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LETIZIA DIPASQUALE
SAVERIO MECCA
LUCIA MONTONI

Heritage for people

Sharing vernacular knowledge to build the future

versus plus
heritage for people

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Environmental and socio economic-context

opposite page
Digital survey of of the Perdas Nieddas tuna fishery located in punta Maggiore, Sant'Antioco
(credits: CHM_Lab)

Connected to Sardinia by an isthmus built by the Carthaginians and improved by the Romans, the island of Sant'Antioco is off the southwestern coast of Sardinia, Italy. It is a volcanic island with large areas of limestone and Quaternary deposits on the east coast. The western part of the island is characterised instead by vertical or very steep cliff faces, interspersed with numerous inlets.

The climate is Mediterranean, with long, dry summers and mild winters. The average annual temperature is 21 degrees, with 250 mm of rainfall per year.

The presence of the sea has always strongly influenced this area. In addition to being a valuable resource for the economy, which has historically been based on fishing, the sea is an essential part of the local culture, giving rise to customs, myths, routines, and a way of life. Even the name of Calasetta, the town located on the northern tip of the island, is linked to the sea. It derives from 'Cala di Seta', and refers to byssus, a silk-like filament obtained from the *gnacchera*, or *pinna nobilis*, once abundant in the surrounding sea (Rombi, 1988; Cabras, Rivano Poma, 1992).

The island hosts 10,600 permanent residents and about 10,000 visitors in the summer. Fishing, salt cultivation, agriculture, and especially winemaking are the main historic economic sources. Although tourism now accounts for a significant portion of the economy, traditional local production and small handicraft workshops dedicated to weaving, byssus processing, and wooden boat manufacturing still persist.

Cultural landscape

The island of Sant'Antioco has a hilly topography that is characterised by Mediterranean scrub with low-growing plants, such as juniper, myrtle, lentisk, rosemary, and dwarf palms, as well as vineyards and arable land that is cultivated to produce wheat and legumes.

The Piedmontese colonists who arrived in this area in 1773–1774 introduced the system of grape cultivation and wine production, which has characterised the island's economic development and cultural landscape in a profoundly balanced relation with the territorial and environmental context.

The nature of the sandy soil has made it possible to cultivate the ungrafted vine without resorting to American vine grafting. This rare cultivation technique brings several advantages to the plant, such as greater drought resistance, longer vineyard longevity, and a better vegetative-productive balance. The

Traditional vineyard cultivation in sand

***Baracca*, a small rural dwelling**

(credits: Hirusha Hettiarachchige Don)

Carignano vine, which is cultivated without external support structures, is highly resistant to sea winds, which has enabled it to be planted in the sandy, sunny soils of Sant'Antioco. Traditional methods, such as treating the vines with sulphur and copper, fertilising them with manure and fava beans, weeding by hand, and using green manure, are still employed.

The vineyards occupy large portions of land, bordered by fences made of blocks of trachyte, a local rock of magmatic origin, long and narrow in shape (about 30 x 150 cm), positioned at about 2 m from each other. The stone blocks, locally known as *Sschèn*, are connected to each other by reed screens, which serve to protect the plants from strong winds. Prickly pear plants were often placed at the edge of the vineyards, also serving as wind shields.

In terms of biodiversity and the valorisation of small territorial productions, the production of black lentils (*Lentiggia naigra de Cadesedda)* should be mentioned. The lentil was imported from the Tunisian coast island of Tabarka by the *Tabarchini*, who are ancient Ligurian settlers from Pegli who were moved there in 1544 by the Genoese Lomellini family and were known for their coral-fishing prowess. Forty-eight of these *Tabarchini* families arrived to colonise the island of Sant'Antioco in 1770 and settled there to practice agriculture and farming. The black lentil was planted in the centre of the rows of vines once vine cultivation was widespread throughout the entire agricultural area. The lentil was cultivated as a source of protein and also used by farmers as an exchange for fish products and a method to improve soil fertility. At risk of extinction in 2017, the production of black lentil has increased, thanks to a regional announcement that resulted in the creation of a protection community, from 50 kg in 2019 to 100 kg in 2020, grown by 10 farms, three of which are organic.

