

In the shadow of Vesuvius. Sustainable and bioclimatic lessons from a vernacular heritage

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Topic: T1.1. Study and cataloguing of vernacular architecture

Abstract

Downstream of the Somma-Vesuvius volcanic complex, the countryside records the flourishing of communities based on agricultural economies that have been facilitated, since the early modern history, by the fertility of the land, the mildness of the climate and the favourable location with respect to the natural routes of communication. The adaptation and dialogue between this territory and man led to the realization of the so-called “masserie”, the articulated rural artefacts, mostly developed on a primitive compositional structure at court, in which residential and working functions seamlessly co-exist. The paper discusses the sustainable and bioclimatic solutions for building and running evidence of this volcanic vernacular system, to inquire how the constructive knowledge, based on the awareness of the properties of local materials, has given solutions to various needs. Indeed, the peasants used the different characteristics of the various igneous rocks, exploited to their maximum performance capabilities, to realize rubble masonry, light vaults, outdoor flooring, and even fixed furniture. In the same functional and “green” resource use, the plan layout follows a distribution corresponding to the best use of the sun and its effects on environmental optimization, and the rainwater collection system connects multiple wells to the underground tank whose position, spatial conformation and materials are expertly engineered. The study finally deepens a case study (the masseria of the Duke of Salza) representing the application of local building tradition in terms of construction features and typological aspects, and the evidence of the history and vulnerabilities of the Vesuvian land. In addition, the specificities of the masseria sample allow mastering the functioning of the whole building organism and the quality of the finishes, which demonstrate how, in their formal simplicity, these vernacular “monuments” were soberly embellished and complexly designed.

Keywords: Vesuvian masseria; ancient bioclimatic strategies; building tradition.

1. Introduction

In ancient times, the current municipality of Somma Vesuviana formed the hilly and economic relevant (De Simone 2008, p.329) area of the wider territory, immediately north of Vesuvius, that divided Naples from Nola and approached the borders of Herculaneum and Pompeii. After a first land management from

the superimposition of Nolan centuriation systems (Pardo 2001) the territory of Somma witnessed a general administrative and structural reorganization carried out by the central Roman government between the I century b.C. and the I century a.C. (Migliaro 1995, p.90), that involved the establishment of numerous rustic settlements, in the higher foothills (D’Avino, 1984, p.5) close to the sources of

streams and free from swamping¹. The fortified medieval centre of Somma grew away from the plain which, reduced to woodland after the fall of the Roman Empire, developed thanks to the Anglo-Norman and Aragonese expansion of religious orders, and the subsequent investments of the large feudal families of the Kingdom.

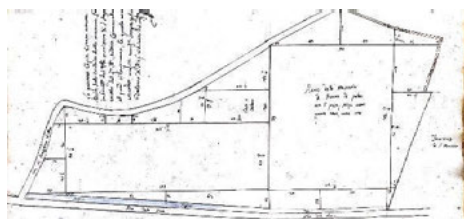


Fig. 1. Detail of a territory in Somma owned by the Chartusians of the Monastery of St. Martin in Naples (Source: S.A.N., *Corporazioni religiose soppresse*, vol 2329, f.16)

The latter, urged by the Viceroy Don Pedro of Toledo to leave Naples, moved to the fertile rural vesuvian land (Canino 1981, pp. 127-128). The discretization of the territory shaped the system of the so-called *masserie*, architectural complexes with residential and productive vocations, realized by expanding pre-existing structures or building new ones – in dialogue with the surrounding landscape of natural and artificial riverbeds, gardens, fields and sporadic road arteries (Cennamo, 2002, pp.101-102).

2. *Masserie* in the countryside of Somma

2.1. Mapping and typological analysis

As highlighted by overlapping eighteenth and nineteenth-century cartographies and a satellite image of Somma Vesuviana, more than twenty *masserie* still remain in the countryside, albeit abandoned or completely renovated, allowing the comparative reading for a typological analysis. These vernacular architectures were part of microsystems that included fertile farmland delimited by roads or stone ends, small artifacts and,

