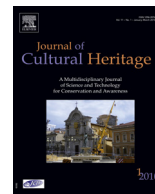




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Original article

Analytical studies of the Sirocco room of Villa Naselli-Ambleri: A XVI century passive cooling structure in Palermo (Sicily)



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ABSTRACT

This work focuses on a passive cooling architecture particularly popular from the Renaissance in Palermo area, as building sumptuous suburban villas became a real hobby for the Sicilian aristocracy. A Sirocco room is an artificial subterranean construction, built close to a water spring in order to reproduce the pleasant conditions of freshness that could be experienced in a natural cavern. In these places, nobles used to spend their time with friends to escape from the hot summer. The room of Villa Naselli-Ambleri is nowadays the best preserved in Palermo thanks to its owners' conservation care and it is unique for its cooling operating principle. The above-mentioned considerations make this structure worth of deeper analysis regarding its architectural configuration along with some climatic studies. Following a well-established procedure intended for an intimate knowledge of historical architecture, the construction has been investigated from various points of view. A preliminary analysis of ancient documents (manuscripts, notary deeds, pictures) was performed to outline the historical evolution, the materials and constructive techniques used and the possible modifications it had undergone. Then, an architectural survey was performed in order to evaluate the geometrical/dimensional features. The collected data were compared with the historical quotes previously acquired. Furthermore, some thermo-hygro-metric measurements were performed with the purpose of studying the unique cooling operating principle that is caused by the room peculiar architectural configuration and by the interaction water-air-limestone, recalling the antique Persian systems of passive cooling. Such a scheme was partially modified during the beginning of last century reducing *de facto* the cooling effect; a potential restoration project, as hoped by the owners, the Counts Naselli Dukes of Gela of the Princes of Aragona, will deal – as a central theme – with the reconfiguration and re-functionalization of the structure. The knowledge of such a construction and operating principles is also particularly important to re-discover the forgotten “places of delight” that are a fundamental element in Palermo history and culture, a central part of its population identity. Furthermore, preservation and reuse of surviving rooms represent a useful way to understand a simple passive cooling system whose principles could be reproduced in a contemporary way in modern buildings intended for a valid and functional energetic control.

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1. Historical and cultural background of Palermo “Golden Valley”: relaxing in the country

The Golden Valley surrounding Palermo has always undergone a deep land exploitation, due to a pretty favourable climate and the presence of many pure water sources [1–4]. From the middle age, farms used to mixed together rural-growing with gardens intended to make living in the countryside more pleasant [5,6]. The trend of

relaxing outside the city slowly became a real vogue. Thus, from the XV century aristocracy began to buy those farms in order to establish industrial activities (paper/oil mill, sericulture, winery, etc.) with the purpose of supporting their highly mundane life along with escaping from the summer heat. Thus, farmhouses were gradually renovated to become aristocratic manor-houses referred to as “places of delight” as they were surrounded by lush gardens characterized by a green ornamental scenography completed by many amenities: water machines, green-houses, lakes, grottoes, waterfalls, labyrinths, etc. Such a tendency reached its acme in the XVIII century and many *Grand Tour* travellers reported [7,8] that villas were constructed mindless of expenses [9–11]. After the feudalism abolishment (1812), that guaranteed the transmission of the entire

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Fig. 1. Ambleri Sirocco room's three main elements. A. Major gallery, mid-internal view. B. Wind tower (medieval water well), external view. C. Large Fountain – the marble plate is a double-measurement device: it indicates the level of the water in the basin along with the water flow rate expressed in the abolished Sicilian unit *zappa* ($63 \text{ m}^3/\text{h}$).

patrimony from father to firstborn, the immense properties were divided among many heirs. Thus, villas became too big and expensive to be maintained and started an inexorable decline, fasten by a 1950s–1970s unscrupulous speculation. Fortunately, quite many are still in a good state of maintenance and sometimes the original owners still hold them. This is the case of Villa Naselli-Ambleri and its Sirocco room.

