of drystone constructions in the Terra Alta area and throughout Catalonia can be found on the Wikipedra platform. The internet site Wikipedra, created in Catalonia (Spain), is an interactive platform for the location and description of drystone heritage ("Wikipedra. Construccions de Pedra Seca," n.d.). The project is developed by the Landscape Observatory and collaborates with the association Drac Verd, the Parc del Pirineu Català, the Regional Natural Park of the Ariejans Pyrenees, other entities and experts that take care of the heritage of drystone. The existing constructions in the different landscapes and in each municipality can be consulted, through maps, files, photographs and sketches. It is also possible to collaborate

by introducing the constructions that are known through the specific forms for huts or cabins, constructions to store water, walls and sets, ovens and other constructions. The proposals introduced are validated by the association Drac Verd in collaboration with other experts in the field, and subsequently published on the website.

The numerous drystone walls and buildings around La Fatarella are made of the local limestone. This kind of rock was formed about 25 million years before, during the epoch of Oligocene (Cenozoic era, Neogenic period), by the deposition of carbonate mud in a lacustrine environment. The climate was arid, so the rivers dried out during most of the year and water evaporated, leaving behind carbonate material, as well as sand and gypsum, which occurs in some places. The most frequent fossils are gastropods (*planorbis),* ostracods (small crustaceans) and charophytes (freshwater green algae), which confirm the origin of the limestone in a freshwater environment (Colombo, Franch, & Vilarrasa, 2004). The limestone occurs in well-defined layers, whose sight reminds a drystone wall (figure 9).

Figure 9. Well layered limestone formation near La Fatarella.

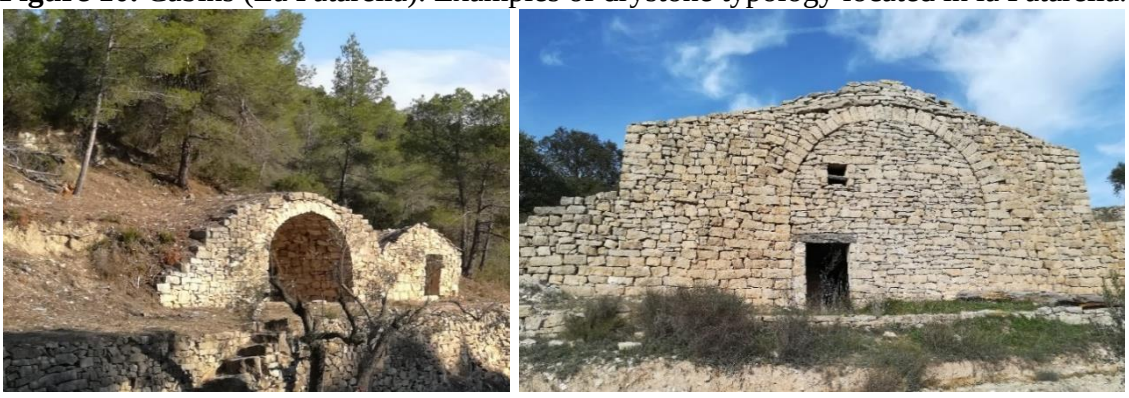
Source: Authors.

When you visit the municipality and the region, you can see a humanized landscape, adapted to the needs of a town which are agriculture, livestock farming and construction (Rebés d'Areny-Plandolit, 2003). The Fundació el Solà, with its seat in La Fatarella, is located in this context. This institution was founded in 1999 and is a non-profit organization whose objectives are the study, development, dissemination and preservation of the drystone heritage mainly in La Fatarella, but also in Terra Alta and adjacent Catalan-speaking counties.

A large part of the landscape around us is the result of decades of fieldwork, the so-called humanized landscape. The common denominator of this landscape is the material, the stone and the technique, the drystone. La Fatarella is a municipality with a large number and diversity of drystone constructions, intended for agricultural use, water supply, land management and other traditional activities: large terrace margin walls, vaulted huts, "perches", and waterwheels, among others (figure 10).