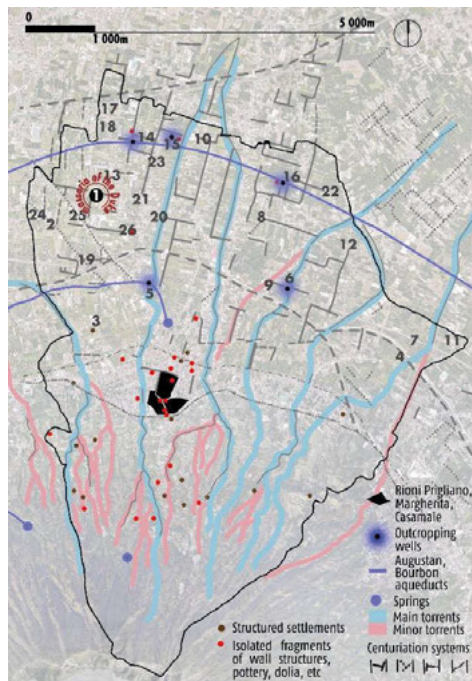


Fig. 2. Chart drawn by interpolating bibliographic sources (D'Avino 1984; Pardo 2001; Cirillo 2003), cartographies (Rizzi Zannoni 1793; Marchese 1799-1800; ROTN 1817-19; Amedei, Leonardi et al. 1876) orthophotos, and hydraulic risk map. The black line is the municipality of Somma. The *masserie* identified, from 1 to 26: Duke of Salza, Starza Vecchia, Starza Regina, Pigno, Resina, Santa Chiara, Serpente, Alaia, Ciciniello, Cuomero, Di Siervo, Madama Fileppa, Paglietta, Sant'Anna, San Domenico, Montesanto, San Giorgio, Pratico, Mele, Allocca, Guidi, Cammarelle, Castagnola, Panico, Villa rustica, Allocca (author's elaboration)

sometimes, dovecote towers (Guarniero & Pagano, 1936, p.77) or rural residences with the exclusive function of dwelling (*case palazziate*). Many *masserie* in Somma were developed with a courtyard layout featuring at least two large arched entrances for carriages. Full-height spaces or small rooms in succession expand around the centre, lacking space limitations or problems of soil irregularities, which instead affected the urban contexts and areas at higher altitudes. A farmyard, often detached from the perimeter of the main building², and a small walled orchard

¹ In the *ager nolanum*, the discovery of wooden finds, sometimes worked and in a good state of conservation, testify the possible reclamation interventions by man (Castaldo, Vecchio, 2011).

² To allow its use also to the settlers of the surrounding fields (Venuto, 1777, p. 280).

complete the plan of outdoor areas. The rooms, entrances, and stairways are structured by use destinations. It follows that the spaces hosting the owner are distinct from the one connected to the work in the fields, there are two different kind of cellars, one for aging and one for production of wine, the stables feature a bipartition between places destined to farmyard and those for draft animals. The distribution of the rooms respects precise criteria as well. The cellars are optimally ventilated and placed underground facing north to avoid the sunlight, a primary requirement for the conservation of wines. The apartments are often located on the opposite side, with large terraces above the coating in wrought lapillus. The stables, preferably positioned in the eastern wing, open towards the courtyard, while the chapel connects to the outside both in the main and internal facade. Finally, the attics used for the conservation of food, the storage of hardware, seeds and hay, crown the first floor and shelter the apartments below from winter cold and summer insolation (D'Avino 2006). Far from the water springs of the mountain, the roofs are also equipped with systems to convey rainwater into underground cisterns, even if in a few cases, the passage of the Augustan aqueduct ensured the water supply with outcropping wells³.

2.2. The construction tradition: lessons from local master builders

The techniques, technologies and construction systems adopted in most of the architectural elements of the *masserie* in the countryside of Somma can be referred to simple structural typologies, made exclusively with local resources of igneous and wooden materials. The oldest masonry is made of *scheggioni*, shapeless volcanic stones coming from the crushing of the original block with thin and sharp ends that fit into voids. The application of this technique required that the stones, previously wet, were arranged with the widest base downwards and that every step of work finished with the laying of smaller and

spheroidal stones, the *scardoni*, which better settle on the mortar bed. The same masonry is often used with dry technology for the borders of the threshing floors, surrounding walls and animal shelters, while additions or maintenance interventions made use of blocks of tuff imported from nearby Naples. The windows, proportionate to the levels of lighting, ventilation and environmental optimization required by the function of each room, generally mark the facades with rec-



