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A Venetian rural villa in the island of Crete.

Traditional and digital strategies for a heritage at risk

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Abstract — The Trevisan *villa*, an example of rural built heritage in Crete dating back to the Venetian period, was the object of an architectural and archaeological survey in order to study its typology and plan transformations. Considering its ruined conditions and the difficulties in ensuring its protection, a first reflection was started on possible strategies of digitalization, in the perspective of a digital Humanities policy: a 3D modeling and simulation and a digital archive on a GIS framework to make information accessible.

Keywords — Rural architecture; Crete; survey; 3D modeling; GIS map; digital humanities

I. SCIENTIFIC BACKGROUND

This paper deals with architectural heritage and focuses on a noble house in the countryside of western Crete dating back to the Venetian period, the Trevisan *villa*. The island was a Venetian and an Ottoman territory, and a wide historiography concerns these long phases, basing on written sources¹. Several works deal with Cretan history during the Venetian rule from 1204 to 1669, as [1]; others focus on its relationship with Venice and the Eastern Mediterranean and on economic structures on the island [2 and 3]; scholars also investigated architectural and artistic achievements [4]. As for the Ottoman period (1669-1898), social and landscape transformations [5 and 6] were studied, but often in a general way and compared to Istanbul². A study of built heritage, instead, is mostly to be done: except for the main urban monuments still in place, the knowledge slowly progresses, mainly about the Western part of the island whose Venetian sources are lost. It is to be said that [7], the account of an archaeological mission of 1902-1904, is yet the major work on the supposed Venetian heritage on the island.

The Greek attitude towards Venetian monuments changed over the 20th century because of the value given to ancient ruins, considered “authentic” as concerning the Greek identity after a long foreign rule: «Roman, Frankish, Venetian and Ottoman monuments were not thought of as real monuments;

rather they were regarded with indifference or even hostility»³. These ones were abandoned or demolished and only recently, especially before Greece entered the EU, remains of Venetian heritage were recognized in their value: but academic research and conservation practices slowly develop. House architecture, in particular, is almost completely absent from the literature, preventing a full understanding of Venetian building policy and historic phases of the buildings. The lack of researches joins up to that of conservation: touristic development and urbanization works are degrading their environment and the Greek authorities cannot ensure their protection because of economic crisis. As a result, several buildings are poorly known or likely to disappear, especially far from the cities: the mansions, inhabited or abandoned, are often ruined, when they are not a quarry for new buildings⁴.

Studies on built heritage are growing under the patronage of the EU, supported by a legislative body as UNESCO *World Heritage Convention* (Paris, 1972) and the *Convention for the Protection of the Architectural Heritage of Europe* (Granada, 1985). These documents emphasized the value of recognizing heritage (having an outstanding universal worth from the point of view of history, art or science) and the role of European countries in its inventory and documentation.

II. PURPOSES AND METHOD

The Trevisan *villa* is a representative case of a hidden built heritage. Venetian rural houses are an evidence of past ways of life and building techniques, which underwent the Ottoman period until today: they are a mirror of reinterpretation of Venetian architectural models in the case of a noble house. The evaluation of architectural, historical, environmental and aesthetic characteristics of the building is the first step towards its conservation or revitalization: however, the present ruined conditions of the building hardly limit restoration possibilities, also taking into account economic and practical difficulties.

During a mission on the field in March 2013, we carried out a first architectural and archaeological survey of the *villa* using traditional and digital instruments, in order to provide graphic data and envisage possible digitalization strategies,

¹ Venetian manuscripts are kept at the *Archivio di Stato* of Venice, while the Ottoman sources referred to the local governor (*kadi*) are being translated from Greek scholars and their accessibility is limited at present.

² Urban studies concern the Venetian capital *Candia* (the current Iraklion), Chania (the Ottoman capital) and Rethymno. See: M. Georgopoulou, *Venice's Mediterranean colonies: architecture and urbanism*. Cambridge 2001; M. Andreadaki-Vlazaki, *Khania (Kydonia)*. Oxford 2012; A. Malagari, H. Stratidakis, *Rethymno: a guide to the town and the prefecture*. Athens 1994.

³ O. Gratziou, “Venetian monuments in Crete: a controversial heritage”, in *A singular antiquity. Archaeology and Hellenic identity in twentieth-century Greece*, ed. by D. Damaskos and D. Plantzos. Athens, 2008, pp. 209-222, pp. 209-2012.