A rural dwelling
(credits: L.Dipasquale)

Traditional rural dwellings

The traditional rural dwelling (known as *Baracca)* is a small (25–30 m^2), rectangular, single-cell volume, almost always located at a corner of the agricultural plot. These tiny structures served as a winter base for farmers and a summer residence for the entire family which moved from the town to the countryside. A wooden mezzanine (*saié*) divides the internal space of the hut into two levels, separating the living area from the sleeping area. The mezzanine, which is accessed by a wooden ladder, is built at the bottom of the space, where the useful height is higher due to the roof's slope.

The openings are limited and small in size. The access door is often positioned on the main front, facing south-east. In many cases, a single small window on the north-west side, placed at a height above that of the loft, ensures effective cross-ventilation.

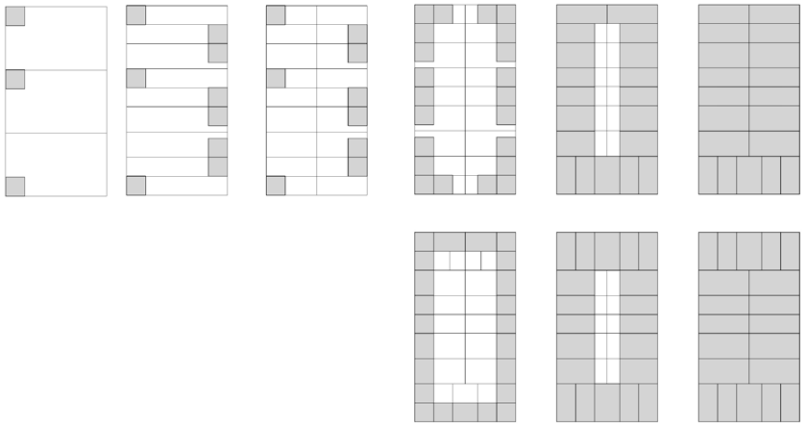
The chimney, which was typically placed on one of the side walls, allowed for cooking and heating the space. A cistern (*ciassè*), typically located against the outside wall, provided the water supply by collecting water from the roofs through a system of downpipes.

The walls have an average thickness of 50 cm and are made of red-brown volcanic stone (*ignimbrite*) bonded with a clay-based mortar.

Due to the lack of tall trees, juniper wood or salvaged timber gathered from the beach were employed. The roofing, made of brick tiles, generally rests on a mat of woven reeds.

Generally isolated within the plot, it is also possible to find typologies with several huts joined together, generating a housing stock. In some cases, additional auxiliary volumes outside the hut have been observed housing little farm animals.

Photoplan of the southeastern side of the section of Guglielmo Marconi street between Regina Elena street and Vittorio Emanuele street



Hypothetic philological outline of the five phases of increment of the 5x8 *trabucchi* type plot

(credits: CHM_Lab)

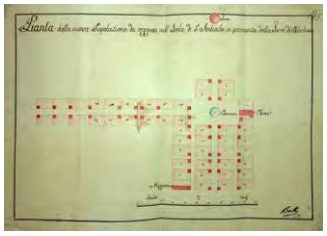
Urban morphology and development

The island of Sant'Antioco is known since pre- and early history, as testified by the many Nuragic and Phoenician settlements and necropolises. After the Roman period it was abandoned for many centuries, due to the frequent raids by Barbary corsairs, until the middle of the 18th century when the village of Sant'Antioco began to be repopulated (Vacca, 2009).

Calasetta is among the new lands founded by command of the House of Savoy in order to populate and protect the territory of Sulcis-Iglesiente from corsair raids. The layout of the city was designed between 1770 and 1771 by artillery lieutenant Pietro Belly (1731-1791) and is characterised by a Hippodamian grid structured on two mutually orthogonal guiding axes; the main N-W/S-E[1] route (via Roma[2] for a total length of 108 *trabucchi*[3]) is countered by a S-W/N-E route (via Guglielmo Marconi, with a lenght equal to 54 *trabucchi*); both axes have a width of 3 *trabucchi*, while secondary roads have a width of 2 *trabucchi*.

The church and the great cistern are located in the main square (24x12 *trabucchi* = 6 *stari*), while the supply storehouse (2x9 *trabucchi*) is located along the southern limits of the settlement.

[1] The settlement is rotated 45° with respect to magnetic north.
[2] The toponymy used in the text is the current one.
[3] The *trabucco* is an ancient unit of measurement used in Piedmont until 1818 that corresponds to 3.082596 metres and can be divided into 6 *piedi* measuring 0.513766 metres (Martini, 1883).



