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Ph.D. Thesis

BUILDING TECHNIQUES WITH LIMESTONE WALL FACING IN THE UMBRIAN-MARQUES AREA BETWEEN 8TH AND 15TH CENTURIES

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Indice

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Introduction

Present research, aimed to deliver an historical and technical in-depth analysis about this item in a still underdeveloped area, has been performed in continuity with the studies carried out in recent years on medieval construction techniques at national and international level. The historical and geographic boundaries of the examined techniques have been designed by the territory features and by the choice of construction materials. Along the Umbria-Marques Appennines, where appropriate raw materials for building can be drawn, we have found similar building methods characterised by wall facings with limestone blocks.

The object of my study was the Umbria in its current administrative boundaries and the Appennines territories of Marques, paying particular attention to the cities located along via Amerina and via Flaminia, with their main side roads.

My study had initially been designed to deepen the analysis of medieval Umbrian buildings, but have had some changes due to the particularities of the geographic area under study. Actually no building techniques used during middle ages in the area that today falls below the borders of the region Umbria, can be circumscribed at the present borders of Umbria, which don't respect the historical and geographical complexity of this area. Umbria is located by nature in a border area between different cultural realities of central Italy since the pre-roman age, when there were Etruscans in the west, and Umbri in the east. Even the construction materials and related techniques were different, especially in the late antique and medieval times. Two macro-areas can be distinguished: 1) the area of sandstone masonry, which can be found most in the northwest part of the region and are not here discussed, and 2) the zone of white and pink limestone structures which can mainly be found in the south and east. The latter have something in common with already studied, contemporary realities in Lazio and Abruzzi and full similarity with the architecture of Marques, that have thus been included in the zone under study. Social, political and administrative conditions have also created exceptions to the described division: these aspects have separately been taken into consideration.

The ultimate goal of present study, beyond historical knowledge, has been to raise awareness of the importance of medieval architectural heritage in order to improve its conservation, including in the Umbrian-Marques area. In these regions, despite the existence of fine publications, it was not possible to find any complete cataloguing of masonry types nor advanced and organic studies on the various construction techniques. This event caused a general lack of attention in the restoration phases of structures, especially for the non- decorated surfaces. Even though Renzo Pardi wrote precious papers on the medieval architectural panorama in Umbria and more recent studies on Umbrian Romanic architecture performed by Maria Grazia Gigliozzi, there is still a lack of specialized literature on this subject and the documentation on which to base the research is still scarce. The cited studies are indeed the ones dealing with the middle ages architecture in an organic and comparative way. Apart from some lucky exceptions, buildings have been investigated mainly as artistic products to the detriment of the architectural analysis; in all cases the relevance to constructive techniques and their transformations are very rare. Among the early studies on Umbrian masonry we have the fundamental contributions by Donatela Fiorani on the transformations of technique in late-medieval wall facings and by Daniela Esposito on the paradigmatic case of the church of S. Maria Assunta in Otricoli. Moreover Renzo Chiovelli catalogued of the various types of murals found during the study of the Spoleto fortress. Though basic, these studies are not enough exhaustive to drive the research in a so large and various territory, still having many unknowns.

Present study has been carried out by combining the direct analysis of masonries and construction materials with the exam of bibliography and archive documents. To overcome the lack of sources and difficulties found in attesting the authenticity of the structures and their finishes, the study was performed on as many as possible masonry of proven realization in the middle ages. Given the great difficulty of analytical approach to the research topic, the creation of a large database containing a large number of case studies was of fundamental help. This long filing campaign has been not only useful for the identification of different types of wall, but also for the compilation of statistical comparisons concerning the different use of construction materials, the impact of trade, the presence of different raw materials and of reuse materials on the territory.

The discovery of the monuments of major interest for the research has always been based on the presence of studies with written and iconographic sources attesting the construction phases, and on the presence, within these structures, of masonry pieces which - if possible - are statistically significant 'undisturbed samples', concerning the different use of construction materials, the impact of trade and the presence of different raw materials as well as of reuse materials on the territory.

The analysis method has been focused on the physical aspect of the constructions in a multidisciplinary manner, with collaborations in fields different from architecture.