⁴ An emblematic case is a *villa* in Ano Drapaniàs, a village west of Chania. At the beginning of the 20th century it was intact and inhabited, but today only a few ruins survive: some blocks were reused to build a new house next to it.

with the final goal to support operations of heritage knowledge and protection⁵.

An archaeological study was carried out dividing the *villa* into zones, sectors and stratigraphic units (SUs), in order to facilitate its comprehension. The SUs are the smallest analysis units of a monument (such as a door, a window etc.). This analysis, based on a “stone by stone” observation and derived from geological stratigraphy, allowed creating a repertory of SUs (detailed with metric and geometric data), in order to register them in *Syslat* software, used for archaeological site database⁶. We will get a relative chronology of the building by means of a diagram (Harris *matrices*), grouping the SUs and the sequence of building actions⁷. This is a preliminary work in the absence of any prospecting operation, which could help to establish an absolute chronology of the monument.

In meantime, a survey of its accessible parts was achieved using a total station (an electronic theodolite) connected to *AutoCAD* through *TachyCAD* application⁸, to generate 3D results in real time. With *PhoToPlan* application, then, the elevations survey was completed by a true-to-scale digital image rectification, allowing recording the most remarkable elements of the facades (such as decorations, cracks, plastered surfaces and alterations)⁹. The result will be a complete 3D survey of the mansion in its today conditions, giving us information about the original plan and its transformations over the time.

We are collaborating to extend an existing GIS web-based platform, *Digital Crete*, created by the researchers of the IMS-Forth (*Institute for Mediterranean Studies*) of Rethymno¹⁰: it contains heterogeneous information (photos, chronological data and bibliography) of the major urban monuments of Crete since the ancient period. Our role is to produce data on rural mansions, starting from the Trevisan *villa*, also including the survey results and a 3D model of the sample buildings.

III. THE CASE OF STUDY

A. Land occupation

In the 12th century, on the eve of Venetian conquest, there were a few installations on Crete, mostly towns and fortresses dating back to the Byzantine or more ancient period. While harbors were more active starting from the 14th century, other settlements remained rather rural, despite urbanization works: it was about small villages or multiple gatherings of properties (*metochia*), which inherited the role of the Byzantine *choria*. Located away from the coast, at the foot of the slopes or at the borders of cultivable lands, they were typical countryside

settlements and the medieval economic unit¹¹. Turkish attacks began in 1645: Rethymno, Chania and several fortresses were conquered in 1647, while Candia was taken in 1669. In the early years, characterized by Cretan revolts, the Ottomans emphasized military control¹²: many smaller settlements disappeared and a few new villages were founded, but the 16th-century rural fabric survived until today, as well as most of place names of villages¹³.

The Trevisan *villa* is in the locality of Travasianà¹⁴, a few distance from the small village of Drapaniàs, east of Kissamos (Fig. 1). Unfortunately, Venetian written sources about Chania region (from which Kissamos area depended) were lost, and the only source to learn the architectural typology and the building techniques is the building itself.



Fig. 1. Aerial photograph with indication of Drapaniàs and Trevisan *villa*.

B. The architectural typology

The *villa* is a sample of “Italian Renaissance” style house: mansions of this type were probably built from the 15th to the 17th century, mostly keeping their appearance in the Ottoman period. Gerola struggled to distinguish between Veneto-Cretan and Turkish features: such an interpretation remains difficult even today, because of the lack of sources and the continuity of use of the sites¹⁵. In particular, he described the Trevisan *villa* as «one of the best models of countryside mansions of a clear 16th-century Venetian style», most likely in coherence with other similar houses¹⁶. The whole building became a defensive place against the local rebels during the Turkish occupation; it was enlarged with annexed buildings and was

⁵ The building is part of a sample of mansions detected in the western part of Crete, in the context of a Post-Ph.D. project.

⁶ M. Py, Lattara 10. *Syslat 3.1 Manual de Référence*. Lattes: Mélanges d'histoire et d'archéologie de Lattes, 1997, pp. 26-30. The SUs are connected each other by temporal relations: a SU is “above” another one if it is more recent, or “below” another one if it is older; a SU is “equivalent” to another one if they belong to a same building action (such as two parts of a wall).

⁷ E.C. Harris, *Principi di stratigrafia archeologica*. Roma: Nuova Italia Scientifica, 1987, pp. 134-140, 165-170.