Regional Technical Map 1:2000, Region of Sardinia
(credits: CHM_Lab)

Plan of the new settlement to be established in the Island of Sant'Antioco in proximity of the Tower of Cala di Seta
(credits: Ing. Pietro Belly, 1770, A.S.Ca., Regia Segreteria di Stato, Serie II, Volume 1291, carta 45)

Drawing of the village of Calasetta and its surroundings
(credits: Engineer Giovanni Francesco Daristo, 1773, A.S.To., Sardegna, Sezione Corte, Paesi, Sardegna, Materie Feudali, Feudi per A e B, mazzo 22 "Isola di Sant'Antioco", file 73)

Settlement of Calasetta
(credits: Maggiore di Stato Carlo De Candia, 1844, A.S.Ca., Regia Segreteria di Stato, Real Corpo, serie mappe, unità 004, scala 1:5000)

The 39 plots, assigned to the first thirty-eight families that settled there (Schirru, 2013), are of different sizes depending on their location within the settlement:

- 5x8 *trabucchi* along the long sides of the square, on via Marconi and via Tabarkini.
- 4,5x9 *trabucchi* on the S-E side of the square,
- 9x5 *trabucchi* on via Solferino.

Within the plot is the dwelling itself (square in plan and with a side equal to 1.5 *trabucchi*) located at the corners of the properties, while the rest is left to arable land[4].

The arrival of new settlers made it necessary to extend the settlement. The Expansion Plan, drafted in 1773 by the Savoyard engineer Lieutenant Giovanni Francesco Daristo (?-1777), increased the available lots by only partially complying with Belly's layout.

A comparison of the two plans reveals the following:

- a different distribution of secondary routes, especially along the N-W/S-E expansion axis (via Roma), which determine the structure of the typical block in Calasetta (8x15 *trabucchi*),
- the relocation of the parish church to a second square placed along the main axis[5],
- the setting of the defensive walls (two irregular and mirror-like pentagons) provided with six bastions[6].

In the mid-19th century, the building fabric still consisted of scattered houses aligned along the streets of the 18th-century layout. The surveyed area, between the Savoyard Tower and via Savoia, was settled between the late 19th century and the early years of the 20th, following the same plan layout set by Daristo.

From the reading of the current context and the analysis of the historical iconography it is possible

[4] A differnet metrological reading to that of Schirru (Schirru, 2013) is proposed.
[5] This proposal was also later discarded, and the first core of the present religious building was constructed between 1838 and 1840 in what is now Piazza Gautier (Cabras, 2010).
[6] It should be noted that in both the Belly and Daristo projects the tower is incorrectly placed.

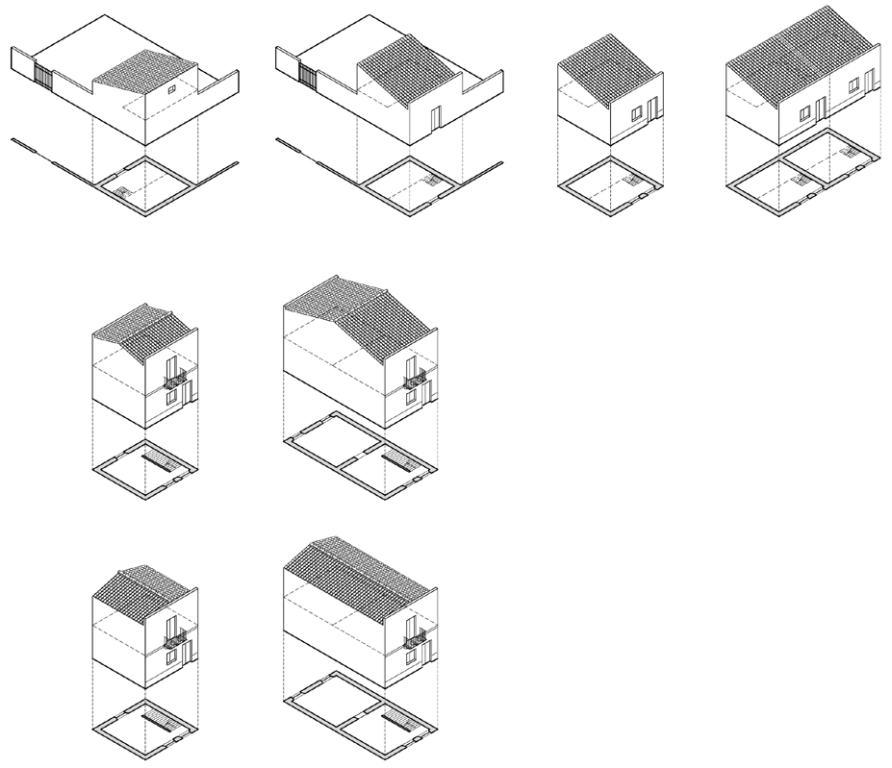
Aereal views of the city of Calasetta

opposite page
Typological process of the elementary building cell (dwellings): diachronic variants
(credits: CHM_Lab)