Throughout its lifetime, the research was able to enjoy the collaboration of the Experimental Laboratory of the Department of History, Design and Restoration of the Sapienza Architecture faculty where, under the supervision of architect Elisabetta Giorgi, I was able to carry out the tiling campaigns of masonry and mortars.

The study of the building materials and of the geo-morphological landscape of the Umbria-Marques Appennines has been performed by collaboration with professor Angela Baldanza of the Department of Physics and Geology at the University of Perugia. Under the supervision of professor Baldanza, a 6-month curriculum was conducted for the local limestone and its physic-chemical characteristics, in order to analyse its diffusion in relation to its use as building material.

The adopted method has also been refined thanks to the participation in the PhD program in inheritance of the Cultural Heritage Study, directed by professor Jósef Laszlovszky at the Department of Medieval Studies at Central European University in Budapest. This project gave rise to the opportunity to deepen my research on the properties of building materials with the collaboration of the Department of Geotechnics and Engineering applied to Geology and the Department of Mechatronics, Optics and Computer Engineering of the Budapest University of Technology and Economics. With the help of professor Ákos Antal and under the supervision of prof. Ákos Török I was able to initiate the experimentation of the phenomenon of chromatic degradation, which is visible on the Umbrian-Marche architecture pink limestone. This part of the study was particularly intriguing, given the presence of bi-chrome decorations in medieval times in Umbria with the juxtaposition of different coloured limestone - white and pink - which in some cases seem to have changed their 'design' because of the discoloration of the stone. The emerging project lies in the search for the chromatic alterations of stone materials that are currently a further subject of research on the conservation of construction materials.

Given the historical-geographical magnitude of the theme and the pioneering level of the research, the work done can not be considered exhaustive for all the construction techniques and their variants present in the examined territory. However present study sets as a starting point for a wider study that fits into the already well-defined part of the building techniques in Central Italy.

1 HISTORICAL OUTLINE

In present thesis we are examining a land whose boundaries are: at south approximately the current boundaries of Umbria, at west the river Tiber valley including Perugia, Umbertide, Montone and Città di Castello, at north the river Metauro valley, at east the chain of Sibillini mountains (fig. 1).

These territories are - at the moment - part of several administrative districts, but show each-other deep links due to the partially common history provided with continuous economic exchanges and cultural relationships additionally connected by the presence of similar, easy minable raw materials, leading to comparable building techniques even in temporally and territorially different contexts.

Umbria and Marques are concerned with cities and countries that trend to variety and fragmentary nature, sharing complex historical-administrative events. Thus it was impossible to divide the study of building techniques from the geographical-political *milieu* in which these techniques were used.

Both Umbria and Marques only recently arrived at the current administrative structure, after development of unitary Italian State government. The above countries defined their boundaries after a long historical-political course resulting in incorporation of lands belonging to very different realities. Despite several attempts to centralization done by the Papal state all along the modern age, only since the institution of Umbria and Marques districts in 1860 we can recognize two political- administrative entities though due to bureaucratic decisions more than the result of autonomous culture.

Lack of well defined geographical and ethnic boundaries of Umbria, the above mentioned political fragmentation, the centuries-old political marginality of this land, that is opposite to its geographic centrality, the existence of several local realities, the lack of a strong point of convergence able to collect various territories, each instead attracted by neighbouring areas, during centuries created an unstable and somewhat unclear situation and a considerably heterogeneous political network in which feudal, religious powers as well as municipal and sub-regional autonomies played their role.

The territory of Marques also shows strong multiplicity. We can recognize this multiplicity in the name itself of the land. The name of Marques comes from the German *Marka* which means "boundary." The territory was actually divided in several borderlands by Ottonian dominion, thus the current name means union of several borderlands.[1]

[1] The first marka was the Marca of Camerino, followed by the Marca of Fermo, of Ancona, and Urbino. During Middle Ages these lands were joined and named "Marca of Ancona" as reported by Egidian Constitutions in 1357 (SELLA 1912).

1.1 Historical outline from pre-Roman times to Middle Ages

The Umbrian-Marques Apennine has always been characterized by the presence of two different areas of influence divided by the Tiber River valley that represents a well recognizable border in the history of local medieval construction technique.