⁸ *TachyCAD* software is useful for on-site surveying and data capture through a network of reference points shot inside and outside the building.

⁹ *PhoToPlan* similarly works on *AutoCAD* platform, adding functionalities to the classical photogrammetric dual image evaluation.

¹⁰ <http://digitalcrete.ims.forth.gr/index.php?l=1>.

¹¹ M. Gallina, *Una società coloniale del Trecento. Creta fra Venezia e Bisanzio*. Venezia: Deputazione Editrice, 1989, pp. 26-28.

¹² *Greece, the hidden centuries. Turkish rule from the fall of Crete to Greek independence*, ed. by David Brewer. London: I.B. Tauris, 2010, pp. 121-140.

¹³ E.-Y. Kolodny, “La Crète : mutations et évolution d’une population insulaire grecque”, *Revue de géographie de Lyon*, n. 43-3, 1968, pp. 227-290, pp. 229-230.

¹⁴ G. Gerola, *Monumenti Veneti dell’isola di Creta*, vol. 3. Venezia: Istituto Veneto di Scienze Lettere ed Arti, 1905-32, p. 258.

¹⁵ Gerola, vol. 3, pp. 250-252. He distinguished two general types of houses, the towers and the *villas*. These last assumed special characters in different regions: in the area of Kissamos, in particular, they had a ground floor used as a warehouse and a first floor with a central room and symmetrical side smaller rooms.

¹⁶ Gerola, vol. 3, p. 258.

inhabited until the beginning of the 20th century (Fig. 2). It is yet a private property, but two decrees declared it as historical monument in 1965. Thirty years ago, the 28th Ephorate for Byzantine and Post-Byzantine Antiquities carried out an architectural survey, but the current building is very different from that measured (Fig. 3). For this reason, our first aim was to update available information, correcting the existing survey on the field.



Fig. 2. The eastern façade of the *villa* in a photograph of 1900-1902 from [11], photographic collection n. 424.



Fig. 3. The eastern façade in a photograph of 2013.

C. The mansion in its today conditions

Surrounded by recent buildings, the *villa* is accessible by one of the streets going towards the coast from the old Chania-Kissamos road (receded to a role of provincial road after the construction of the highway in the 1980's further north). Supposing Venetian topography compared to the current aerial image, land use is mostly unchanged, with agricultural lands and olive groves: we can assumed for the *villa* a privileged location for noble holidays and/or for land control (perhaps through appropriate buildings standing at a short distance). The mansion belonged to a Venetian family, which probably patronized its foundation and lived there between the end of the 16th and the first half of 17th century: it is the approximate date given by the scholars.

It is a large two-storey building with a rectangular plan (13.30 x 15.30 m), with an east oriented main front. In the

external staircase with two orthogonal flights, we recognized two series of steps. In the flight parallel to the main front, a first series of steps is in tuff stone, whose molded profiles stand out; a second series of higher steps in white limestone was put on the older steps but was shorter in size, because of a low wall (railing) built on the previous steps. In the other flight, we can see the previous steps recomposed and cut next to the more recent ones. A barrel vault on two pillars, giving a beautiful effect on the façade, supports the balcony.

The high-quality limestone structure is in heavy ruin: the intermediate floor and the wooden roof structure are missing; a part of the southern front partially fell down, while the northern front almost entirely collapsed after an earthquake in 2006; several vertical cracks probably refer to failures of foundations, which compromised the static equilibrium and caused localized collapses. Recent earthquakes aggravated the situation. However, despite alterations over the centuries and the current state of abandonment we documented in the survey, several decorated openings and corbels for the roof beams are still in place, revealing that the owners could afford a rich mansion.

We firstly studied the most remarkable built elements, distinguishing those belonging to a same series of building actions. We noticed that the whole staircase structure was just leaned against the façade, so it was subsequently added. We do not know if there was to be a previous staircase structure and if, like many Venetian *villas* of the motherland, another flight was on the other side of the central arch. We also identified at least two types of stone, a white limestone and a yellow tuff, which degraded in different ways. We analyzed all decorated openings still in place, creating a repertory in order to study their typologies and decay conditions (Fig. 4). The study of relative chronology of the main built elements is yet in progress: we identified the four perimeter walls, the staircase and the fireplace, basing on the SUs subdivision.

