

The Modern-era technique of the semi-rupestrian architecture in the Matera area (Italy)

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Abstract

During our extensive surveys in the Matera area, we have encountered a significant number of artificial cavities characterized by an unusual type of architecture. The main common architectural feature is a completely built roof, and at the same time mostly dug-in-the-rock vertical walls. We may call this architecture “semi-rupestrian”, but we have to keep in mind that usually this word is used to define a completely different kind of structure. Indeed, in an usual semi-rupestrian architecture, there are two different areas: a completely rupestrian volume (a proper artificial cave), and in front of this, as a forepart, a completely built volume. The entire building itself is then called “semi rupestrian”, as it is composed of built and rupestrian elements, contiguous to each other. This will be quite clear if we take the roof into account: in the same room a completely built roof is followed by a rock ceiling, as we enter the cave-part of the structure. So the building as a whole is a semi-rupestrian architecture, but the single elements are either entirely built or entirely rupestrian. A completely different scenario is experienced in the semi-rupestrian structures we study in this essay. In all of our cases we'll have the lower part of the structure directly obtained shaping the rock, creating in this way the vertical walls. Sometimes all the four walls, most of the time three out of the four walls. In some cases, a built roof is grounded directly on top of the rocky walls. More often, the rocky walls are extended with a built part, and then a subsequent built roof. Even though this is a preliminary study on an unbeaten field, we have already cataloged nearly 20 structures and we can define the most usual patterns. The usual shapes of our semi-rupestrian structures are rectangular. They are usually built on steep slopes of ravines or on the edges of quarries. All of them date from the XVII to the XIX century, a clear sign of an evolution of the typical medieval semi-rupestrian architecture where we have a proper building and a proper cave contiguous to each other. We might even call this a Modern-age semi rupestrian technique. In one case it is a church within the city of Matera limits, in all the other cases they are part of countryside villas or rural farm houses dedicated to the breeding of sheeps, cows, horses, goats, bees. A very similar technique is used for rural cisterns, very well known in the area as “*cisterna a tetto*” or roofed cistern, where the cistern itself is dug in the rock as a square pool, but the roof is built on top. This kind of cisterns also date back to the Modern age, and after our study, they can be thought as a specific type of our semi-rupestrian structure, shared with many other artificial cavities, as stables, storages, beehives, villas. We found a few other examples of this technique in the mediterranean area, but nobody so far focused a study just on them. A few cases can be the Cisternale di Vitignano and the church of San Basilio in Lentini. In Syria the famous Saint Simeon has got a built roof, and a few examples are in Cappadocia, where this technique is used for houses and storages, according to the Seljuk tradition.

Keywords: Matera, semi-rupestrian architecture, Sassi of Matera.

Introduction

In the years 2020 and 2021, we have conducted extensive searches in the Matera area, in order to catalog every single historic structure, as we personally worked on the Municipality Record for historic structures (*Catasto dei beni culturali del Comune di Matera*). More than 1.000 historic sites have been visited, photographed, described and cataloged. They belonged to a very different array of sites: buildings, museums, churches, farm-houses, old factories, monuments, theaters and so on. Among them there were all Matera's artificial cavities, both in the city and in the countryside (in the Municipality Record they are a few thousands, sometimes cataloged as a single unit, and sometimes grouped in rock-hewn settlements). This extensive and unprecedented work has given us the chance to determine the general aspects of our historical heritage, including its evolution and every little detail. Also all the man-made caves have been deeply

studied, allowing us to detect standard practices and common architectural features.

The Sassi of Matera

Matera is worldwide famous for its rock-hewn settlements, rock churches and above all for its old districts called “Sassi”. Even though a common narrative portrays them as “prehistoric dwellings” and they are very often perceived as “natural caves”, the truth is that the caves of the famous Sassi are entirely man-made, and the vast majority of them were dug during the Middle age (Rota 2011, Fonseca Guadagno Demetrio 1998, Restucci 1990).