We have the first document of the dual identity of Umbria in pre-Roman age, when on right of the river Tiber there was the Etruria and on left of the same river we can observe the territory of Umbri. The country of Umbria was isolated and rather closed to economic and cultural exchanges with neighbouring people. The emperor Augustus, who divided his empire in several *regiones* maintained the ancient division and named Umbria a larger than current zone, corresponding with the territory previously occupied by Umbri. Actually the *Regio VI* consisted of two sub districts divided by Appennines excluding Perugia, that belonged to Etruria (*regio VII*), and Norcia, that was included in Sannium (*region IV*), whereas Umbria included Orticoli and the Casentinian territory. At east, along the Adriatic coast, theare was the so called *Ager gallicus* including Rimini and Ancona (fig. 2).[2]

The rearrangements done by Diocleziano and Costantino in the III and IV century included most of the territory in the district of *Tuscia and Umbria*. Thus the Umbria no more had its administrative autonomy.

Between 5th an 11th centuries the barbaric invasion of Visigoths and Ostrogoths, the bizantin conquest and the occupation by Longobards lead to important fragmentation, decay of farming, crisis of towns arosen along the connection routes.[3] A new arrangement took place at first due to the birth of Dukedom of Spoleto[4] and the creation of the so-called Byzantine Corridor,[5] which implied the shift of all the commercial traffic along via Amerina. Further rearrangement, with the re-opening of Via Flaminia, followed Carlo Magno's action, that destroyed the Longobardian kingdom and practically delivered the region to the Papal dominion (fig. 3).

Central Italy, which in roman era was one of the most urbanized areas conserved many of its urban settlements, the most important of which were localed along the routes Flaminia and

[2] "The *VI Regio Augustea* included the Umbrian Appennine, the Adriatic zone with the rivers Pisaurus, Metaurus and Aesis: thus included Umbria and Ager Gallicus. This disposition was rather the same of that described by Strabo (…); the strabonian Umbria however included also Ravenna and Rimini." (MAZZARINO 1964, p. 245).

[3] Umbria and Marques were occupied by Goths that arrived to the cities of Spoleto, Norcia, Perugia, Assisi, Narni e Todi, where we can find some restorations ordered by Teodorico. This region was then at the center of the Greek-Goths war, which caused substantial decline of ancient urban centres, partly due to demolition of acqueducts during sieges. Cf. BULLOUGH 1978; GROHMANN 1978 e MOCHI ONORY 1954, pp. 57-77.

[4] The dukedom of Spoleto was isolated from the Longobardian Kingdom by Byzantin estate. It had variable and often unclear boundaries. The territory of Dukedom, at its maximal extension arrived to Marques and included the cities of Assisi e Foligno, the high valley of Nera river, the hollow of Norcia and Leonessa and the zone of Rieti with a great part of Sabina. Cf. BOGNETTI 1958, pp. 263-265.

[5] The Byzantine Corridor was a narrow belt belonging to the Ravennian exarcate: it served to connect Rome and Ravenna. This belt followed Via Flaminia and Via Amerina, including Amelia, Narni, Orvieto, Todi, Perugia and Gubbio (MENESTÒ 1999, t. II).

Amerina.[6] Due to need of security and to the formation of swamplands, relocation of settlements towards higher places often occurred in late ancient age. Some of the most paradigmatic cases are the towns of Gubbio, definitely transferred on Igino mount (fig. 4); Foligno temporarily transferred on S. Valentino hill;[7] Otricoli, where the Medieval village was rebuilt on hills, where the pre-Roman village had been abandoned, Acquasparta, rebuilt on the hill from which still now it overlooks the valley of Naia river[8] and Gualdo Tadino, that appeared in 1180 as a completely new centre with squared drawing where we can see some characters of Federician foundations, different from the Roman *Tadinium*.[9]

Some other cities did not follow the above trend and remained inside the Roman walls. This behaviour was anyway often typical of already located-on-high-ground settlements, as Perugia and Spoleto were. Terni, Bevagna and Città di Castello instead are intriguing exceptions. These cities were positioned on particularly strategic locations, thus maintained the same placement even between the 6th and 11th century.