Cultural, social and economic changes have a great impact on the landscape and in particular, on the way crops are worked. These changes cause the disuse and, consequently, the loss of the knowledge of the drystone construction technique. The Fundació el Solà aims to detect this progressive loss of knowledge and to emphasize the need to study, conserve, develop and disseminate the drystone heritage. It is for this reason that, among other actions, the organization and realization of drystone training courses are carried out. Between 2002 and 2014, ten drystone training courses were organized throughout the municipality.

Figure 10. Cabins (La Fatarella). Examples of drystone typology located in la Fatarella.



Source: Authors.

La Fatarella was and is lucky to have traditional drystone building teachers who, in collaboration with the Foundation, are responsible for the training of interested students and tourists. In addition to introducing the technique, drystone constructions are also being restored. Throughout the term, there are many constructions that due to lack of use and maintenance deteriorate and collapse. In order to be able to carry out the courses in different places in La Fatarella and neighboring counties, an agreement must be made with the land's owner in which rights and duties are established. The owner allows to restore the drystone element during the days of the training and to visit the place accompanied by a member of the Fundació El Solà. On the other hand, the Fundació El Solà undertakes to keep the space in good condition during the term of the agreement.

In 2015, a new stage began in relation to drystone courses, in which the School of Architecture of the Rovira i Virgili University (Tarragona) joined the organization and realization of the courses.

These experiences combine the practical part and the experience of the courses carried out by the Foundation and the academic part of the University. From 2015 to the present, three joint experiences have been carried out: the courses in the Segurets area, the courses in the Pontils de l'Anreba area and the courses in the Canyerets area. The courses are aimed at the general population and tourists (figure 11).

The purpose of the drystone training courses is, first of all, to transmit the theoretical and practical knowledge of the construction technique and of the different typologies of constructions. As a result, the interest and respect for the popular architecture that makes up the landscape and which is little recognized, is promoted.

The objectives of the drystone training courses are: to introduce the basic knowledge which is necessary to understand the existing drystone constructions; to deepen the knowledge of drystone structures linked to the containment of lands; to introduce and to apply, in a practical way, the fundamental concepts for restoring and conserving these constructions; to evaluate if the context allows to build new ones. These objectives respond to the need to recognize the value of drystone constructions, and the interest in the technique and the landscape that shapes it.

Figure 11. Drystone courses in La Fatarella.

Source: Authors.

The drystone courses help to preserve the environment, the history and the testimonies of an agricultural and livestock farming past. The instinct for survival made it possible to develop and to perfect a construction technique, and to adapt it to the topography, the raw material and the climatic conditions of each place. Throughout these stone courses, the basic tools are given to know and to put into practice the construction technique of drystone. In addition, spaces that were doomed to disappear due to the lack of use and maintenance have been restored and recovered. Stone is the common denominator of all places in the world where there is stone, and consequently drystone constructions.

The influence of the project at the local level is reflected in the visual impact caused by the

recovering of close surroundings. The villagers and tourists can go through the spaces and itineraries have been developed to tour and visit the different interventions. The influence of the project at the regional and national level is evidenced by the diversity of people who contact the Fundació el Solà to request information about the offered courses. This influence is also evidenced by the fact that the Foundation participates in various conferences or meetings of drystone to explain the developed experience. The last invitation took place on January 25, 2020 in Vinaixa in the conference entitled "Present and future of the drystone margins in Les Garrigues". The influence at European level is evidenced by the participation and aid of the Fundació el Solà together with the teachers and collaborators of the drystone courses, having supported the candidacy presented to the UNESCO to declare the technique of the drystone building Intangible Cultural Heritage of Humanity.

Currently, in parallel to the task of carrying out courses, the Fundació el Solà is dedicated to recording and studying drystone constructions applying Digital Photogrammetry (SFM), a massive data capture technique. Drystone construction has been studied on the Iberian Peninsula since the beginning of the 20th century (Rubió, 1914; Torres Balbás, 1933), although the main catalogues have only been published in recent years (García, M. , Zaragozá, 2000; Tarragó, 2006).