Moreover, if we take into account the cubic meters of volume, the 18th and 19th centuries had a huge impact on existing man-made caves and on the excavation of new ones. There were two main goals for artificial cavities in Matera: firstly, they were proper quar-

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ries during the excavation, providing blocks that were used as building material. In second place, most of them were dug to be used as storages for goods (wheat, wine, cheese, olive oil, beans), productive facilities (tanneries for leather, olive oil mills, wool factories) or to breed animals (bees, goats, hens, sheeps). Two more functions can also be found: a religious one (rock churches or funerary chapels) or a residential one (cave-dwellings). The function of each cave was not a permanent one: it was extremely common for a cave to constantly change its function, and be converted from one usage to another. When this occurred, caves were usually adapted to their new usage through enlargements or heavy modifications of their shape.

The Casalnuovo is a peripheral area of the Sassi, showing nearly a hundred caves, without any built forepart: these caves had been dug between the 16th and 18th century as wine cellars (Foschino 2020), exploiting the north orientation, that prevented the sun to enter into the caves, increasing the temperature (which would have damaged the wine). So in the Casalnuovo area we have an entirely rupestrian architecture: structures consist entirely of man-made caves. Indeed, this practice does not represent the standard in the Sassi area: by far the most common condition is a semi-rupestrian structure, where a built forepart and a man-made cave are created, simultaneously, one in front of each other.

The traditional technique of the semi-rupestrian structure in Matera

The old city of Matera (Sassi) is settled in soft limestone valleys and hills, overlooking a deep canyon, so the usual condition is a rocky slope. The first action was to dig a ledge (in Italian: *cengia*), which means to remove a certain volume of rock from the slope, with the purpose of creating an horizontal space (in order to accommodate a street or a courtyard), and a perfectly vertical cliff (useful to start the excavation of man-made caves; Tab. 1). In case the area was flat, the ordinary solution included the digging of a trench, and then a cave was dug on the vertical cliff. Another option would have been to dig a wider area, as a small crater, connected through stairs to the planking area, and then all the caves were dug all around the cliffs of the small crater (Tab. 2). For further insight please refer to: Dell'Aquila and Messina 1998.

At this point a building was then built in front and on top of the caves. In case the built floor was on the same level of the cave, the cave and the building created a single big volume, partially built and partially dug. Looking at it from outside, the cave is completely invisible, as it is hidden behind the building. Once the door is crossed, we'd be in an entirely built room, with a built ceiling on our heads. If we'd keep walking, at some point we would exit the building and enter the caves, in a continuous volume, nearly inadvertently. So two contiguous and continuous volumes stand next to each other, an entirely built one and an entirely dug one. According to the steepness of the slope, a second or a

third floor might have been built on top. In this case, they could have been partially dug and partially built, exactly like the ground floor, or they might have been entirely built. In any case, each floor has got an independent entrance: we never encounter internal stairs. Each floor is reachable independently from the outside, sometimes the entrance doors are located on different sides of the structure, as indicated on the tables, where the arrows point to the entrances.

This is the ubiquitous technique visible in the Sassi area of Matera, and it is the most common to be found also in the surrounding area and in the neighboring region of Apulia (in rupestrian settings).

Indeed, this is considered an usual semi-rupestrian architecture, where there are two different areas: an entirely rupestrian volume (a proper artificial cave), and in front of this, as a forepart, an entirely built volume.