During the above age monasteries, that represented a religious, cultural and economic meeting point, played a very important role for the cultural growth of the entire zone. Exempla are the settlements of Monteluco, centred on the monastery of S. Giuliano near Spoleto following the system of the *laure*. In Valnerina moreover the hagiographic tradition wants that the eremus of friars Felice e Mauro was exactly where now is placed the Church of S. Felice from Narco. A very ancient monastery had to be located near the S. Pietro Abbey in the Ferentillo valley;[10] the monastery of S. Eutizio in Nursi land, which was already known from the VI century, also deserves a mention.[11]

Only after the A.D. 1000, following political-economic changes happened in Italy and in the mayor part of Europe, we observe a shift in the Umbria-Marques zone, where the free-cities started arising. Social and politic changes sharpened the conflicts between ecclesiastic authority and nobles, bringing to important changes of the appearance of cities, so architecture started playing a growing role among arts.

Actually from 11th century, tanks to increase of trading, people started working for more and more complex and ambitious building sites in all the Umbria and Marques area. The link among territories of these regions and north Latium became stronger particularly along the Flaminia and Lauretana routes.[12]

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[6] The cities of Spoleto, Gubbio, Perugia, Gualdo Tadino, Todi, Terni, Otricoli, Narni, San Giovanni Profiamma, Foligno, Spello, Trevi, Bevagna, Amelia, Bettona, Nocera Umbra, Assisi e Orvieto. corresponded to the ancient Dioceses. Cf. CZORTEK 2012, pp. 12-13.

[7] The ancient city of *Fulginia* was abandoned In late-ancient era tanks to barbarian invasions. According to the few found documents it can be suggested that people seek refuge on the S. Valentino Hill, in the town of Civitavecchia, now disappeared. For details on the city of Foligno see SENSI 1984.

[8] CAGIANO DE AZEVEDO 1965, p. 155.

[9] GUIDONI 1978, pp. 387-409.

[10] PANI ERMINI 1983.

[11] PENCO 1965; MELONI 1966; PANI ERMINI 1983.

[12] According to Alberto Grohmann in the introduction to the volume *From urban reality to reconstruction of a civilization framework. Local History Tracks* since the Middle Ages, in Western Europe, there is a substantial process of economic development that finds in cities a point of strength. This phenomenon is particularly clear in cities distributed along the Mediterranean coastline and in those located along the

From 11th to 13th century, the demographic growth and urban development was higher than in every other era. This happened in the majority of Italian and European centres. The renovations and improvements included building of new walls, squares, city halls: in central Italy these enlargements were enough extensive to contain further developments over centuries.[13] It is worth noting that the municipal self-government created new urban needs with the requirements of architecturally significant buildings to erect in dominant places of the city, in contrast towards the symbols of the religious power (fig. 5).[14]

The expansion of new, even large, architectural works did not happen only in citizen environment. Between 11th and 12th century not only the municipal self-government but also the mendicant orders were born.[15] The mendicant orders knew great expansion in Italy and even in the rest of Europe, with important effects on architecture and arts (figg. 6-7).[16]

Towards the end of Middle Ages the city of Perugia showed a great expansion: this event shifted the cultural and economic barycentre of the entire zone and Perugia obtained the control of the entire Umbria plus part of Marques.

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main road axes connecting the south and north of the continent. The city and its market thus play a significant role for a new development model. Cf. GROHMANN 2006, p 8.

[13] Among the earliest and most important enlargements we can see Todi (first half of 13th century), Foligno (1250) and Spoleto (end of 13th century). Cf. GROHMANN 1981, pp. 84-106 e GUIDONI 1978, p. 398.

[14] In Italy, between late 11th and the 12th century, started the phenomenon of the municipal city–states. At first the authority was represented by the college of consuls, in substitution of the ancient power of Bishops, then by the Podestà, and at half 13th century, by the Capitano del Popolo (Chaptain of People). It was obviously mandatory to build a palace for developing the political and administrative activities.

[15] Panhandler friars are initially present in Umbria and Tuscany, spreading also in urban environment. The *Ordo fratrum predicatorum* (Dominicans), the *Ordo fratrum minorum* (Franciscans) and the *Ordo eremitarum Sancti Augustini* (Augustinians), were the most important. Augustinians were the first: their regulation was approved in 1059, the other two started in 13th century.