Figure 12. Vaulted cabins' exhibition.

Source: Authors.

These studies make it possible to publish and disseminate the constructions and the construction technique in a visual and didactic way, in addition to analysing the characteristics of the construction technique in detail. An example is the exhibition on vaulted huts that was inaugurated in August 2020 at the seat of the Fundació el Solà in La Fatarella. The exhibition *Les cabanes de volta de la Fatarella. Una Mirada tridimensional* shows 7 representative types of

vaulted cabins using models and images (figure 12.). By studying the models, the visitors can appreciate the characteristics of the buildings and identify the construction typologies that exist throughout the municipality.

One of the actions that the Foundation has used to promote the drystone constructions characteristic of the surroundings of La Fatarella has been the development of tourist routes. These routes, aimed at all audiences, show different examples of drystone constructions while putting the landscape in context and value. The people who carry out the routes have a positive impact on the municipality itself and on the region, since economic and social dynamics are generated in a sparsely inhabited area with few economic resources. The region of Terra Alta, where La Fatarella is located, is one of the most depopulated areas in Catalonia, with only a few visitors. Therefore, the establishment of a sustainable cultural tourism based on the drystone landscape can become a brand of the territory and may motivate other municipalities in the region to create new routes.

7. CONCLUSIONS

The cultural heritage and the history of a site may be completed by the knowledge of the geological setting, joining a natural component. Cultural tourism is sustained by the *genius loci*, the local spirit which is provided by cultural and natural heritage (Chylińska & Kołodziejczyk, 2018). The knowledge of the purpose of the drystone walls and constructions, their spatial arrangement and construction techniques, the plant cover (figure 13), as well as the geological history and the common rock types of the region, or geological structures like a visible fold will deepen the visitor's experience and make him to see and to understand the entire context of the visited area's heritage.

In many regions with natural and vernacular heritage, a great potential for the development of touristic activities exists, which may include visits to sites with geological and cultural landmarks to satisfy the tourists' curiosity. The interest that visitors manifested during the author's guided geotouristic visits in areas with drystone walls and terraces shows that this is a way to spread geological and cultural knowledge. The field activities which can be guided walks or workshops, should be completed by the installation of information tables, booklets, folders, and so on, written in an easy to understand way, as well as by the creation and offer of smartphone applications, with QR codes, videos and other multimedia gadgets (Martínez-Graña et al., 2017). Besides the geological setting, the drystone walls as a cultural vernacular heritage, their technique and their purpose will be better known, drawing more attention for its maintenance, preservation and protection.

Figure 13. Drystone walls and terrace landscape in the Alva river valley around Avô (District of Coimbra, Portugal).

Source: Authors.

There is the problem that vernacular heritage like the drystone walls is often not recognized as such or regarded as "minor" heritage. Even the local residents consider economic concerns as more important than cultural ones (Olson & Dowling, 2018). Improving the knowledge of the local cultural heritage, will be a way to protect it more efficiently. The local or regional development may be fostered by the creation and sale of heritage-related products, and the training and employment of local field guides or guards may decrease the emigration (Farsani, Coelho, & Costa, 2011). The participation in workshops to learn the technique of drystone construction is a precious contribution to the skills and the self-confidence of a person.

Geotouristic activities enrich the existing touristic offer in a region and are an economic complement as the guided visits and other events are paid. The main target group comprises people with medium-high income including culturally and scientifically interested adults and children. Geotouristic and cultural visits may take place at nearly every weather and is independent of the season.

The aims of geotourism and cultural tourism are very similar. Both have the objective to spread knowledge and to raise the awareness of the protection and preservation of the respective natural, tangible and intangible heritage in an entertaining way. By the aggregation of these two branches

of tourism may result a profitable win-win-win-situation for the customers, the providers and the local residents.