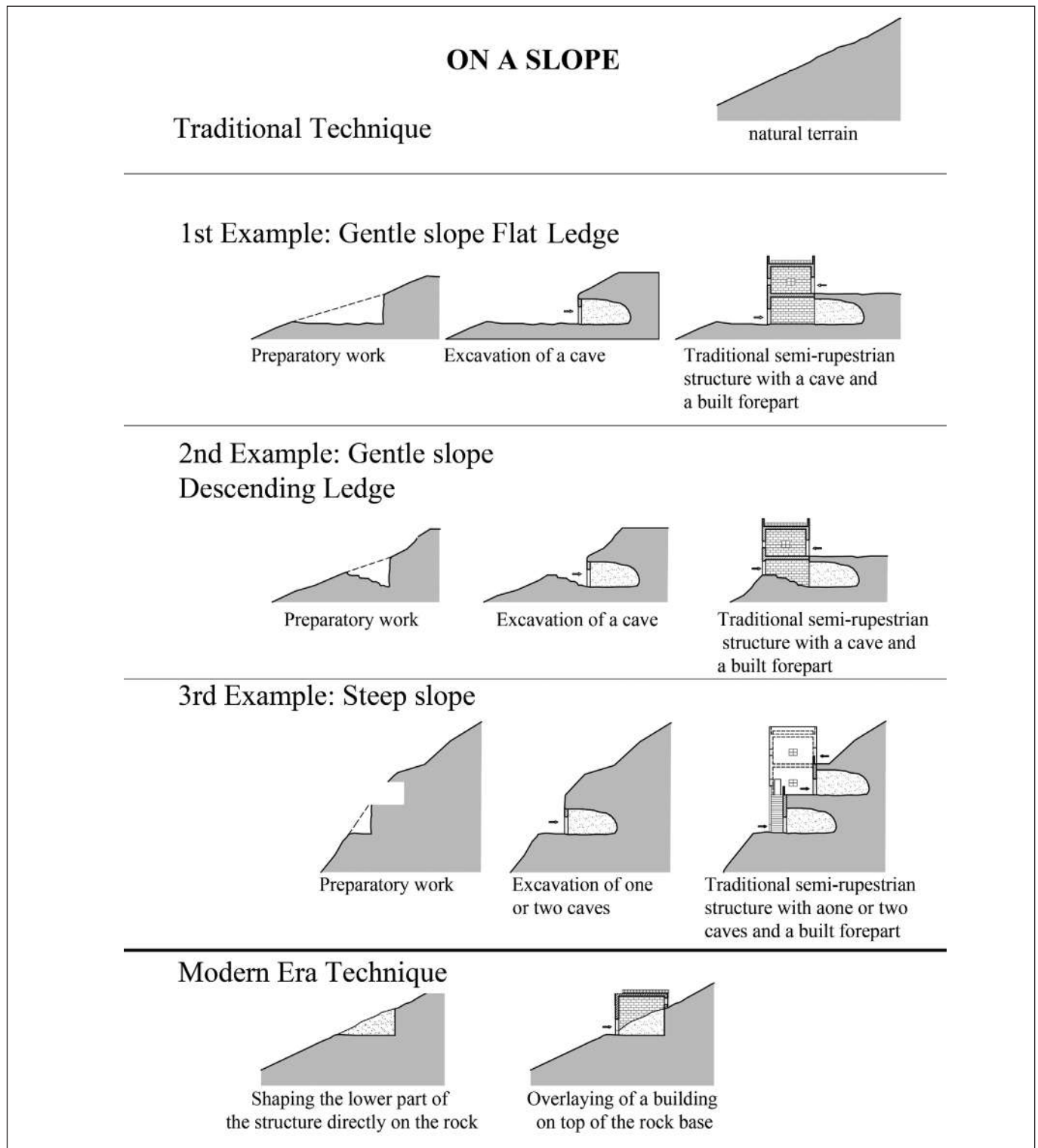
The Modern-era technique of the semi-rupestrian structures in Matera

The traditional technique is also quite common in the countryside area, but quite surprisingly, it can not be defined as the standard practice, as it is in the city. Indeed, we noticed that many of the structures built on the countryside, on a limestone area, were not created as usual semi-rupestrian structures, where there is a building as a forepart of a cave.