Fig. 3. Masonry of scheggioni in the masseria of Starza Regina (Source: Author 2021).

tangular geometries in correspondence with the above-ground floors, while smaller square openings light up the basement rooms. Furthermore, articulated shapes such as those referable to the lunette semicircular compartment located on the doors, or the oval ones to ventilate the chapels and the main halls, enliven the sober elevations enriched only by a few moldings. On the other hand, the interiors offer finer surfaces with frescoes depicting festoons or figures, a few stuccos and decorated papers. Vaults and wooden floors cover spaces sized on needs, and a boulder formed by white and black lapillus and mortar wrought overhangs and protects the horizontal structures, even in clay (*lastrico terraneo*). The light vaults, mostly with sail, simple barrel or with lunettes⁴, are built of pumice, lime, and pozzolan cast on ephemeral mounds of soil or wooden scaffolding and overtop cellars, stables, and the chapel. The other rooms, especially on the upper floors, are hedged by wooden structures made up of rough-hewn chestnut main

³ For example those present in the *masserie* of Santa Chiara, Montesanto, San Domenico.

⁴ Even if there are other geometries.



Fig. 4. A section on the courtyard of the *masseria* of the Duke of Salza. The section intercepts the cistern, along the shorter side, the room on the groundfloor where there was the *scalandrone*, a stable with the upper terrace, the meeting hall in the apartment of the administrator and the attic. On the background, there's the loggia facing the courtyard (Source: Author, 2018).

beams and rough transvers beams, decorated with “wrapped” (*incartate*) on the intrados or hidden by false ceiling in wooden frame and paper finishes (Aveta 1987, pp.164-170). Peculiar pitched structures configure the coverage trusses, usually designed with simple arrangement as two struts joined at the bottom of the chord and at the top of the king post. Webs are sometimes added to reduce the free deflection span of the struts. Purlins, beams, and battens complete the structural part of these roofing systems. The backed clay tiles are finally installed. The most common type of covering is made up of trapezoidal tiles, (*embrici*), on the top of which curved ones are superimposed forming gaps in the foreheads, sealed with punctual applications of rough mortar (*palombelle*).

3. The *masseria* of the Duke of Salza

In a side street of the road that connects Pomigliano to Somma, the *masseria* of the Duke of Salza stands in the center of a driveway, acting as a traffic divider between the two directions of travel. Despite the poor state of conserva-

tion, this example of Vesuvian rural architecture is an excellent case study thanks to the archive sources and the not excessive contemporary manipulations.

The *masseria* was built on commission from Strambone family⁵ as an extension of a previous architectural artifact purchased in the first half of the seventeenth century⁶, perhaps consisting of the northern part of the *greco* cellar⁷, the eastern body and the cistern. After the death of the Duke of Salza in 1749, the Pio Monte della Misericordia, a secular charity organization, inherited the *masseria* with the explicit condition imposed by the testator not to sell, exchange, nor rent it⁸. This clause entailed the continuous maintenance of the building led by an administrator of the Pio Monte, with the collaboration of farmers for the management of agricultural and production activities⁹. The backdrop changed with a Bourbon decree that enabled the sale of the *masseria*, besides the apartment on the first floor, so that the property passed to the business partners

5 Noble family of Naples belonged to the Sedile di Porto (De Lellis 1663, p. 307).

6 State Archive of Naples (S.A.N.), *Notaries of XVII century*, Nicola Maione, vol.4, ff.34-35; Historical Archive of Pio Monte della Misericordia, *Fondo Patrimonio*, Cat.B, Rub.e, n.XIV, fasc.16.

7 *Greco* is the ancient white wine products in the *masseria* (Historical Archive of Pio Monte della Misericordia, *Fondo Patrimonio*, Cat.B, Rub.e, n.XIV, fasc.17).

8 Historical Archive of Pio Monte della Misericordia, *Eredità*, Cat.B, Rub.b, n.LV, fasc.1, ff.4-5.

9 The collaboration was regulated by a guide (Venuto 1777).

Forquet, Giusso and Olivieri¹⁰. Vintage photos¹¹ prove that *masseria* has operated at least until the 1970s, even if there are no documents about interventions or further changes of ownership after the first sale.