[16] The birth of begging orders have played an important role both in the rural and in the urban sphere, which in some cases have led to urban expansion plans, leaning on the old walls or overcoming them as Spoleto did (ROMANINI 1983). For a closer look at the geographic expansion guidelines of the monasteries and hospitals of the town of Perugia, see GROHMANN 1972, pp. 26-97.

1.2 Main ancient and Middle Ages roads

Via Flaminia and via Amerina run across the Umbria-Marques land following pre-Roman design which were rationalized by romans between the 4th and 3rd century B.C. (fig. 8). Since their first creation, these roads and their respective variations linked the most important cities of Umbria, Marques and Romagna with Roma and Latium. Thus structuring the territory[17] and allowing continuous exchanges even in time of great crisis.[18] Economy, but also culture survived during all the late antiquity period and Middle Ages in central Italy thanks to the mentioned routes. In architecture, this cultural survival is documented by the use of similar and well recognizable building techniques.

In the studied area we can document intensive commercial traffic during 13th century; great amount of goods was delivered to Rome after having crossed Marques and Umbria. The commerce was done among local cities[19] as well as with central Europe and Asia.

At the end of Middle Ages also the Via Lauretana, whose design was similar to the actual state route SS 77 - Val di Chienti. The traffic in Via Lauretana started at the end of 13th century and was anyway dependent to Via Flaminia for trans-boundaries transports (fig. 9).

Tabula Peutingeriana[20] (fig. 10), and *Cosmgraphia by Ravennatis Anonymus*[21] are the oldest documents from which we can identify the ancient and Middle Ages pathways in our area.

The fluvial ways were connected to the ground roads. Umbria and Marques show several rivers, however long sections of them are not navigable, especially in the tract inside Umbria.

We can thus think that the rivers were mainly used from the Adriatic and Tyrrhenian harbours of Latium and Marques to the fluvial harbours on boundaries. From fluvial harbours the traffic continued on ground. The most utilised rivers were the Tiber, whose navigability is well documented in Roman and Medieval times till the city of Orte, on west and the Esino on east.[22]

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[17] In high Middle Ages the network of roads was still founded on Via Flaminia and Via Amerina. Via Flaminia passed trough Narni, Bevagna, Foligno, Forum Flamini, Nocera Umbra the passages of Sheggia and Furlo. The Flaminian arm called "esteriore", which passed through Terni and Spoleto, rejoined to the main Flaminia at Forum Flaminii. Another arm of consular road, came out from via Salaria near Rieti arrived to Terni. Via Amerina came out from Cassia and proceeded trough Ameria, Todi, Bettona, Perugia and rejoined to Cassia at Chiusi (MILLER 1963, p. 16, tav. XII).

[18] The eastern arm of Flaminia, in other words the way trough *Spoletium*, *Trebiae* and *Fulginia*, was completely working during the Greek–Gotic war (A.D. 535-553) as Procopius Cesareus writes and as it is documented by the maintenance of the road ordered by Teodorico, who selected *Spoletium* as administrative headquarter of central Italy. Cf. ALBANESI 2014, p. 560.

[19] Trading of paper is a significant exemplum: more than 70% of paper used in Rome during 13th and 14th century was made in Marques, small sheets at Camerino (Piorago) and large sheets at Fabriano. Main production of parchment used in Rome and Naples came from Gubbio, Foligno, Spoleto, Perugia and Spello. For details see DI STEFANO 2014.

[20] The *Tabula Peutingeriana* is a medieval copy (12th-13th century) of one of ancient *itineraria picta*, written between the 3rd and 5th century. These papers were a sort of guidebook used by travellers as a map with suggestions of itineraries, towns, stations, etc. The *itineraria picta* were different from *itineraria adnotata* that contained lists of towns with distance town to town, on a single road.

[21] *Cosmographia* by *Anonimus ravennatis* is a paper based on an itinerary, written in Ravenna on about 700.

[22] NICO OTTAVIANI 2008; BONAMICO 1930.

