The «Cuba» near Castiglione in Sicily. A self-supporting vault made of volcanic stone

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The Sicilian Medieval architecture is widely recognized as rich of different mixtures and influences, that affected features and spaces of the civilian buildings, and particularly the religious ones.

The wealthier period on this subject is certainly the one beginning with the conquest of the island by Normans after the Muslim rule (second half of XI century) and carry on for more than two centuries and half, until the end of Swabian dynasty of Frederick II in 1266.

The long Muslim presence in Sicily (from 827 to the Norman invasion led by Roger I) influenced the characters of architecture in the following centuries, by mixing its features with the surviving Byzantine traditions (expecially significant in the eastern part of the island) and with the European trends brought by the new sovereigns.

THE PROBLEM OF DATING CUBA

The building studied is a little church, laying ruined in the country-side at the north base of Mount Etna. It is called «Santa Domenica» (or «San Domenico») but this dedication seems to be more recent than the real foundation of the church: the first time this place-name is found, is on a map dated 1891, with the exact name of «Molini San Domenico» (Saint Dominick Mills).1

The «Santa Domenica» church is commonly called «Cuba»: probably this denomination has helped in the misdating of the building during the Byzantine period of the island (VI-IX centuries, and so the name should derive from the Islamic period after the building of the church).2 Many scholars (Sardo Sardo 1910; Freshdfield 1918; Lojacono 1936; Bottari 1939; Pace 1949; Giglio 1997), linked the Cuba with a lot of little cellae trichora in this part of Sicily. Some of these buildings are laying also few kilometres far from the Cuba (Lojacono 1960a, Giglio 1992a), and date back to the Byzantine period, but they are basically different from the building we
are considering, according to a comprehensive study which includes the analysis of the construction techniques.

The Cuba, abandoned several centuries ago, was used as a sheep-fold until 1959, when repairs, conducted by the Soprintendenza ai Monumenti della Sicilia Orientale, gave the building the present appearance (Lojacono 1960b, Lojacono 1963).

In the whole XX century only two times the Cuba was defined as a medieval building, far from the ones derived from the roman architecture. The first to write about a possible datation after the X century was Stefano Bottari, and this is a part of the description he made about the Cuba:

La capziosa ingegnosità di questa costruzione, pur agile ed ariosa nonostante il gioco complesso dei suoi elementi, si coglie più da vicino quando si pensi alle sue minuscole proporzioni (il lato del quadrato non supera gli otto metri). E' stato detto e giustamente, dal suo primo illustratore, Freshfield, che essa, tra quelle siciliane, è l'unica cui convenga la qualificazione di bizantina... ma non è dubbio che la costruzione, per il suo intimo significato architettonico, è già al di fuori della mentalità tardo-romana cioè al di fuori – e si dia al termine la massima estensione – della tradizione classica. (Bottari 1956)

Later on, Charles Nicklies (1994) made an accurate analysis of architectural characters of the Cuba. His study is a crucial point of reference for establishing the church’s datation: between the end of the XI century and the beginning of the XII. As a matter of fact, in this period a lot of monasteries were built in the eastern part of Sicily: in 1092 was founded, by permission of Roger I (Re 1996), the monastery of San Salvatore di Placa, whose ruins are still over a rock not far from the Cuba (Giglio 1992b). This monastery controlled and managed a lot of fields in the neighbourhood, and had two metochia at the moment of its foundation (Re, 1996), two little churches, or chapels, probably with a little house for the monks who received tributes from countrymen. Another metochion related to the monastery was probably the Cuba. As it is a lonely church built far from the town, it completely responds to the function just described.

Aesthetical and constructive characters, stylistic influences

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The church concentrates numerous elements, in plan and in the spatial characters of the interior. The square plan (9 meters for each side) is defined by three bays attached to the transept and an apse, the only element protruding out of the linear outlines, scanned by buttresses on three sides, and the other two around the apse. One can enter the building by a large door with rounded-head arch, or by a smaller one connected to the north aisle, both located in the west façade, where a triple-light window flanked by two little ones; two couples of windows bring light inside from south and north wall, while a double-light window is opened in the apse wall. The exterior is lacking in decoration, except for trichromate arched lintle over the main windows and some simple ones.