REFERENCES

7 Maravilhas de cultura popular. (2020).

Ajuntament de La Fatarella. (2019). Ajuntament de La Fatarella, Terra Alta, Terres del'Ebre. Retrieved January 6, 2021, from https://www.lafatarella.cat/

Bellmunt i Chiva, J., & Sogbe Mora, E. (2010). El paisatge de la paret seca. In *La pedra seca. Evolució, arquitectura i restauració* (Primera, pp. 111–145). BRAU Edicions.

Brilha, J. (2005). *Património e Geoconservação: A Conservação da Natureza na sua Vertente Geológica*. Viseu: Palimage Editores.

Châtelain, A. (2009). *Patrimoine rural. Reflet des terroirs* (Patrimoine). REMPART.

Chylińska, D., & Kołodziejczyk, K. (2018). Geotourism in an urban space? *Open Geosciences*, *10*, 297–310.

Colombo, F., Franch, M., & Vilarrasa, A. (2004). *La pedra de calar de La Fatarella. Aproximació geològica*. La Fatarella: Fundació el Solà.

Commune des Gordes. (2015). Le village des Bories. Retrieved October 10, 2020, from https://levillagedesbories.com/

Díaz, S., & Guerra, R. (2010). Construcción de la identidad de grupo local. El espacio y el patrimonio material e inmaterial como referentes identitarios en Trujillo y Huertas de Ánimas. *Gazeta de Antropología*, *26*(2), Artículo 34.

Dowling, R. (2009). Geotourism's contribution to Local and Regional Development. In C. N. de Carvalho, J. Rodrigues, & A. Jacinto (Eds.), *Geoturismo & Desenvolvimento Local. Geotourism & Local Development* (pp. 15–37). Idanha-a-Nova: Câmara Municipal de Idanha-a-Nova.

FAO. (n.d.). GIAHS-Globally Important Agricultural Heritage Systems. *FAO*. Retrieved from http://www.fao.org/giahs/giahsaroundtheworld/designated-sites/asia-and-the-pacific/en/

Farsani, N. T., Coelho, C., & Costa, C. (2011). Geotourism and Geoparks as Novel Strategies for Socio-economic Development in Rural Areas. *International Journal of Tourism Research*, *13*, 68–91. https://doi.org/10.1002/jtr.800

García, M. & Zaragozá, A. (2000). Arquitectura Rural primitiva en secà. València: Generalitat Valenciana.

Gonçalves, M. M. (2016). *El conocimiento del patrimonio en cuanto factor de estructuración de la sostenibilidad de los territorios. El caso de la freguesia de Cernache do Bonjardim, Portugal*. Sevilla. Retrieved from https://www.educacion.gob.es/teseo/mostrarSeleccion.do

Gonçalves, M. M., Pérez Cano, M. T., & Rosendahl, S. (2019). From stone masonry to emigrant's mansions. Changes in vernacular architecture in central Portugal. *IOP Conf. Series: Materials Science and Engineering*, *603*, 22064. https://doi.org/10.1088/1757-899X/603/2/022064

Gonçalves, M. M., & Pérez Cano, M. T. (2012). The (un)recognition of cultural heritage: the parish of Cernache do Bonjardim, Portugal. In R. Amoêda, S. Lira, & C. Pinheiro (Eds.), *HERITAGE 2012 3th International Conference of Heritage and Sustainable Development* (1st ed., pp. 1181–1190). Porto: Green Lines Institute for Sustainable Development.

Gonçalves, M. M., Pérez Cano, M. T., & Prates, G. (2020). Engineering without Engineers, Architecture without Architects: Dry Stone Walls. In J. A. Marin Casanova, J. E. González Vallés, & D. Navas Carrillo (Eds.), *Contenidos de humanismo para el siglo XXI.* (1st ed., p. forthcoming). Madrid: Pirámide (Grupo Anaya).

Gonçalves, M. M., Pérez Cano, M. T., Rosendahl, S., & Prates, G. (2018). When agriculture rules over the teritory: drystone walls. In L. Villegas, I. Lombillo, H. Blanco, & Y. Boffill (Eds.), *REHABEND2018 - 7th Euro-American Congress on Construction pathology, rehabilitation technoogy and heritage management* (pp. 311–317). Cáceres: University of Cantabria/University of Extremadura.

