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THE CAPITAL OF 'MAGISTER GUILELMUS' EXPOSED IN THE COLLE DEL DUOMO MUSEUM IN VITERBO
HISTORICAL-ARTISTIC ANALYSIS THROUGH 3D GRAPHIC DOCUMENTATION

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Abstract

The present study is focused on the study of a medieval marble capital found in 1987, during the restoration works on the Romanic church of Saint Silvestro in Viterbo, a town in Northern Lazio (Italy). The carvings on the capital represent the Adoration of Magi and on the artefact base a signature in Gothic characters is readable thus allowing its attribution to 'Magister Guilelmus'. The artefact, now exhibited in the archaeological section of the Colle del Duomo Museum in Viterbo, must had originally three sculpted sides, but currently, one is completely lost. The paper reports the results of both art-historical analysis and 3D model realization, the latter being particularly relevant to the stylistic comparison of the artefact. The two approaches of the research are complementary, thus allowing defining the artefact from the historical-artistic point of view and advancing some reconstructive hypotheses concerning the parts of the capital which are no longer preserved. Finally it was possible to date the capital back and set it into the cultural context of the 12th century.

Keywords: Romanic capital, 3D, graphic, documentation, Via Francigena

1. Introduction - the church of Saint Silvestro

Saint Silvestro is one of the oldest churches in Viterbo and is located in the heart of the historic city centre (Figure 1). The first written records date it back to 1080, but its foundation could be dated back earlier than the year 1000. For a certain period the church had a considerable importance thanks its position, being built on the Piazza del Mercato, the centre of the city's political and social life; on this square there were also the offices of the magistrates of the Podestà and the Priori [1]. In the second half of the 13th century the Church lost prestige due to two events: the murder in 1271 of Prince Henry of Cornwall, cousin of the King of England Edward I, assassinated by Guido and Simone di Monfort during the

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celebration of mass inside the church (mentioned by Dante in the 12th Canto of Inferno) [2]; the transfer of the magistrate offices to the current Piazza del Comune. The church of Saint Silvestro thus assumed secondary importance compared to the church of Santa Maria Nuova and the Cathedral of Saint Lorenzo.

Over the centuries the church was administered by many different corporations (e.g. the *Arte degli Ortolani*) and religious orders, including the Jesuit Fathers in 1622, followed by the Discalced Carmelites for about ten years. Starting from 1643 it was managed by the Confraternity of the Most Holy Name of Jesus, which is the reason why the building is still known as the Church of the Gesù [3]. From the 1800s until the 1970s the church was assigned to the friars of Penitence, while at present the management is entrusted to the Confraternity of the Knights and Dames of the Equestrian Order of the Holy Sepulcher.

The church is characterized by simple and essential lines preserving its Romanesque style despite the architectural changes made over time. The façade, similar to that of other Romanic churches in Viterbo, has a bell tower with three bells and more ancient marble inserts on top. On the sides of the bell-glabe, on the slopes of the roof, there are two sculptures of animals, a lion on the right and a winged bull on the left, which according to the most widespread opinion among scholars, could belong to a lost prothyrum. The church consisting of a single nave illuminated by four lateral single lancet windows (two on the right wall and two on the left) and by an oculus above the apse; which is frescoed with a sixteenth century *Noli me tangere* among the saints Andrea and Silvestro, commissioned by the Arte degli Ortolani [4].

A first restoration of the church was carried out in 1917, followed by a long period of neglection, culminating in 1971 in some collapses in the rear of the building. Finally in 1987, thanks to a funding from the Cassa di Risparmio di Viterbo bank, a new restoration and conservation intervention was carried out; that's when the capital, was found [5]. It was initially kept at the Provincial Tourist Office of Viterbo and in the following years it was placed inside the Colle del Duomo Museum.

2. The capital - stylistic analysis

The capital found in 1987 is a marble artefact of fine workmanship, historiated with the Adoration of the Magi and signed by the author *Magister Guilelmus*; the name is engraved in Gothic characters and it is only partially preserved (Figure 2). It has two sculpted sides, the third side has been lost while the fourth side, which is the rear, has no carved figures but it is engraved with some grooves. On the basis on this evidence it can be supposed that the capital was part of a portal jamb. This hypothesis seems to be supported by the dimensions of the capital (26 x 27.5 cm and 32 cm high). According to Fulvio Ricci, a local art historian, the capital had been reused in the church as an acroterion placed on the top of the façade [6].

Figure 1. The church of Saint Silvestro in Piazza del Gesù (Viterbo, Italy).