The interior is very impressive because of the variety of vaults, different for each space they cover: from the main entrance one can see the large, squared central bay, covered with a domical vault. This space is flanked by the narrow side-aisles, with their sets of three cross vaults supported by corbels. The three bays are separated by round-headed arches from the transept, composed by the bema covered by a cross-vault, and two side spaces (prothesis and diaconicon) barrel-vaulted, where two niches are contained within the thickness of walls.

As we can infer from this description, the Cuba is a mixture between the basilical type and the centric one: because of the shortness of the aisles and because of the square shape of the central one that is prevailing over the two others, in plan and in height. The vault of naos draws visitors’ attention more than other elements of the building, and this maybe was the aim of the planners and the builders. The construction of the vault will be explained later; now is necessary to examine its shape and its strategical position in the equilibrium of the whole building, also because of the uncertain datation.

Actually we cannot find examples in Sicily similar to such a vertically-strained shape, but in Puglia there are a lot of so-called churches «with domes on axis» (Messina and Dell’Aquila 1998), with shapes of dome vaults analogous to the Cuba’s one.

These similarities are interesting because they can be temporally linked with the great migration of the monks from the East to Puglia, and then to Calabria and Sicily. In 1059 the Norman Robert the «Guiscardo» became Duke of Puglia and Calabria, after the alliance with
Rome’s Church, and subjected many Byzantine communities, while introducing the latin religion. The monks, who arrived in these regions from the East various decades or centuries before, were then forced to move towards Calabria and Sicily, by following the Normans. In reality, the new sovereigns were not interested in establishing a unique religion for the latest acquired territories. On the contrary, they used to spread both the two Christian worships, from Rome and Byzantium, depending on the community’s customs they found over their path. However, a lot of Byzantine monks, allured by the conquest of new lands over the Islamic oppression, accepted to move while carrying their experiences, also concerning architectural issues (Scaduto 1947).

This is a key by which we can explain part of the influences that may be found in medieval architecture of Southern Italy, expecially of Sicily and of the Cuba too, where significant experiences from Greece, Armenia, Turkey and Puglia have been mixed with Islamic characters.

THE DOME-VAULT: CHARACTERS AND CONSTRUCTION TECHNIQUES

The stone used for all the Cuba’s valuts is pumice-stone (specific weight 0,001 kg/cm³) from Muont Etna, while the walls and the arches are made of basaltic stone, heavier about two times and a half than the pumice. This difference helps in engaging with less weight the supporting structures; moreover the vertically-strained geometry of the dome-vault distributes thrusts over the wall section below (thickness of about 60 cm) in an effective way, making the resultant closer to the core of the section. The eccentricity of the resultant over the western wall (today the most damaged) is de facto acceptable, and the serious damages we can see in this part of the building are due to other reasons.\(^3\)

The little stones, by which the intrados of the dome-vault is made, are similar to bricks in their shape (about \(8 \times 12 \times 20\) cm); the peculiarity of this structure is the bond by which these stones were laid, in a special way where no centering was required, at least for the first phases of the construction.

The section of the dome-vault, with a thickness of about \(40\) cm, is composed by an intrados with regular hewn stones for about one third of the section, and by a second cover over the first, made of rough stones.

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over which the roofing tiles were laid.

The construction of the vault began when the basaltic stone walls were raised until the shoulders of the inner shell; over one side of the wall was a level for the regular hewn-stones (creating an arch on the inner faces of the four sides of the naos), on the contrary the external side of the wall was built entirely with a square line-drawing on the four side of the church.

Over the rounded-level left in the wall, the builders laid the first projecting stones in the four corners of the central bay, making a basis for the first squared stones, arranged in arches laid one upon the other. According to this, the projection of the arches in plane is turned of 45 degrees respect to the wall perimeter.

When the four angular squinches were completed, the gap between them and the external walls was filled with stones and mortar. Later, between the four great squinches, other four squinches were raised, turned of 45 degrees respect to the first ones and so ensuing parallel to the walls. Builders used a fairly quick-setting mortar, that let them to build the first three or four sets of squinches without centering.

Furthermore, the inner shell of the brickwork is basically a centering for the outer one, that was begun after the second set of squinches was laid. The other sets were embedded one upon the other, smaller and always turned of 45 degrees toward the keystone. It is a squared wedge stone with a hole, squared at the same way, maybe useful to put inside an iron cross.