Gonçalves, M. M., Prates, G., Pérez Cano, M. T., & Rosendahl, S. (2020). Territory and Drystone Walls. Comparative of Case Studies in Central and Southern Portugal. In I. Lombillo, H. Blanco, & Y. Boffill (Eds.), *Rehabend 2020. Construction Pathology, Rehabilitation Tecnology and Heritage Management* (pp. 274–281). Santander: University of Cantabria.

Gonçalves, M. M., Prates, G., & Rosendahl, S. (2017). Renewing terraces and drystone walls of Algarvian Barrocal. Cultural and touristic values. In A. Mortal et al. (Ed.), *INCREaSE2017* (pp. 13–31). Faro: Springer International Publishing AG 2018. https://doi.org/10.1007/978-3-319-70272-8_2

Hose, T. A. (2012). 3 G's for Modern Geotourism. *Geoheritage*, *4*, 7–24. https://doi.org/10.1007/s12371-011-0052-y

ICOMOS. (1999). *Carta sobre o Património Construído Vernáculo*. Cidade do México.

ICOMOS. (2013). *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance*.

Les cabanes de Breuil. (n.d.). Retrieved December 10, 2020, from http://www.cabanes-du-breuil.com/

Lopes, D. (2017). The Incredible Story behind the Biscoitos Wines. Retrieved December 14, 2020, from https://diogowinemaker.pt/acores-a-incrivel-historia-dos-vinhos-dos-biscoitos-english/?lang=en

Mairie de Vals-près-Le Puy. (n.d.). Au pays des chibottes. Retrieved December 11, 2020, from https://www.valspreslepuy.fr/65-patrimoine-au-pays-des-chibottes.html

Malafrè Balsells, C., Jover, A. C., Pla, S. C., Santos, A. N., Gonçalves, M. M., Rosendahl, S., & Prates, G. (2019). Dry-stone walls as touristic attractive. Comparative between northeast and southwest of Iberian Peninsula. In *INCREASE2019* (pp. 1163–1179). Faro. https://doi.org/10.1007/978-3-030-30938-1_92

Marín, M., Miralles, F., & Monort, J. (2008). *Los hombres y las piedras. La piedra seca en Vilafranca: un paisaje humanizado*. Els Ports: Magnifico Ayuntamiento de la Real Villa de Vilafranca.

Martínez-Graña, A. M., Serrano, L., González-Delgado, J. A., Dabrio, C. J., & Legoinha, P. (2017). Sustainable geotourism using digital technologies along a rural georoute in Monsagro (Salamanca, Spain). *International Journal of Digital Earth*, *10*(2), 121–138. https://doi.org/10.1080/17538947.2016.1209582

Nogué, J., Sala, P., Aragonès, J., Saladié, S., Miró, N., & Sabaté, X. (2013). *Catàleg de paisatge Les Terres de l'Ebre* (1a edició). Barcelona: Departament de Territori i Sostenibilitat, Diputació de Tarragona.

Office de Tourisme Sarlat. (n.d.). Les cabanes du Breuil. Retrieved December 10, 2020, from https://www.sarlat-tourisme.com/offres/les-cabanes-du-breuil-saint-andre-dallas-fr-1940175/

Olson, K., & Dowling, R. (2018). Geotourism and Cultural Heritage. *Geoconservation Research*, *1*(1), 37–41.

Petronela, T. (2016). The Importance of the Intangible Cultural Heritage in the Economy. *Procedia Economics and Finance*, *39 OP*, 731–736. https://doi.org/10.1016/S2212-5671(16)30271-4

Rebelo, F., Nave, A., Pereira, N., Silva, M., Carvalho, A., & Fialho, J. (2006). *Paisagens de socalcos e riscos naturais em vales do Rio Alva*. (L. Lourenço, Ed.). Coimbra: Núcleo de Investigação Científica de Incêndios Florestais, Faculdade de Letras da Universidade de Coimbra.