to deduce the process that led the early sparse fabric to turn into a 'dense' fabric of terraced houses in which every block presents along the whole perimeter a continuous street-front construction.
Once the agricultural function was lost, every plot was first divided transversely into rectangular plots (phase 1) and then, presumably at a later moment (phase 2), also divided longitudinally.
Throughout the decades, the alleys that led to the plots (phase 3) were gradually incorporated into the buildings. The original dwelling cells were extended both in depth (at the expense of the appurtenance areas, phase 4 and phase 5) and in height (with the addition, in general, of only one storey).

The building type in an urban context

It is likely that the original housing cell located within the plot consisted of a single room covered by a sloping roof directed toward the farmyard, from which the building could be accessed. At an initial stage, the urban building type must not have been much different from the rural one, a configuration that changed radically when, once the productive function of the lots had ceased, the dwellings (phase 1) opened onto the public street. This important change had two relevant effects: a different direction of the slope and the creation on the street front of a sort of 'veil', or 'veletta', consisting of an extension in height of the facade in order to conceal the pitch of the roof. There may be more than one reason for the presence of this element, which still characterises the architecture of Calasetta today: the saving of both time and costs obtained by avoiding the complete demolition of the upper part of the original rear wall; the advantage of having an *impluvium* to channel water to a possible cistern; and the wish to maintain the same street-front appearance (with the exception of the entrance door to the houses) which had been consolidated over time.
The possibility of extending the cell both in length and height brought about early variants to the original type.
In the least articulated version on the facade there are three openings: on the ground floor there is an access door and a window that illuminates the living area, and on the first floor there is an additional



window located in the center of the wall (in some cases a French door that opens onto a small balcony supported by three corbels) which provides the sleeping area with light.

The internal staircase, aligned with the front door, is usually very steep (a typical feature of Genoese *fondaco* storehouses; Caniggia, Maffei, 2008) in order to limit its overall dimensions.

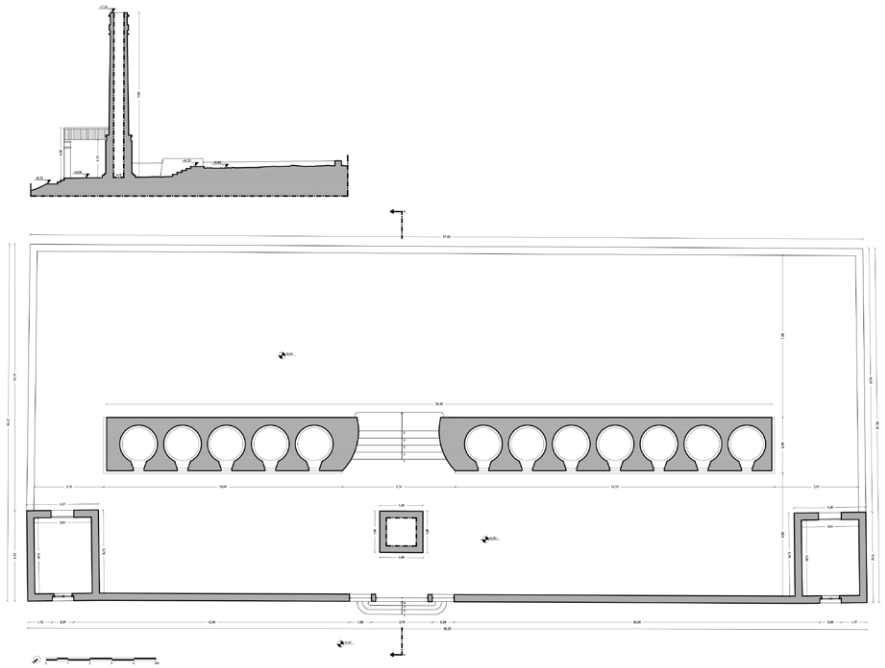
The building material consists of ignibite blocks from open-pit quarries in the proximity of the settlement, some of which are still visible today. The exterior stone masonry, covered with lime mortar and dyed in pale colors, has a skirting approximately 60 cm high, made of larger ashlars and a different colouring of the surface finish.