The only necessary centering was probably the one needed for sustaining the last two sets of squinches, and for the keystone. The holes in the perimeter walls of the central bay could receive the scaffolding structure for this little centering.

The origin of the construction techniques

In some ways, the structure described above is similar to some famous buildings, very far in space and in time from the Sicilian countryside of the XI–XII centuries. However, it may be useful to run shortly over the history of this construction technique by following an evolution begun with the Diocletian Mausoleum in Split (ended in 302). Here the arches, made of bricks, compose the spherical triangles that create the great self-supporting vault. But the
technique used in this roman building «non viene da Roma, non viene dalla Siria che usa la pietra, ciò deriva dal procedimento persiano-mesopotamico» (Monneret de Villard 1915).

Therefore, the origin of this kind of arranging vaults is to be found from Persia, where Sassanian skilled workers rose structures as the dome of Ardashir’s Palace in Firuzabad. This imposing brickwork structure is connected to the walls by «quattro archi in pietra diagonali sugli angoli» (Sanpaolesi, 1978), four pendentives. It is one of the earliest examples we can find in the history of architecture: this ancient technique is the basis of a practice more and more commonly used in the most representative Persian buildings, as the dome in Sarvistan (V century) shows, according to the sketch reported by Arthur U. Pope (1938–1939).

During the following centuries the Muslims invade Turkey and besiege Byzantium: these events influence the architectural techniques, as many examples in Greece, Turkey and the capital Byzantium can show.

Indeed, the Persian constructive practice become very common. It covers little squared spaces with domes or vaults, arranged with brick’s rows, and makes geometrical drawings based on the principle of rotation of squares by 45 degrees, that is a mandala with a symbolic meaning: the place where earth meets the divine has always to be emphasized.

The example closer to the dome-vault of the Cuba is the rich group of vaults of the more ancient part of the Friday Mosque in Esfahan. Here a great number of spaces, shaped in square or rectangular and defined by ogive arches, are covered by vaults in which the
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The same principle of rotated-squares applies. The technique is comparable with the one described for the Cuba’s dome-vault: the first squinches are laid over the corners, and the space between them is filled by other squinches smaller and smaller. The key is made by a spiral of four bricks or by special wedges, as four triangular bricks (Galdieri 1973).

In Persia this technique had a wide spread, thanks to the great skill of the builders, and to the possibility to cover little spaces (rooms with the side of 5 or 6 meters). It becomes a real trademark for the medieval Persia. During the X and XI century, this practice became very common also in the Byzantine Empire, when a drastic reduction of the spaces occurred in churches’ construction, because of the crisis of the Empire. The magnificent domes are now replaced by smaller and domestic spaces, often covered by barrel or dome vaults; in this period we can find a lot of meaningful examples with the same constructive conception of rotated-squares, applied in different ways depending on the various aesthetical and constructive requirements. These examples form a complete collection, together with the Friday Mosque, of the ways in which you can cover a square place with a vault made of bricks.

Sometimes the geometry is misshaped in order to avoid use of centering, and builders tried to find always a new way to do it: the squashed vaults in Saint Panteleimon in Thessaloniki are in contrast with the vertically-strained ones in Istanbul, at

Figure 13

Figure 14
Panthocrator church in Istanbul (XII century). Crypt’s vault. (Ousterhout 1999)

Panthocrator, but derive both from the same constructive will (Ousterhout, 1999).

If these vaults are arranged in a rough way, somewhere else the same technique creates so much rich and precious drawings that the builders didn’t cover the arrangement with plaster. For instance, in the crypt of Saint Demetrius in Thessaloniki (X century) the vaults are somehow still connected with the roman practice: the bricks form, on the vaults’ surfaces, unloading and following arches, that do not connect the sides of corners with squinches, but they extend them with parallel rows making fanlights intersecting on the diagonals of the vaults. On the contrary, the semi-domes of the apses at Saint Aberkios in Kursunlu and Saint John in Trullo in Istanbul (XII), show in toto the persian influences: the spherical triangles are laid one upon the other (Ousterhout 1999).

Structure and decoration: covering as celebration of construction

As most of the vaults’ examples described above show, the function accomplished by the vaults (covering little spaces) adapts itself to the
requirements of the Byzantine churches of the late period; but in this way they end their role: a mere constructive role.