On the other hand, in all of these cases, the bottom half of the structure is dug out of the rock, and the top half of the structure is a regular building. So only the lower part of the structure was obtained from and into the slope, directly shaping the rock, in order to create the bottom part of the vertical walls. Usually three out of the four walls were obtained in this way, but in many cases this number may differ (rarely all the four walls, sometimes only two of them, never only one). This worked as the base for the built walls. On top of the rocky part, indeed, then a proper wall was built in continuity with the rock part, and eventually an entirely built roof. In some cases, a built roof is grounded directly on top of the rocky walls. More often, as said, the rocky walls are extended with a built part, and then a subsequent built roof. In all of these cases the roof is always built, so it is a completely different case than the traditional semi-rupestrian technique. Please refer to Tabs 1 and 2 for further insight. If we take into account a traditional semi rupestrian structure, if we remove the building out of it, for the sake of this example, we would be left with a proper man-made cave.

In these examples, if we remove the built part, we would be left with the bottom half of it, which is just the lower parts of the walls.

Luckily we have found a few cases where the structure had not been completed, where no built part was added, which can be very helpful to fully understand this technique. If we look at the two cases we show here (on a gentle slope and on the flat, fig. 1) it is possible to see the preparatory work on the rock, result-



Tab. 1 – Graphic rendering by Sabrina Centonze.

ing in the lower part of the future walls. As it is clear, the rock had been shaped in order to accommodate a built extension (which, in these cases, never occurred). We refer to it as “Modern-era technique” as all cases we have found in Matera can be chronologically determined in a time range between 1710 and 1880. No semi-rupestrian structure before 1710 was created in this way. Moreover, this appears to be the standard technique in the 18th and 19th centuries.

The Modern-era rock-hewn architecture in Matera

As we stated in the introduction, a huge volume of man-made caves has been dug in the 18th and 19th centuries in Matera. The most common reason was to create productive facilities that could exploit the natural advantages of the caves, thanks to their micro-climatic conditions. The improvements in the trans-