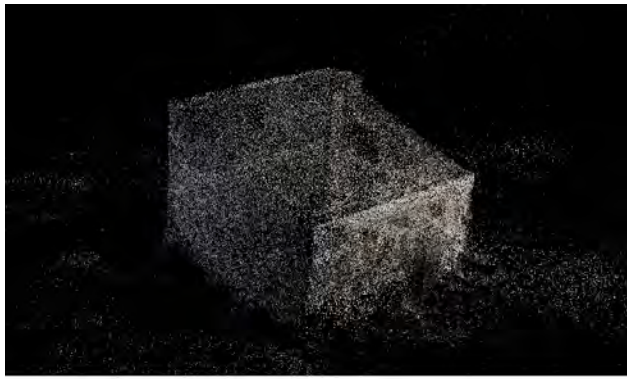
An articulated rainwater collection system, where present, fed rainwater to cisterns excavated in the rocky mantle below the dwelling. The kitchen area generally included a fireplace, used for the preparation of food and heating the dwelling, and a connection to the water supply from the cistern.

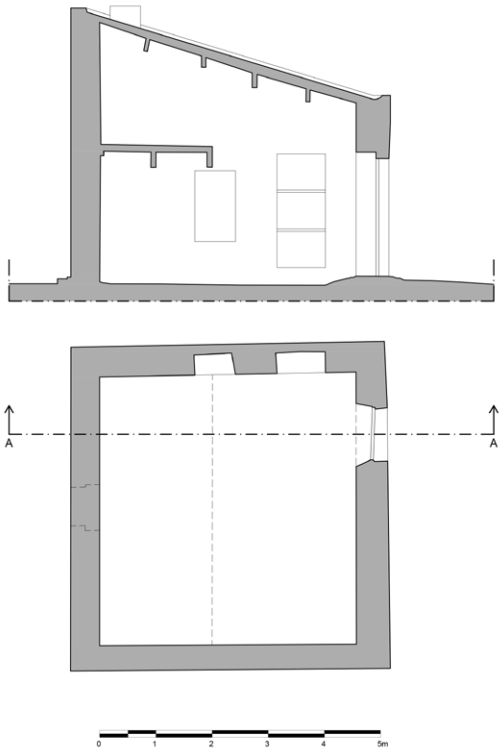
The main change introduced over time concerns the roofing system. A single pitch was sometimes preferred to a gabled roof, and this was usually built together with the vertical extension of the dwelling. The two pitches[7] can be positioned perpendicular to the street, or else be arranged parallel to it[8];

[7] The two pitches are supported by a timber frame consisting of main rafters and secondary joists placed at intervals equal to that of the tiles and counter-tiles that form the roof covering. A false floor slab of reeded roofing separates the attic from theroom below, thus providing a better microclimate within the dwelling. In many cases the traditional tiles and counter-tiles have been replaced by Marseille tiles.

[8] In interventions that are more respectful of tradition and of the consolidated image of the urban context, the *veletta* has



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Urban warehouse
Traditional stone masonry
(credits: authors)

opposite page
3D model, plan and section of the Perdas Nieddas tuna fishery located in punta Maggiore
Pointcloud, plan and section of the *barracca* located at Saline (39°04'34.1"N 8°21'43.1"E)
(credits: CHM_Lab)

the second solution provides an undoubted advantage: by having rainwater flow into gutters and downspouts facing their own plot of land or the public street rather than in the direction of the spine walls between the two buildings, it avoids possible disputes with the neighbours.

The increase in floor area gave rise to further variations of the original type[9]: in many cases the building became a multi-family dwelling, accommodating one apartment on each storey; the number of openings on the upper floors increased, usually to two per floor, distributed along two vertical axes.

In addition to residences, the lots also include warehouses or spaces suitable for storing tools and/or sheltering animals. These structures, of the same size as the basic cell, are single-storeyed and are covered by two pitches that are perpendicular to the road. The main facade is characterised by a single large archivolted opening with a double-panelled wooden gate, located in the center of the plastered wall. In order to ensure a greater functionality and adequate ventilation and lighting for these rooms over time, the gate was replaced with a rectangular doorway and a window.