Rebés d'Areny-Plandolit, X. (2003). *La Pedra en Sec a La Fatarella*. (Fundació el Solà, Ed.) (2a ed.). La Fatarella.

Richards, G. (2018). Cultural Tourism: A review of recent research and trends. *Journal of Hospitality and Tourism Management*, *36*, 12–21.

Rodrigues, M. L., Machado, C. R., & Freire, E. (2011). Geotourism Routes in Urban Areas: A Preliminary Approach to the Lisbon Geoheritage Survey. *GeoJournal of Tourism and Geosites*, *2*(8), 281–294.

Rosendahl, S. (2014). The Geological Heritage of Algarve and its Potential for Geotourism. In R. Amoêda, S. Lira, & C. Pinheiro (Eds.), *Heritage 2014. Proceedings of the 4th International Conference on Heritage and Sustainable Development, Guimarães* (pp. 1483–1490). Barcelos: Green Lines Institute for Sustainable Development. https://doi.org/10.14575/gl/heritage2014

Rosendahl, S., & Gonçalves, M. M. (2019). Joining geotourism with cultural tourism: a good blend. *Journal of Tourism and Heritage Research*, *2*(3), 252–275.

Rosendahl, S., & Gonçalves, M. M. (2020). Georiddles, Brainstorming and Creativity in Natural and Cultural Tourism. *Journal of Tourism and Heritage Research*, *3*(1), 454–468. Retrieved from http://www.jthr.es/index.php/journal/article/view/152/266

Rubió, J. (1914). Construccions de pedra en sec. Barcelona: Col·legi d'arquitectes de Barcelona.

Secretaria Regional da Energia Ambiente e Turismo. (2020). Vinhas dos Biscoitos. Retrieved December 14, 2020, from https://parquesnaturais.azores.gov.pt/en/parques/8/areasprotegidas/97

Tarragó, S. (2006). Actes del 1r. Colloqui Internacional de construcció de pedra seca. Barcelona: Aguazul.

Torres Balbás, L. (1933). *La vivienda popular en España*. (A. Martín, Ed.). Barcelona.

Turisme Vilafranca. (2017). Vilafranca. Retrieved December 11, 2020, from http://turismevilafranca.es/

UNESCO. (n.d.-a). Browse the Lists of Intngible Cultural Heritage and the Register of good safeguarding practices. Retrieved from https://ich.unesco.org/en/lists

UNESCO. (n.d.-b). Lista do Património Mundial da Humanidade. Retrieved from http://whc.unesco.org/en/list

UNESCO. (2017). UNESCO Global Geoparks. Retrieved December 13, 2018, from http://www.unesco.org/new/en/natural-sciences/environment/earth-sciences/unesco-global-geoparks/

UNESCO. (2018). Art of dry stone walling, knowledge and techniques. *UNESCO*. Retrieved from https://ich.unesco.org/en/RL/art-of-dry-stone-walling-knowledge-and-techniques- 01393

UNWTO. (2018a). *Tourism and Culture Synergies*. Madrid. Retrieved from https://www.e-unwto.org/doi/pdf/10.18111/9789284418978

UNWTO. (2018b). *UNWTO Tourism Definitions*. Retrieved from

http://publications.unwto.org/publication/UNWTO-Tourism-definitions

Villacis-Mejía, M. C., Torres-Matovelle, P., Pons-García, R. C., & Tanda-García, J. (2016). Diseño de productos turísticos culturales a partir del patrimonio inmaterial. *Retos Turísticos*, *15*(3 OP-Retos Turísticos. sep-dic2016, Vol. 15 Issue 3, p93-108. 16p. 2 Diagrams, 5 Charts.). Retrieved from http://search.ebscohost.com/login.aspx?direct=true&site=eds-live&db=a9h&AN=121473706

Wikipedra. Construccions de Pedra Seca. (n.d.). Retrieved January 4, 2019, from http://wikipedra.catpaisatge.net/