1.2.1 Via Flaminia and its double route

The construction of Via Flaminia started about 223 B.C. and was completed on 220 B.C. owing the will of the censor Caius Flaminius.[23] Via Flaminia was one out of the first *viae publicae* directed towards northern Italy: it maked possible the roman expansion in the Po valley. Caius Flaminius himself was one of the major supporters.[24] The design of Via Flaminia made unitary and "rearranged" preexisting roads used by the preceeding italic populations linked to transhumance and to migration of Umbrian people that habited on left of Tiber since the ironage.[25] The most ancient design, named "protoflaminia,"[26] was used to make the section that crossed, and still now crosses, Umbria and Marques. This ancient road was used by Umbrian people to cross the Apennines and by people of Marques to connect the major cities. We can actually think that discovery of the ancient route allowed romans to conquest and develop new colonies which in turn had major importance for the final construction of the street.

Via Flaminia started from Servian wall and continued toward north, through the Tiber valley. The first section connected Rome with important towns such as Civita Castellana (*Falerii Veteres*), Otricoli (*Ocriculum*) and Narni (*Narniae*), where presented a branch: The more ancient road reached the cities of *Carsulae*, Massa Martana *(Vicus ad Martis)* e Bevagna (*Mevania*), whereas the second arrived to Terni *(Interamna)* passing for Spoleto (*Spoletium*) and joined the old road at San Giovanni Profiamma (*Forum Flaminii*). After reconjuction, Via Flaminia crossed Appennines and arrived to Fano (*Fanum Fortunae)*.

The original design of Via Flaminia was improved by Caius Sempronius (177 B.C.), Augustus and (27 B.C.) e Vespasianus (76 A.C.).[27] The improvements regarded reinforcement, recovery with construction of holding tanks, linearization of the design with building and restore of bridges.

As previously discussed, Via Flaminia not only contributed to the Romanization of Umbria and Marques, but also created a consistent link between Rome and Gallia: Actually, once reached Rimini (*Ariminum*) in 187 B.C., Via Flamina joined with other roads such as Via Emilia, thus allowing the connection with roman colonies in Gallia.[28]

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[23] FESTO LXXIX, 16; STRABONE libro V, 217; PLUTARCO, *Quaestiones Romanae,* 66; CASSIODORO, *Chronica* 534; LIVIO, *Perochae,* 20.

[24] *Viae publicae* were roads passing trough public ground, thus were subject to public administration. These roads had to be built by magistrates holding the *imperium,* which gave them the authority of dispossessing. The first (most ancient) road was probably Via Amerina, built few years before the Via Flaminia. Cf. Sisani 2006; RADKE 1981, pp. 21-24; FESTO 508, 20; SICULO FLACCO, De Condicionibus Agrorum, in Gromatici Veteres, vol. 1, p. 146 (ed. Lachmann); ISIDORO, Origines 15, 16, 5; ULPIANO, Digesta 43, 8, 2, 21.

[25] Pineschi

[26] RADKE 1981, pp. 22.

[27] Opening a second tunnel, longer and more interior than the preceding tunnel in the canyon of Furlo is due to the emperor Vespasianus. Fulfillment of this tunnel was rather difficult because of excavation inside calcareous rocks.

[28] On north of *Ariminium*, Via Flaminia joined *via Aemilia* (187 B.C.) that arrived to Piacenza (*Placentia*) and *Via Popilia* (132 B.C.), that arrived to Adria (*Hatria*) running along the Adriatic coast.

Via Flaminia entered in Umbria at XLI miles from Rome in the site of August's Pile whose name still now remembers the existence of a bridge erected on pillars (fig. 11).[29] From this place, via Flaminia continued as a straight line from Otricoli to Narni trough the bridge so called ‘bloodly’ on the river Nera. The design coincides with the actual road. From the site named Testaccio, Via Flaminia proceeded on the western slope of the cliff, arrived to the pass of Garibaldi square in Narni, then the road ran down to the Nera river. Over this river Romans built the Augustus bridge.[30] After Narni, Via Flaminia became double: the old road that passed though *Carsulae* e Bevagna and the new connecting Terni, Spoleto, Trevi and Foligno. Both arms rejoined at *Forum Flaminii,* today San Giovanni Profiamma. The two ways are two parts of the same road, with different functions, because the western way is the military road ordered by Caius Flaminius, the east had economic and commercial uses. The second way actually was 6 miles longer than the western. The east road was curvy because it passed trough densely inhabited territories that had previously been absorbed by Romans. The eastern arm was also called Via Interamma or Via Flaminia Nova. It probablly was a piedmont road, changed with a more speedy design, owing the movement towards plain of cities only in late republican age.