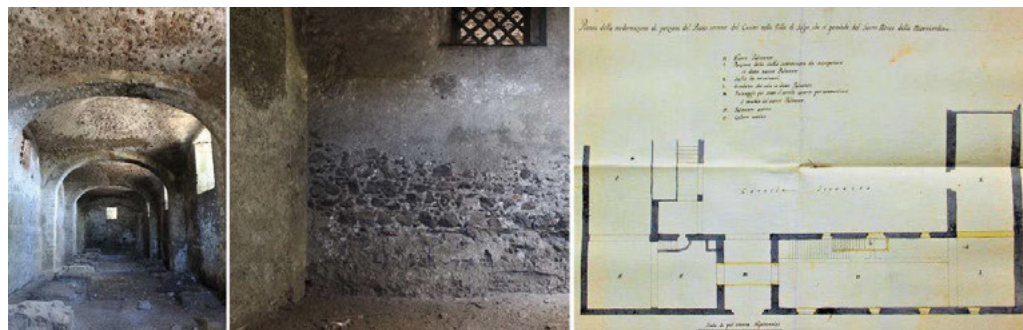


Fig. 5. Spaces in the *masseria* of the Duke of Salza, for aging and production of wine. The first photo represents the late eighteenth-century cellar, whose left wall is in adherence with the *cellaio*. The second photo shows the right front of the *cellaio*, where the traces of the old *lastrico terraneo*, demolished in 1761, are evident (Author, 2018). The last image reproduce the eighteenth-century project of the enlargement of the *cellaio* (Source: H.A.P.M.M., Fondo Patrimonio, Cat.B, Rub.e, n.XIV, fasc.32).

The case study qualifies as a pre-industrial wine factory and consists of a square-shaped building developed on three levels, with an open courtyard in the center overlooked by the external *distesa*¹² staircase (Cennamo, 2006, p.188), the rooms on the ground floor, and the windows and terraces of the apartment above. Two portals in igneous stone with monolithic jambs, facing respectively east and west¹³ in asymmetrical position with respect to the center, lead to barrel-vaulted hallways¹⁴ that guarantee access to the courtyard from a public road, closed with gates in 1765¹⁵ and perhaps part of the Nolan centuriation. Likewise, the walled garden adjacent to the building had double arched accesses, located perpendicular to the north-east corner of the main front of the *masseria*, and in the diametrically

opposite point along the perimeter of the fence. Inside this *hortus conclusus*, fruit trees grew for the subsistence of the administrators¹⁶, while in the surrounding fields the landscape was characterized by vines cultivated in *arbusta*¹⁷, that is

“married” to live brackets according to Etruscan customs (Buono & Vallariello, 2002, pp. 55-56). Thirteen octagonal pillars with stucco enclose a third garden, the backyard¹⁸, forming a filter between the fields and the facade. Few openings interrupt the linearity of the front and, in the case of the chapel and the cellar, provide direct entry to the inside of the *masseria*. A ramp paved with large basaltic boulders leads to the basement, facilitating transport by carriage, and leans on a pavement partly in *lastrico terraneo*¹⁹ and partly in bare earth – to improve the coolness necessary for the conservation of wines. The first room along the route is that of production, the so-called *cellaio*, whose floor was lowered in 1761 for its enlargement along the western wing of the building, with the goal of increasing the production of

10 Historical Archive of Pio Monte della Misericordia, *Fondo Patrimonio*, Cat.B, Rub.e, n.XIV, fasc.33.

11 From the photographic archive of R. D’Avino.

12 *Distesa* staircase consists in a slab with steps, based on the perimetral walls, whose section is an arc.

13 Comparing the description in the deed of sale and the eighteenth-century reference to the backyard on the western front, it is clear that the entrance has changed with the inversion of access (H.A.P.M.M., *Fondo Patrimonio*, Cat.B, Rub.e, n.XIV, fasc.8,33).

14 Under the eastern one once the little portal has the Strambone coat of arms carved on a jamb (D’Avino 1991, p.6).

15 H.A.P.M.M., *Fondo Patrimonio*, Cat.B, Rub.e, n.XIV, fasc.8.

16 In 1821 are attested figs, mulberries, licks, pears, plums, laurels, oaks, walnuts, sour cherries, citrus fruits, vines, poplars, a mulberry (H.A.P.M.M., *Fondo Patrimonio*, Cat.B, Rub.e, n.XIV, fasc.33).