The Savoyard tower

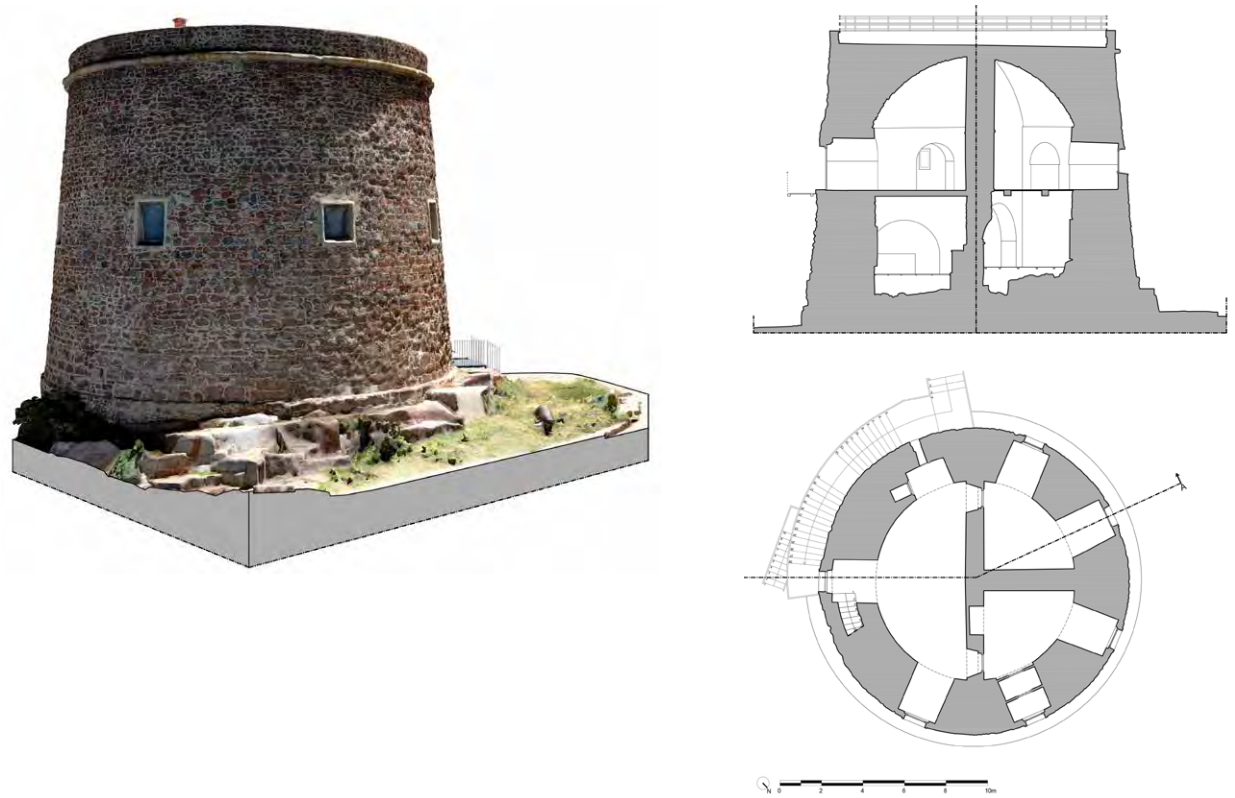
At the top of the hill overlooking the town, at the end of Marconi Street, stands the circular tower known as the 'torre Sabauda', or Savoyard tower (also known locally as the 'tower of the French' or the 'civic tower'), whose construction predates the one at Terranova (1746; Marongiu, 1977).

The structure, which has a diameter at the base of 16.21 m, and 14.03 m at the top, with a total height of 14.20 m[10], served both as military stronghold and watchtower. The wall is composed of uncut trachyte

been reconstructed, which, in the case of pitches parallel to the road, has sometimes been erected above the last row of roof tiles, which, therefore, protrude from the main facade, thus resulting in an 'peculiar' crowning element.

[9] Over the past decades, a rather flexible building regulation has allowed the indiscriminate use of incongruous materials in doors and windows and in wainscoting, as well of shading systems that do not belong to the local tradition, the installation of eave gutters on the main facades, and the construction of balconies using improper techniques, which have in part compromised the distinctive features of the Calasettan building tradition.

[10] Measured from the floor level on via Regina Elena, in axis with the second floor access door.