2. The location: Villa Naselli-Ambleri, a Renaissance place of delight

Villa Naselli is situated on the South-East Palermo Mountains in a prevailing position over the village of Ambleri (from the Arab *ayn billawri* meaning “crystalline fount”). The construction has the typical configuration of a middle age *baglio* that has been renovated to become a suburban villa. A *baglio* is a Sicilian fortified farm made up of a quadrangular disposition of different buildings around a main courtyard. Villa Ambleri belonged to four important Sicilian families who continually adorned and enlarged the property: the Agliata, or Alliata, of Villafranca, the Platamone of Cutò, the Guascone of Villamena and, finally, the Naselli of Gela who still live in [12].

The first known documents are some notarial deeds (dated 1287, 1331, and 1357) dealing about land and water exploitation [13]. In 1474, the Agliatas bought the property with the purpose of establishing a farm. Between 1542–1554, the Baron Gerardo Agliata acquired new lands with “vines, olive trees, fruit trees,

uncultivated lots, reed-grove and some new buildings” [13] and enlarged the existing constructions to spend some time in that place. Furthermore, “he also built some rooms, large and fair; such a knight used to keep those rooms and galleries decorated by silk curtains and many other ornaments; and he often enjoyed that comfortable and luxurious chamber with gentlemen and ladies, friends and relatives” [14]. That is the Sirocco room, which made the house pretty famous for the opulent parties hold by Giovan Battista Alliata, Gerardo’s brother [13–16].

In mid-XVIII century the Nasellis bought the property. Thus, the *baglio* was renovated to its present configuration and style. Furthermore, they established an industry based on water exploitation constructing public aqueducts and setting new citrus-groves. Finally, in the 1980s the VI Count Francesco Paolo Naselli of Gela (Palermo, 1927–2004) decided to live permanently into the villa. Consequently, he restored all the wings and renewed the park along with the Sirocco room. Nowadays, he is often recalled for his total commitment in preserving at best the villa and the memory of his House.

3. Sirocco room: typological characters

Sirocco rooms spread in Palermo during the Renaissance as charming architectural machines. They are a typical “low passive cooling architectures” that exploit natural forces to improve indoor thermal comfort.

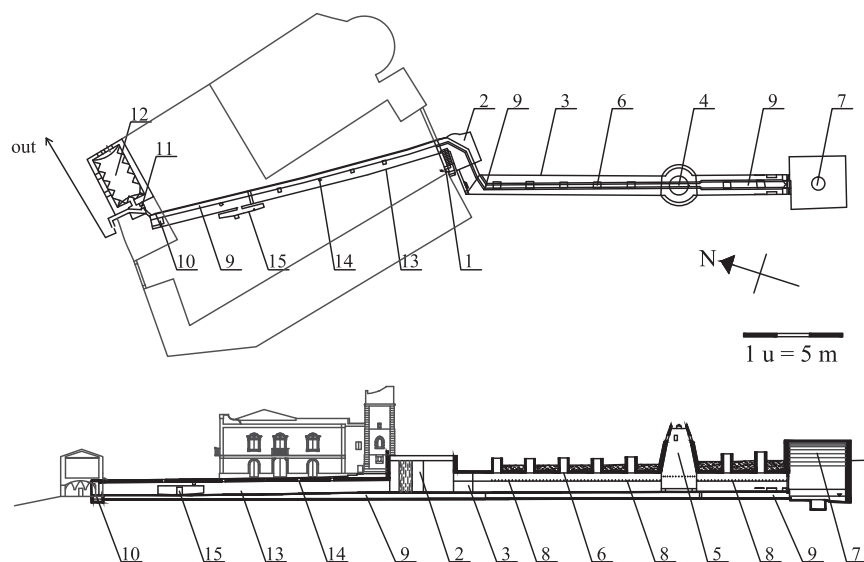


Fig. 2. Plan and longitudinal section of the Sirocco room.

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