The western arm, once passed the August's bridge, proceeded close to the east-northern side of Nera river crossing the creek Calamone and after two miles the creek Caldaro. When passed the church of S. Bartolomeo, the road continued to Sangemini and *Carsulae*, a city with roman plant built on Via Flaminia so that in the urban segment is the *decumanus maximus* and orients the development of the city (fig. 12-13).

An important diversion originated from Flaminia just at north of Carsulae. It was directed to Spoleto and Appennines. This road is still now called “via romana” or also Road of sheeps, because it was used for transhumance. In this section the ancient and the current road have the same design until the church of S. Giovanni De Butris, that was built over the archs of a roman bridge. orients the development of the city (fig. 14).

Than the road crossed on two bridges the Naja creek in order to reach the site where nowadays the church of S. Maria in Pantano is. This site had to be a stop point (*statio vicus ad Martis*).

The path to Bevagna today is no longer recognizable for long stretches. According to ancient itineraries it should be about sixteen miles and have a more direct course of the current road. The only unmistakable trace of the route is the Bridge of the Devil in Osteria del Bastardo; hence the ancient road was descending to the Valle del Attone to arrive to Bevagna through a land fertile and rich in rustic villas and settlements. The current urban layout of Bevagna still retains the characteristics of the ancient road and the Via Flaminia, which in the urban section had to represent the “*decumanus maximus*”. The road goes out from Porta Foligno to head towards Madonna della Fiamenga with a straight-line that gets to San Giovanni Profiamma.

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[29] Piles were probably still visible on 1673 as documented by the Agostino Martinelli’s picture and by planimetric-topographic maps of 17th century, to follow the changes of riverbed. For example look at the map of Tiber at Ponte Felice, done on A.D. 1658 (BAV, Chigi P VII 12, f. 47).

[30] One out of the most famous Roman bridges tanks to several pictures done by Italians and foreigners landscape painters.

Eight or nine miles from Narni, there was Terni, first city along the western track, also called via Flaminia Nova. At Terni Via Flaminia Nova crossed the river Nera after havig crossed the valley of Tessino and the pass of Somma. Though we have not documents about, in this section thepath is obliged, owing the geo-morphologic character of the territory. When passed the city of Spoleto, we can find the ruins of the bridge built about 175 B.C., so called “bloodly”, that crossed the creek Tessino. Finally the segment *Spoletium-Forum Flaminii,* that was studied by Schmiedt, is identifiable as a rural road starting from S. Maria Pietrarossa of Trevi. This street now runs parallel to the current railway and arrives to the town of S. Eraclio, where it is possible to find the ruins of the ancient roadbed. After having passed S. Eraclio, Via Flaminia can be identifiable with the route which brings to S. Maria in Campis of Foligno, where we can now find part of the road bed and a large necropolis. From this necropolis Via Flaminia entered the old city of *Fulginae* – now Foligno - and then arrived to S. Giovanni Profiamma.

The ancient street probably corresponded to the road passing now trough a built-up area on the right side of Topino river. From this site we can think that both the ancient and the current streets have the same pathway until the bridge “Centesimo”, where the ancient Flaminia went down towards the river Topino, crossing it on a bridge now destroyed by overflows of river and also by the contruction of the railway. The ancient street then climbed on the left side of the river and after the current railway station of Capodacqua proceeded on a long bridge, of which we can now only see the tank for collection of water. From the above site Via Flaminia arrived to Pieve Fanonica where we find the ruins of a complex work for containment of ground, close to the current tunnel done in Topina valley; an impressive bridge, very small traces remaining now, brought the street again on right side of the river and with a straight way to Nocera Umbra. After having passed Ponte Marmoreo, a long rise brought to the sites Spugne and Cartiera and finally to *Statio Nuceriae*. The path of ancient Flaminia was different from the current street from the Gaifana railway station to Gualdo Tadino. From Palazzolo di Fossato di Vico a straight rise arrived to the top hill of Borgo di Fossato di Vico, crossing appennines at the pass of Scheggia (*Ad Aesis*), 632 mt. above sea level.