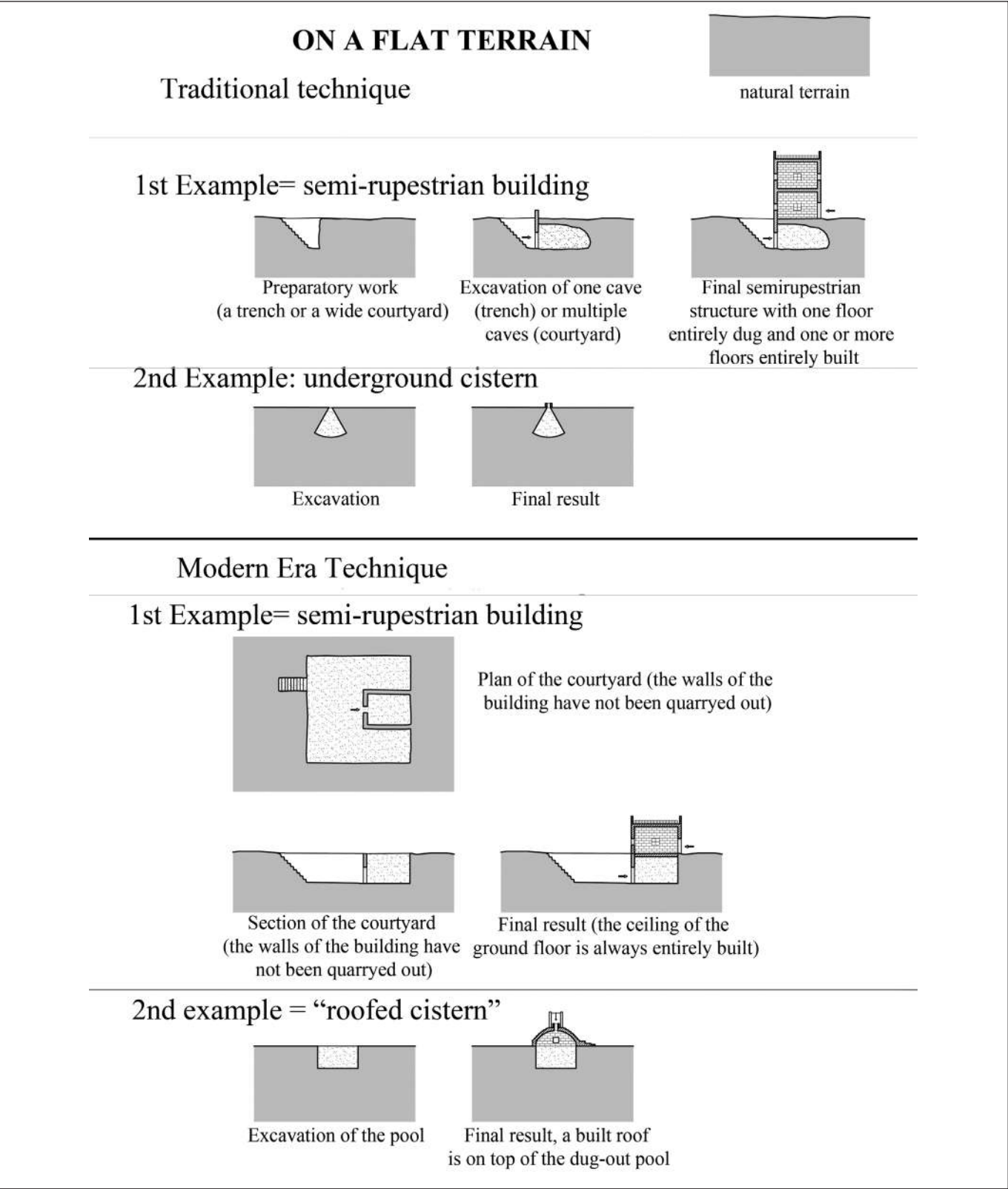




Fig. 1 – Uncompleted structures of the Modern-era semirupestrian technique of Matera: on the left an example on a flat terrain (at Casino Plasmati) and on the right an example on a slope (not far from Casino Passarelli) Antros Archive.

buildings with a wide range of functions: the residential part, the stables, the mills, the storages. In case a masseria was built on the limestone, the standard practice was to create a semi-rupestrian structure according to the new technique we just described, which unfolded differently according to the nature of the terrain, as we are now going to describe. Please keep in mind that in all cases these Modern-era structures always have a perfect rectangular shape, always an entirely built ceiling, and always a rural function: stables, storages, sheds.

The Modern-era technique on a flat terrain

On a flat terrain a proper quarry will be started, removing layers of rock. During the quarrying, some portions of rock will remain untouched, as these will be the perimeter walls of the building. The planking area will correspond to the first floor of the building, meanwhile the quarry level will be the ground floor. On the inside part of the rocky walls a recess was usually left, in order to accommodate the blocks of the vaulted ceiling (as visible in fig. 1). Once the quarrying was completed, using as building material part of the quarried blocks, the ceiling and the upper floor were built. In this scenario all the four walls of the ground floor are directly shaped into the rock, and for the entire height: no parts of the walls are built. The built part consists of the vaulted ceiling and of the upper floor. In one case, Casino Plasmati, the thick rocky walls had also been pierced, in order to accommodate a beehive (fig. 2).

The Modern-era technique on a slope

According to the traditional technique, at first a ledge was dug on the rock. According to the Modern-era