3D model, plan and section of the Savoyard tower
(credits: CHM_Lab)

stones of different sizes with horizontal recursions. Restoration interventions carried out to repair collapses, as well as tampering of the structure due to the enlargement of some windows and the probable reduction of the total height, are evident on its surface. A skirting made with ashlars larger than those above characterises the connection of the tower to the ground, while a projecting reinforcing rod can be seen at its top.

Access to the tower is placed at a height of 6.50 m, so as to make the tower impregnable in case of a siege. Six small embrasures suitable for firearms open in the wall thickness, which varies from 3.70 m to 2.60 m. The structure is divided into two levels: the lower one, accessed through a door added during the restoration works in the Eighties of the 20th century, has the natural rock as pavement, from which a central pillar rises forming three arches that support the new timber floor above. On the left side of the door there is an opening connecting to the water cistern.

The upper level, also divided by a spine wall, is covered by a two-coloured limestone 'basin' vault that supports the last floor, which is accessible by way of a stone staircase carved into the wall thickness and covered with a rampant barrel vault[11].

[11] Since 1875, the tower and the surrounding state land have been the property of the municipality of Calasetta. The ground floor of the tower currently houses an archaeological museum managed by the Macc foundation; the upper level, which is divided into three different rooms, is used for ceremonies or temporary exhibitions.

Perdas Nieddas tuna fishery

The Perdas Nieddas tuna fishery, located along the longitudinal axis of the promontory of Punta Maggiore in a North-Northwest/South-Southeasterly direction, is a complex that has been abandoned since the beginning of the 20th century, yet still preserves the remains of buildings for the processing of tuna caught in the nearby waters[12].

In the documented area there are two small buildings for the storage of salt, two sets of stoves for cooking the raw material, and the smokestack, which skillfully combines the use of brick elements, special pieces, and sandstone blocks.

The two sets of stoves, 11.40x2.43 m and 15.08x2.43 m partially buried parallelepipeds, have five and seven holes, respectively, which open on the horizontal surface into large circular vents; metal receptacles were placed in these vents containing the chunks of tuna. On the only long side above ground and at each opening there was a hole for feeding wood to the fire, while also serving as an air intake. On the opposite side, a further hole served instead as a forced draught, allowing combustion fumes to be channeled through underground pipes to the smokestack, where, thanks to the chimney effect, they were expelled at a height of 7.52 m.

Intangible heritage

The intangible cultural heritage in Sant'Antioco includes a wide range of traditional knowledge and practices concerning the management and conservation of natural resources, including traditional agricultural techniques, the balanced management of the land to prevent erosion and ensure agricultural production, and the processing of products derived from agriculture and spontaneous vegetation. The island's Mediterranean scrub is a resource for producing not only crafts but also food products: the mastic tree, for example, was used to produce oil, which was consumed when olive oil was not available; from the dwarf palm tree, traditional brooms of various sizes are still produced today, by processing and plaiting its dried leaves.

The cultural identity of Calasetta was influenced by the cultures of the Genoese and Piedmontese populations who founded and inhabited the city. The commonly spoken language is the *Tabarchino* dialect, which is a unique blend of Ligurian and Sardinian, inherited by the migrants from Tabarka who founded the city. The Tabarchino dialect finds expression in stories, popular songs, and serenades. Tabarkan traditional customs are also deeply rooted in the gastronomic traditions and popular festivals (such as the Feast of San Pietro and the Tuna Festival).

A valuable experience of enhancement of the Tabarkan culture has been conducted by the Millepiedi

[12] The tuna fishery was built in 1772 under commission of Giovanni Porcile, captain of the Royal Sardinian Navy, yet its stopped operating after only one year. From the year 1773-74 it was granted to the Order of Saints Maurice and Lazarus, and despite numerous changes of ownership and incidents, it continued to operate until the second half of the 19th century. The buildings used for the processing of tuna were built during the second half of the 19th century. The present spatial distribution only partly reflects the way it was originally, because the large area where the nets were prepared and the boats were stored is now devoted private residential purposes (Contu et al., 2006).

and opposite page
Pictures of some of the activities done during the workshop in the island of Sant'Antioco

Workshops and field trips with artisans, interview and seminar
(credits: authors)

association, which, in the framework of the project Raixe - financed by the Region of Sardinia - has created a permanent exhibition and a digital archive aimed at fostering the dialogue between the local cultural associations and providing a place for the sharing of memories, knowledge, and know-how. The five itineraries of the exhibition show the elements that represent the intangible heritage and the cultural identity of Calasetta: history, memory, cycle of life, cycle of the year, traditional crafts, and activities.