Figure 2. The capital of *Magister Guilelmus* in the Colle del Duomo Museum (Viterbo, Italy).

Figure 3. The left side and the front side of the capital with the scene of the Adoration of the Magi.

The Magi are sculpted in profile and wear long dresses crossed by well-defined furrows that create folds with an undulating shape, the same technique is visible on what remains of the Child's robe. The Magi also have long hair and beard and a face with sturdy features, on the whole they appear as solid figures, endowed with a naturalistic plasticity.

The scene flows without interruption from left to right (Figure 3). At the corner of the left side, the best preserved one, there are the three horses of the Magi placed in vertical succession. The three animals, depicted harnessed, come out of what could be the gate to the city, characterized by a door, a column with capital and a semi-arch. On their right stands the first figure of a magus, almost entirely preserved, who is about to remove the crown from his head with his left hand, while he probably holds a gift in his right hand The second magus, carved in the corner between the left side and the front side, is the most poorly preserved figure; only the left arm remains, carved in the act of removing the crown from his head. The third magus is instead kneeling in front of the Virgin with the Child; he also removes the crown from his head with his left hand, while in the right he probably brings a gift.

The Virgin with the Child is partially visible, so we can understand that she was carved in the traditional iconographic image, sitting with the Child resting on her legs.

2. The 3D graphic documentation

In the field of Cultural Heritage, the graphic documentation has the purpose of reproducing and transmitting the forms of artefact. The relief of the geometric characteristics of such artefacts has to be necessarily conducted through instruments with very high spatial resolution due to their often articulated forms. The development of terrestrial photogrammetric procedures which allow a high level of automation (digital photogrammetry) has become an interesting research topic especially for the enhancement of close-range systems based on photogrammetric software implemented by Computer Vision automation algorithms [7-9].

The close-range multi images system use the 'Structure for Motion' (SfM) strategy to allow the simultaneously and automatically estimation between the images, the internal and external orientation parameters and the coordinates of the points that constitute the object [10]. The SfM technique makes possible to extract and identify homologous points, and subsequently to orient sequences of images, without having a preliminary knowledge on the camera characteristics. SfM is therefore a process of image matching that uses algorithms developed in the Computer Vision field from the 1990s to calculate spatial coordinates using pixels sampled in digital photographic images.

The aim of this work is to apply a non-invasive 3D digital documentation based on the close-range multi images system with high metrological precision to the study of the marble capital. The realization of a 3D digital model is particularly useful in the artefact documentation, conservation and restoration

phases, as it allows a complete investigation of the surfaces of a 3D subject with a single 1:1 scale model. Furthermore, the system is completely non-invasive since it does not involve contact with the object. The close-range multi images system therefore allows analysing the surface state of conservation, the loss of material, and the presence of overlapping materials.

The 3D documentation was carried out with the acquisition of photographs of the capital by using a Nikon D5300 digital camera. The 3D relief of the capital with the multi-image close-range system was performed by Agisoft PhotoScan® software. The software allows to automatically create textured 3D models from a set of digital photos of the object. The advantage of the PhotoScan® software is to provide an intuitive graphical interface where the menu bar contains the main software functions necessary for the realization of the 3D model and its texture. Like traditional photogrammetry, SfM employs overlapping images, acquired from different points of view. The difference between SfM and the traditional photogrammetry is in the possibility to determine simultaneously and automatically the internal geometry of the camera used for the shots, its position and orientation [11].

The workflow of the software, after uploading the photographs, requires the use of the SIFT (Scale Invariant Feature Transform) algorithm, developed by Lowe in 2004 [12]. This algorithm is able, to calculate and reveal the position of the homologous points (pixels) in the whole set of inserted images. The homologous points present in the frames are sufficient to establish the spatial relations within a system of relative coordinates XYZ, and consequently to arrange the photographs according to the calculated parameters. The SIFT algorithm also allows to connect the characteristics of the frames, also with scale variations, viewpoints of the shot, partial occlusions and variable exposure of the photographed object. Thus, the bundle adjustment algorithm controls and limits errors during the transformation of the coordinates of the 3D points of the object into a point cloud, more or less dense, depending on the key points revealed [13].

The next step is the generation of a dense cloud of points through image matching algorithms. These are: Area Based Matching (AMB), which perform the statistical comparison of the grey intensity scale detected on the images, but do not extract the function; Feature Based Matching (FBM) that first look for common functions in the images and then proceed to extract them. The combination of both algorithms ensures optimal results, but takes a long time. The dense points cloud thus obtained can be used for the generation of a mesh, which can in turn be textured to create a 3D photorealistic digital model [14].