17 In addition to the type of cultivation, poplars, licks, mulberries, chestnuts and pines are indicated in the inventory of plantations as essences married to the vines ((H.A.P.M.M., *Fondo Patrimonio*, Cat.B, Rub.e, n.XIV, fasc.33).

18 Called *retrano* courtyard (H.A.P.M.M., *Fondo Patrimonio*, Cat.B, Rub.e, n.XIV, fasc.8).

19 Realized in 1761 (H.A.P.M.M., *Fondo Patrimonio*, Cat.B, Rub.e, n.XIV, fasc.5).

*lacryma Christi*²⁰. Adjacent and also facing north there is the cellar built in 1768²¹ to ensure new storage spaces benefitting the first floor of a terrace. This rectangular space is coeval with the reinforcement of the *cellaio* structure²². Therefore, its project incorporates some solutions adopted in the intervention of the *cellaio*. Light vaults (in pumice, lapilli, and lime) are built to cover large spaces. Arched structures are added to reduce the excessive planimetric length and prevent injuries from construction mistakes. Moreover, a construction site was set up in 1771 in order to defend this late eighteenth-century cellar from damage caused by rainwater and soil moisture. This refurbishment envisaged the laying of volcanic gutter ends to reduce the leaching of waters from the terrace onto the above-ground masonry, and the flooring of a strip in the fenced garden²³ protecting the underground portion of the cellar. The latter solution is also adopted for the road to the courtyard, which had previously a ditch next to it, used first to extract material and then as an opened dump²⁴. As memorials of its productive vocation inside the *masseria*, low scaffolding for locating barrels, wine basins, a well to ventilate the cistern and collect the water, the millstone called *palmento*, remain in situ, while only written sources mention the *cercola*, the

winepress obtained from a huge oak trunk²⁵. From the winemaking spaces, a modern staircase leads to a covered loggia with two cross vaults which enters the courtyard. Here is one of the three wells that maybe conveyed the waters of the roofs and terraces towards the central cistern, an underground and rectangular barrel-vaulted room with hydraulic plaster coating²⁶. A fourth *lava* stone well, in the center of the courtyard, communicates directly with the cistern and, when the *masseria* was in operation, supplied water to the animals housed in the stables on the ground floor²⁷. All the other rooms not used for breeding and winemaking serve, except for the chapel, as residences: those next to the main entrance are furnished with a fireplace in the corner and hosted the farmers; the apartment on the first floor accommodated the administrator. A typical wooden staircase, the *scalandrone*, constitutes the internal access to the meeting hall, while, the outdoor and main entrance to the upper floor, featuring grey lava stone steps, starts from the loggia in the courtyard. The suite consists of rooms with a rich stratigraphy of frescoes and with wooden roofs, often hidden by additional wooden structures covered in the past by canvases or papers. The most interesting settings on the second level are the meeting hall, divided by two round arches resting on a square pillar in tuff covered by stucco, and a loggia enclosed by rectangular pillars with rounded edges that embellishes the entrance to the terrace. A “gooseneck” staircase leads to the attic where farmers stored rural instruments. Here, trusses interspersed with tuff arches distribute the weight of the roof. Another room features a staircase to reach the



Fig. 6. The courtyard of the *masseria* of the Duke of Salza (Source: Author, 2018).

20 It was the red wine produced in *masseria* (H.A.P.M.M., *Fondo Patrimonio*, Cat.B, Rub.e, n.XIV, fasc.17).

21 H.A.P.M.M., *Fondo Patrimonio*, Cat.B, Rub.e, n.XIV, fasc.17.

22 Through the construction of arches aimed at avoiding the inflection of the roofs and setting the vaulted covers to replace the flat floor (H.A.P.M.M., *Fondo Patrimonio*, Cat.B, Rub.e, n.XIV, fasc.17).

23 With *lava* stone blocks supported by an hypogeous wall (H.A.P.M.M., *Fondo Patrimonio*, Cat.B, Rub.e, n.XIV, fasc.22).