Versus+ strategies applied

In the framework of the *VerSus+* project, several research and educational activities have been carried out. Among these, the project partners UNICA and UNIFI have run a joint didactic programme that involved students of the Master Courses in Architecture at the two Universities. During the period of one semester, about 25 students were called upon to assess four main subjects: the local cultural landscape, the relation of the people with the sea, the living heritage, and the urban morphology.

The goal of the course for the attending students was to develop skills to analyse, understand, interpret, and communicate the local heritage values of a place that was still unknown. The course, attended jointly by the students of the two universities in a combined form (online and in-person classes), included an on-site workshop where the two groups came together.

According to the variety of the analysed topics, the activities ranged from interviewing artisans and producers, documenting some of the major activities on the island, such as agriculture, fishing and their related production, to analysing the architectural and urban peculiarities of the island and of Calasetta in particular. During the workshop in Calasetta, students and researchers interviewed local scholars, masters of dry stone walls, shipwrights who still preserve the art of making wooden boats, craftspeople

who make brooms from dwarf palm leaves, fishermen, grape and black lentil growers, serenade singers, and producers of typical gastronomic products. Four buildings, representative of Calasetta's cultural heritage, were surveyed using active sensors (laser scanners) and passive sensors (cameras for terrestrial and aerial photogrammetry) to produce graphic drawings and 3D models: a rural traditional building (*baracca*), a productive structure (the ancient trap of Calasetta), the Savoyard defensive tower of Calasetta, an urban building hosting a digital exhibition, and one of the main streets of Calasetta.

The tangible and intangible heritage was documented through sketches and technical drawings, videos, photos, and descriptive texts, which have been uploaded onto the *Heritage for People* Web App created as part of this project. The reported analysis served at the same time as the basis for the creation of serious virtual games. The four games set up in Calasetta by the students addressed the authentic spirit of the island in connection with the landscape, the urban settlement, the relation of the population with the sea and, finally, with the local living traditions. All games can be played by scanning with the cellphone a QR-code to be found in very frequented corners of the village. From there, a narrated story accompanies the player into the discovery of the history of the settlement, as well as of the peculiar traditions of the island, including a local language, music and songs called *serenate*, the art of shipwrights, and a wise, respectful use of the landscape for living and for production.

Lessons of sustainability

The analysis of the traditional tangible and intangible heritage of Sant'Antioco has given us the chance to understand the richness of its cultural value, which is the result of a skillful combination of resources linked to a limited geographical context and the ability to embrace diverse cultural influences. The

Local artisan working with Mediterranean dwarf palm
(credits: authors)

traditional architecture of Sant'Antioco harmonises with the environment: the few resources available are used sparingly and intelligently. The small rural buildings are adapted to the local climate: they have thick stone walls with high thermal inertia, a compact shape for reducing the surface area exposed to external temperatures and minimised openings to reduce heat gain from the intense summer sun. The position of the openings on opposite sides of the building – the south-east door and the small window to the north-west, Mistral wind direction – facilitates cross-ventilation, allowing cool breezes from the sea to pass through the interior spaces and promote airflow. Rural and often traditional urban dwellings incorporate rainwater harvesting and storage systems to supplement water supply during dry periods. The position of the plants within the plot is also designed to enter into a dialogue with the local microclimate. The use of locally sourced, low-transformation building materials not only reduces environmental impacts but also contributes to the architectural identity of the area. Handcrafted products made from the materials available on the island show expert knowledge of resources, great creativity in processing raw materials and developing circular processes, and a deep respect for nature. Simple but not obvious lessons in sustainability, in an era when saving resources and reducing waste are two mandatory rules to ensure the survival of biodiversity and of the next generations.

In an island where tourism is the main source of the economy, traditional architecture and cultural heritage can play a key role in a development that is more in harmony with the environment, society, and culture. Encouraging cultural and experiential tourism, while experimenting with forms of diffuse hospitality, could enhance rural heritage, which is currently largely abandoned or subject to processes of profound transformation that erase its identity features. But it can also generate new opportunities for young people and thus reduce migration. The intangible heritage, including the gastronomic and Tabarkan traditions that have survived over the centuries and still constitute important aspects of the identity of the place, must also be considered as elements to trigger innovative forms of tourism and social economy, capable at the same time of safeguarding the environment and the territory.

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