For the creation of the 3D model of the capital, the first step was to provide a series of photographs in the field with shooting geometry, sufficient for the realization of the digital model. A set of fifty-eight photos of the capital was created to obtain the 3D model; the shots were taken so as to obtain 80% overlap between the images. In order to reduce the error and obtain an accurate alignment of the frames, the photographs were taken without a flash and using a fixed focal lens to avoid distortions in the processing for the creation of the 3D model (Figure 4).

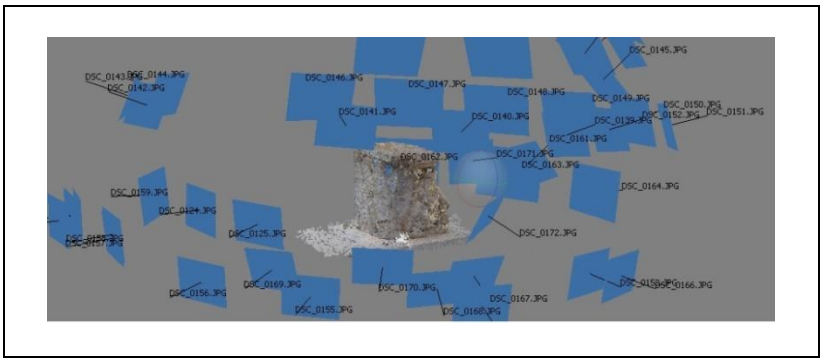

Figure 4. Visualization of the alignment of the fifty-eight photos and the scattered cloud of the capital in the Agisoft PhotoScan® software.

Figure 5. Visualization of the model 3D in the Agisoft PhotoScan® software, from different points of view.

The post-processing phase lasted about 4 hours by use a PC with the following characteristics: CPU Intel(R) Core(TM) i7-7700HQ CPU @2.8 GHz, Ram 16 Gb; Windows 10 64 bit, video card INVIDIA GeForce GTX 1050 4 Gb.

For the model, the software identified 21.813 homologous points on 54 frames (300 dpi resolution, RGB 24 bit, .jpg 8Mb file) and created a dense cloud composed of 16.756.922 points and a 3D model composed of 3.351.374 faces in the mesh.

Thanks to the 3D model, was possible map the state of conservation of the surfaces, and document in detail the sculpted scene in order to achieve a correct historical-artistic analysis and a comparison with some known Romanic capitals.

4. Results and discussion

Through the comparison with some already known Romanic capitals, some reconstructive hypotheses concerning the fractured parts of the capital have been proposed. The support of the 3D graphic documentation in this aspect of research was of fundamental importance (Figure 5).

Several comparison capitals have been identified for the second Magus king scene, the most badly preserved, in order to identify the possible pose in which it had been carved. The most indicative is a Romanic capital with the Adoration of the Magi from the Cathedral of Saint-Lazare in Autun (France, 12th century), in which the second magus is represented in the same act of removing the crown from the head with his left hand, while with the right one he offers the gift to the Virgin with the Child [15]. Comparison with this capital is also important for another reason. On the right side of the artefact, where there is the Virgin with the Child, an arch supported by small columns with capitals, a tower and a portion of walls are also carved. The presence of these structures is part of the practice of characterizing the capitals of the period with the representation of architectural elements and above all it seems to confirm, in this case, the hypothesis advanced with regard to the possible representation of the entrance of the city.

The analysis of other Romanic capitals historiated on three sides was instead important to advance reconstructive hypotheses on the most poorly preserved side of the capital by *Magister Guilelmus*. The most widespread iconographic model foresees Saint Joseph next to the figure of the Virgin with the Child and it is a scheme that seems applicable also to our case. The comparison could be done with a capital of the portal of the abbey of St. Leonardo in Lama Volara in Siponto (Italy, 12th-13th century), an example of Apulian Romanic [16]. The figure of Saint Joseph, among other things, is also present on the right side of the capital of Autun.

The historical analysis cannot ignore the artist *Magister Gulielmus* who was active in the construction of the Cathedral in Pisa in the 12th century. A lost inscription mentions a pulpit made in 1162 by *Gulielmus*, decorated with scenes from the Gospel that, in 1310 was replaced by a pulpit carved by Giovanni Pisano. The pulpit of *Gulielmus* was transferred in Cagliari a city at that time under Pisa political influence. In the 18th century it was divided into two small choirs placed on the sides of the median portal of Cagliari Cathedral. On the right choirs there are the Adoration of the Magi and the Return of the Magi on horseback to their homelands. Despite the importance of the commissions was different, it is possible a stylistic comparison between the artefact from Pisa ad the capital from Viterbo, especially in the representation of figures and draperies.