The building has got a ground floor, eventually used as a warehouse, and a residence at the upper floor (*piano nobile*): both of them are organized according to three spans (*ab*, *cd* and *ef*). At the ground floor (Fig. 5), spatial distribution of the



Fig. 4. The tympanum of the main door at the first floor in a photograph of 2013.

original plan was on a T-shaped main room (*b*, *c*, *d* and *f*) with lateral rooms: in Ottoman times, the arches connecting *b*, *d* and *f* rooms were closed and a wall divided the central room in

c and *d*. The first floor had a similar plan. The central door, whose tympanum bore the Trevisan family coat of arms, leads to a central room, long as much the building: it probably was a guest room and has a molding stone cornice and a mullioned window on the west side, which is totally in ruins. From there, four doors symmetrically led to a couple of rooms, but the ceiling of the first floor is almost completely collapsed and only a few transverse arches in *a* and *e* rooms at the ground floor survive. A fireplace is in the southwestern corner.

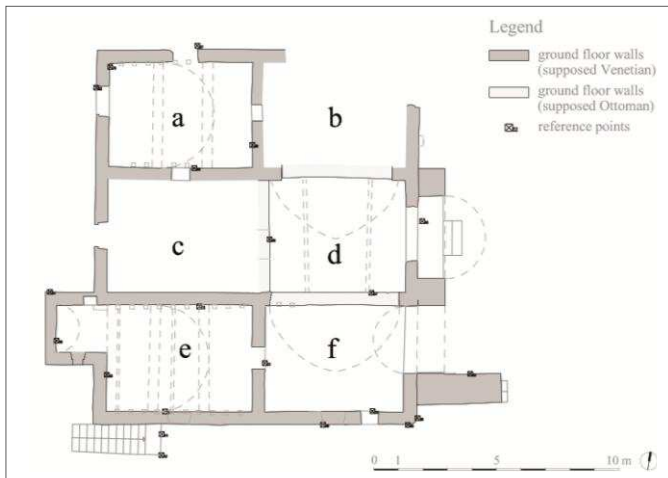


Fig. 5. Architectural survey of the ground floor.

We did not measure all the wall panels because of serious dangers of collapse and access difficulties. In particular, the perimeter walls lost their vertical arrangement and vertical cracks clearly show they are “opening up”: we measured the whole crack pattern through image rectification (Fig. 6).



Fig. 6. The eastern front after digital image rectification with PhoToPlan.

Even if the development of a 3D model of the building is yet in progress, the first results are encouraging: we completed the survey of one of the richest examples of Venetian rural *villas* in Crete, significant as for architectural and building strategies of modern age. Venetian models, adapted to local materials and skills, were generally reinterpreted or rethought. In spite of that, rural mansions as the Trevisan *villa* are almost

unknown, since researchers usually refer to a few surviving urban houses in relation to Venice and Italian Renaissance¹⁷.

IV. CONCLUSIONS AND PERSPECTIVES

This survey inaugurates the inventory of a greater sample of buildings: the start of a mission on the field to document the Trevisan *villa* is the first step to know a vast built heritage at risk on the island. The work is in progress: we will enter the exposed data and those yet to develop on the GIS web-based platform of *Digital Crete*, to create a database for a multi-level documentation. In particular, we will provide each building with a 3D digital model (of its present and earlier appearances) as a restitution of the real object and a VR experience of simulated fly-through for researchers and public.

In view of the continuation of the project with surveys of other houses, our aim is to involve advanced digital strategies, in particular terrestrial laser scanning and photogrammetry, together with traditional human sciences. This will optimize the results, allowing managing quantitative and qualitative information about the monuments in an accessible cultural information system¹⁸. The perspective of this collaboration fits into the broader context of digital Humanities and looks essential to encourage knowledge and protection of minor architectural heritage: Venetian houses and *villas* in Crete are mostly private and abandoned, so a survey on the field may be long and dangerous. Moreover, in the current Greek context, digital strategies may be successful to inventory a built heritage at risk of disappearing.

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¹⁷ J. Dimakopoulos, “Italian Renaissance in Crete”, *The Architectural Review*, n. 960 (1977), pp. 129-132.

¹⁸ L. De Luca et al., “A semantic-based platform for the digital analysis of architectural heritage”, *Computers&Graphics*, n. 35 (2011), pp. 227-241. A reference of digital application for cultural heritage is *Nubes*, a web-based interface allowing comparative studies starting from heterogeneous data.