24 Intervention in 1819 (H.A.P.M.M., *Fondo Patrimonio*, Cat.B, Rub.e, n.XIV, fasc.30).

25 H.A.P.M.M., *Fondo Patrimonio*, Cat.B, Rub.e, n.XIV, fasc.30.

26 That also runs through the ducts of the entire system.

27 A room with nine fidingrough and a stable for two horses.



Fig. 7. The rich layered indoor (top image) and outdoor (lower image) surfaces, in the *masseria* of the Duke of Salza, with superimposition of frescoes (Source: Author, 2018).

choir of the small chapel in the south-east corner of the *masseria*. The *topos* of rural churches is here declined with the solution of a parallelepiped, closed by a segmental barrel vault with lunettes, and furnished with a stucco altar²⁸ which was surmounted by a painting. A few neoclassical moldings, at the entrance to the chapel, in correspondence with the openings, and on the surfaces of the dovecote tower, typify the sober facades. However, as with the interiors, the underlying colors resurfaced or preserved by protruding elements highlight the overlap of multiple layers of paint²⁹. Gaps in the rough and thick plaster of fronts, as in the whole building, revealed the masonry of *scheggioni* representing the main structure of *masseria*, and tuff blocks or pieces of old *lastrici* reused³⁰, employed for additions or restorations.

4. Conclusions

The volcanic vernacular system of *masserie*, although in ruins and deprived of most cultivated estates, defends the identity of the countryside downstream of the mountainous duo Somma-

Vesuvius, which is left in a state of neglect acting as a buffer zone between the centres on the slopes and the *ager nolanum* in the hinterland.

Urbanization and industrial progress have certainly caused the obsolescence of these architectural complexes, but the aggravating circumstance of their abandonment is a consequence of private property ownership and the lack of state constraints. The owners, either for economic reasons or ignorance of the techniques to be applied, often distort these artifacts with improper interventions or leave them forgotten, pending their complete collapse. This contravenes the main rule respected in *masserie* of conservation through continuous checks and repairs. The maintenance and reuse activities have in fact always been central to the management of the *masserie*. The presence of arches, metal tie rods, vaulted structures, reveal attention to structural and seismic themes, while the local rebuilding (“*scuci-cuci*”) in reused blocks, pavements made or restored with lapilli quarried *in situ*, the carving of waste beams for the suspended ceilings, the masonry in pieces of dismantled *lastrico* and the care in choosing the correct exposure for each room, prove the economic and environmental sustainability at the basis of the Vesuvian vernacular culture. Therefore, a primary need consists in the definition of a program with common conservation goals that considers the single building as a node in a network, that guides private owners in their restoration choices, and perhaps even to establish partnership contracts with the public. Another important theme stressed here is the question of traditional outdoor spaces of rural Somma, a natural landscape often overlooked in studies about *masserie*, but fundamental to these pre-industrial factories. Paleobotanical research,

28 Inaugured in 1767 with the visit of the vicar general of Nola, Francesco Broccoli (H.A.P.M.M., *Fondo Patrimonio*, Cat.B, Rub.e, n.XIV, fasc.15).

29 As at the entrance to the administrator's apartment where a shelter, at least until the 1990s (D'Avino 1991), protected the underlying surface or in correspondence with the

chapel, where the window molding protected what appears to be a square perhaps filled with a sacred image.

30 In the late eighteenth-century cellar a front is completely made with pieces of *lastrico* (H.A.P.M.M., *Fondo Patrimonio*, Cat.B, Rub.e, n.XIV, fasc.5)

experiences of re-proposing ancient vines or *viridarium* with the aim of conserving biodiversity, and rediscovering traditions of Vesuvian culture are widespread in the archaeological field with projects carried out in nearby Pompeii (Ciacci et al., 2012) and Boscoreale (Coralini, 2009). However, there is still no example of such projects in the countryside of Somma. Nevertheless, a strong feeling of belonging in popular festivals and in the establishment of associations between farmers promote the rediscovery of the cultural roots of the site³¹. In the context of environmental and cultural requalifications, the conservation and enhancement of the vernacular systems in Somma Vesuviana could certainly be a precious mean to appreciate the territory and to know its evolution. Moreover, the study of these topics is fundamental to investigate the available resources and the technologies to use them, to acquire the skills necessary to repair and reuse the historical building, and to develop economic and energy sustainability for the care of our heritage and homes.

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31 The Festival of the *Lucerne*, added in 2019 in the inventory of Campanian intangible culture; the traditional walk on the mountain in the Easter period, *'A perteca' e Somma*;

the enhancement of typical vegetables or fruits, such as *torzelle*, *crissombole*, tomatoes of the *piennolo*.