The case of the Friday Mosque in Esfahan is different: here some of the vaults have plaster over their brickwork, painted by following the arrangement of the brick’s rows, or sometimes by inventing new ones. Decorations emphasize the masonry, both following the brick’s arrangement and denying it: in some examples, where the plaster is still surviving, one can see paintings that seems to repeat exactly the brick’s rows, even if with a bigger size and, obviously, with less rows in the number. Paintings represent a feasible structure, with dark coloured bricks and white mortar filling. On the contrary, in some cases the vaults’ plaster was left white and, over it, only thin lines were painted (fillings between short sides of bricks are missing). It symbolises a different decorative value: covering takes a step forward, toward an abstractionism typical of the Islamic decorations, that will soon leave the structure behind and will approach muqarnas (since this period more and more three-dimensional and independent from masonry).  

The practice of reproducing structures over plaster, being over many vaults in the more ancient wing of the Friday Mosque, was recently also recognized in the Cuba near Castiglione di Sicilia.
Indeed, thank to the repairs, conducted by Soprintendenza ai Beni Artistici e Storici di Catania in 2000-2001, a painted plaster was discovered over the inner surface of the dome-vault: the whole system of squinches is repeated with red and black rows one upon the other, and white fillings. The distemper is spread over a thin plaster layer, the only one present over the stones. As a result, this decoration has to be considered the original one of the church.

Finally, it is important to point out that who settled such decoration for the vault, gave up using traditional symbols of Byzantine worship: indeed paintings do not represent Panthocrator (that was probably painted on the fresco, now missing, in the semi-dome of the apse), neither a cross in correspondence with the keystone, nor stars over the sky. The painter preferred to represent the masonry, the brickwork made by skilled workers, overlaying the two-dimensional arrangement over the three-dimensional one.

**CONCLUSION**

To sum up, because of the evidences reported in this paper, the dome-vault of the Cuba seems to be built by Persian or Islamic skill workers; they chose for the vaults’ construction the material easier-to-find in that place, pumice stone, but used it as bricks. For this reason a masonry very close to the eastern experiences was possible.

Islamic influences makes possible to put a terminus post quem in 1061 for dating the building: before the Norman conquest, indeed, Muslims did not let any building of churches in Sicily. The Cuba could be built during the 30-50 years when a lot of monasteries were risen up, especially in the eastern part of the island.

The Persian—or Eastern in general—characters can be explained with the migration of monks that occurred in the second half of the XI century from Puglia to Sicily, because of the arrival of Normans in Southern Italy.
NOTES

1. The first map of the zone edited by the Istituto Geografico Militare in 1891 (Foglio 262 della Carta d’Italia, Tavoletta IV), reports the place-name «Molini San Domenico»: it could be referred to a building, still existing near the Cuba. The mill is sited on the banks of the river Alcantara. Moreover, a sketch representing the Cuba appears over another map, more ancient than the first: it is the map n. 116, edited by the Catasto Borbonico, and it was drawn by architect Vincenzo Musumeci approximately in 1850. This is probably the first document where the Cuba is represented (Caruso and Nobili 2001).

2. Probably, the appellation «Cuba» is derived by the Islamic presence in Castiglione di Sicilia, that survived the Norman conquest: *qubba* means a domed space, in Arabic. However, many little buildings in Sicily are named in this way, not depending on their building’s age.

3. The original configuration of the Cuba had certainly a narthex, that provided an effective reaction to the thrusts coming from the dome-vault; unfortunately this structure was dismantled (probably by countrymen) in order to get easily building materials. Moreover a door was opened inside the southern wall of the church: in this point the wall was damaged from the arch of the new door to the dome-vault. The restoration intervention in 1959 repaired this damage, but it is still active and another intervention had to be made in 2001–2002 by the Soprintendenza ai Beni Artistici e Storici di Catania.

4. Charles Nicklies (1994) underlines the similarity between the Cuba’s squinches and the muqarnas because he sees the former as forerunners of the latter. The church of Saints Pietro and Paolo in Agrò (founded in 1117, Figure 3), twenty kilometres far from the Cuba, is reported as a middle-step between squinches and muqarnas: only one, certainly, amongst the heterogeneous and rich complex of similar examples datable around the Norman period of Sicily.

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