Another important aspect is related to the artistic production of the pupils of *Magister Guilelmus*; in 1166 the brothers Gruamonte and Adeodato with Maestro Enrico sculpted the Cavalcata and the Adoration of the Magi on the architrave of the Pieve di Sant'Andrea portal in Pistoia, along the Via Francigena. In the 13th century the style of these Romanic sculptors was renewed by Nicola

Pisano, one of the main masters of Gothic art and father of the aforementioned Giovanni. His pulpit in the Baptistery of Pisa, built in 1260 has a detail that suggests a fascinating hypothesis. Among the panels decorating the pulpit railing, all carved with scenes concerning the life of Jesus Christ, one depicts the Adoration of the Magi. Style and composition are very different from the capital of *Magister Guilelmus*, but the three horses are depicted in order that significantly resembles those carved in the Viterbo artefact, with the possibility of some influence on Pisano by *Magister Guilelmus*.

The style of *Magister Guilelmus* shows the influence of the Lombard and Provençal Romanic and represents a precious testimony of the itinerant nature of the workers. The presence of Lombard Romanic masters in northern Lazio is reported by the Viterbo historian Cesare Pinzi, who lived between the second half of the 18th century and the beginning of the 20th century [17]. In this regard it is necessary to underline the importance of pilgrimages, especially starting from the 11th century, when pilgrims, artists, lords, soldiers, businessmen arrived from Europe to Italy through the *romee* ways.

Figure 6. The Virgin enthroned with the Child on the portal of the church of Santa Maria Maggiore in Tuscania (Viterbo, 12th century).

In many sacred buildings present in Viterbo and in its territory it is possible to find the decorative motifs of the Lombard Romanic; in the city there are the Cathedral, the church of Santa Maria Nuova and the church of Saint Sisto: In Viterbo surrounding area there are the church of Santa Maria in Castello in Tarquinia, the church of Saint Flaviano in Montefiascone, the churches of Santa Maria Maggiore and Saint Pietro in Tuscania [18, 19].

In particular the figures of the Santa Maria Maggiore portal have the same artistic style of the capital of *Gulielmus*, evidenced by the comparison between the two scenes of the Virgin and Child (Figure 6). Based on the stylistic

comparisons and the *Magister Guilelmus* signature, the capital can be dated to the mid-10th century.

5. Conclusions

The presence in the church of Saint Silvestro of a sculpted capital with the Adoration of the Magi is not surprising, since it fits perfectly into the set of symbols and meanings of Romanic art, where the Adoration of the Magi is one of his most recurrent depictions. The journey of the Magi to Bethlehem turns here into an allegory of medieval pilgrimages and consequently along the *romee* roads it found its greatest diffusion: the Magi thus become king-pilgrims, the first pilgrims of Christianity [20].

The Via Francigena, a 1600 km long route that led from Canterbury to Rome [21, 22] was born as a way of communication with a political, military and economic function during the Lombard period. The route took even more importance as a connection between Northern Europe and Rome during the reign of the Franks, hence the name Francigena. In a short time, the road also acquired a devotional function, propitiated by the growing phenomenon of pilgrimages to Rome. The iconography of the Magi visiting the Madonna with the Child then characterized the sacred architecture located along this route, including those in Viterbo. The church of Saint Silvestro, is located in Piazza del Gesù, but also at the entrance of a narrow street still today called Via dei Pellegrini. At the end of this street, near Piazza della Morte, an epigraph, dating from the 11th to the second half of the 12th century, is walled on the façade of a house and bears witness to the donation by the family of Guido and Diletta of their own residence, to clergy so that a hospice for the pilgrims who travelled along the Via Francigena would be built. The house on which the plaque is affixed is still known today as the Ospizio dei Pellegrini [23]. There is no certainty that the placement of the artefact is the original one but, thanks to the discovery of the capital of *Magister Guilelmus*, it is possible to make a very interesting proposal: the church of Saint Silvestro and the Ospizio dei Pellegrini could constitute, inside of the city of Viterbo, an important welcome point for pilgrims who had to walk the last stretch of the Via Francigena, where they could find refreshment and at the same time dedicate themselves to prayer.

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