technique, the work for the ledge actually becomes the preparatory work for the building itself, as the slope is directly shaped to accommodate the vertical walls. Contrary to what happens on the flat terrain, the four walls can not be entirely shaped into the rock. As we are on a slope, the rock part will have different heights: the side that goes deeper into the slope can be entirely made of rock, the most external one will be mostly built. Usually the entrance side is the most external one, so the facade of the building is partially -or even entirely- built. The back wall, on the opposite, is entirely shaped into the rock (fig. 3). The two side walls have an ever increasing amount of rock: close to the entrance they are mostly built, close to the back they are mostly dug into the rock. A vaulted ceiling is then built on top of this structure. The extension of the vault goes above the planking area, making room -sometimes- for a window on the top part of the back wall, very useful for ventilation or to use it as an access point for tools, goods, and straw. We have also found a few cases where the most external side is not the facade, but a side wall. For example, at Masseria del Cristo, the right side is entirely shaped into the rock; the left side is mostly built, and the front and the back sides are partially built, whose rock parts go decreasing from the right to the left sides (fig. 4). Other cases have been found and studied in the Matera areas: Masseria Ridola, Casino Passarelli, Casino Staffieri, Iazzo di San Bruno, Masseria San Francesco at Selva Venusio, Casino Plasmati, Casino Zagarella, Iazzo di Pantone, Casino Padula, Masseria Selva Teresa.

Water cisterns

This technique has also been applied to water cisterns. The usual medieval cisterns were entirely dug into the rock, and the shapes were usually



Fig. 2 – Casino Plasmati: an example of a Modern-Era semi rupestrian structure on a flat terrain. The walls of the ground floor are entirely shaped out of the rock (beehives grids are visible on the wall) and an entirely built floor is grounded on top. Antros Archive.



Fig. 3 – An example of the Modern-Era semi rupestrian structure on a slope, with the back wall entirely shaped into the rock. On the left lazzo di San Bruno, outside. On the right, Masseria Selva Teresa, inside. Antros Archive.



Fig. 4 – Masseria del Cristo, an example of the Modern-Era semi rupestrian structure on a slope, with the side wall entirely shaped into the rock. The built part of the back wall partially collapsed, highlighting the mixed type of architecture. On the side walls the mangers have been dug into the rock. Antros Archive.



Fig. 5 – Masseria Passarelli, a roofed cistern: external and internal view. Antros Archive.

wide at the bottom and more and more narrow to the top, giving just enough space for the well at the opening. Cisterns might have been shaped as a bell (or a pear), similar to a cone; or as trenches, wide at the bottom and narrow on the top. In the 18th and 19th centuries, simultaneously with the struc-

tures we are describing here, a new kind of cisterns were implemented, the *cisterna a tetto*, or roofed cisterns. In this case a proper pool is dug into the rock, with a rectangular plan (a parallelepiped in volume), and then an entirely built vaulted ceiling is overlaid on top (fig. 5). Also, the roofed cisterns



Fig. 6 – Example of the technique in other areas of the world: Colonne di San Basilio in Lentini on the left and Saint Simeon in Syria on the right. Ph. Franco Dell'Aquila.

date back to the exact same time frame of the rural structures: 18th and 19th centuries.

A few cases of the same technique in other geographic areas

This technique, where the bottom part is shaped into the rock and the top part is built, is typical of the Modern-era rural structures in the Matera area. As we looked for comparisons, we have found a few other cases in other areas of the world, where this technique has been used in previous ages.

In the Apulia region, roofed water cistern are extremely common, and an old predecessor can be found: the Cis-

ternale at Vitignano: in this case the roof is not vaulted, but it is flat, and the stone slabs are supported by pillars, purposely built into the pool. A similar example can be found in Sicily, in Lentini, where an enigmatic structure shows a bottom part entirely shaped into the rock, and built pillars supporting stone slab, but its date and purpose are still unknown, and they are usually referred as “*Colonne di San Basilio*” (fig. 6 left).

In Syria, the famous Saint Simeon is partially dug into the rock (Ḥajjār, ‘Abd Allāh., 2019), and the upper part is built on top of it, and the entire structure dates back to the 7th century (fig. 6 right). A few other examples can be seen in Cappadocia, where dwellings and storages sometimes have an entirely built ceiling, as in the seljuk tradition.

Conclusions

This pioneeristic search explored a little known technique, refined in the Modern-era, with important predecessors in the wider mediterranean area. Further studies in the future might help to understand the actual extent of this technique, expand the comparisons of cases, and help to determine how and why the traditional semi-rustic technique was replaced by the Modern-era one.

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