Via Flaminia so entered Marques, passing trough the gulch of Fucicchie and continuing trough the gulch of Burano.

The first town touched by via Flaminia in the Marques region was Cantiano where the ancient center of Luceolis is located. Then Via Flaminia ran along the creek Burano until Cagli, were we can observe the ruins of the impressive Manlio bridge.[31] The pathway proceeded rather straight, retracing the prehistoric way and remaining on left side of Fucicchie gulch with half coastline path. The road came along the Burano stream and the river Candigliano, since the to gorge of Furlo, where we can still observe several Roman ruins.

Once out from Appennines, The Via Flaminia continued with straight line (rectilinear) design going beyond the cities of Fossombrone and Calcinelli and reaching Fano; from there the road went to north overcoming Pesaro and arriving to Rimini.

[31] LUNI 1996.

Along Via Flaminia, especially in Umbria and Marques, we can see secondary streets starting from the principal path, which allowed the connection of several urban centres with economic and military importance and partially lightened the traffic on the principal road.

The most interesting secondary paths were: a road from Massa Martana to Todi; the connection Foligno-Perugia; the road from Nocera Umbra to Ancona, the pathway Cagli – Senigallia and the connection fano-Ancona trough the Adriatic coast. Other, less important, secondary roads were the connection between Spoleto and Massa Martana and *Carsulae,* crossing the Martani mounts, the paths between Fossato di Vico and Gubbio and from Calmazzo to Urbino.[32]

1.2.2 Amerina route

Via Amerina connected the northern roman countryside with Umbria in very ancient, also prehistoric, ages passing trough South Etruria and pointing to Amelia (*Ameria*), the city from which via Amerinatook his name, with a short and speedy design.[33]

In the late ancient age Via Amerina gained major importance when it became the unique connection trait between Rome and Ravennian Esarcate because of the Longobardian control of the central section of Via Flaminia after the invasion leaded by Alboino in 568.[34]

Some modern authors ascribe Via Amerina at 241 B.C., in coincidence with the foundation of *Falerii Novi*, now Civita Castellana.[35] Simone Sisani however, thinks that the name itself gives the precise chronology for this road.[36] Actually he claims that Via Amerina has to be made before 312 B.C., when, with the opening of Via Appia Romans started calling the roads with the name of the Consuls.

Sisani's dating should be taken into account at least for the initial part of the road and is supported by the chronology of the roman expansion to northern Italy, that confirms the *terminus ante quem* given by the fulfilment of Via Appia. From 383 to 373 B.C. the control made by the *Nepet*[37] colony is actually documented; Moreover, Rome and Falisci closed their hostilities in

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[32] PINESCHI 1997; VANTAGGI 2007.

[33] CICERO, *Oratio Pro Roscio Amerino*.

[34] Charlemagne's Franks destroyed the Dukedom of Spoleto on 774; from this date the strategic importance of via Amerina decreased and the traffics came back to Via Flaminia. Via Amerina anyway maintained an important local role even on following centuries until late XVIII century, when Via Nepesina was built by the local administration. Via Nepesina connected Nepi with Civita Castellana. It represented the easiest and fastest connection between Via Cassia and Via Flaminia. More details in CAVALLO 2004, p.13; FREDERIKSEN, WARD PERKINS 1957, pp. 195.197; DE LUCIA BROLLI, p. 31.

[35] FREDERIKSEN, WARD PERKINS 1957, pp. 99, 187-188.

[51] The road takes its name from the town Amerina, where the road were stopped in its first design. However, Via Amerina was prolonged to Perugia in early decades of III century. We can state that, because the precondition to build the monumental gate on the reconstructed walls of the Etruscan city was the existence of a road arriving there. Discovering if the prolongation of Via Amerina kept its original name up or, as generally happened, it acquired a new, no more known, name, derived from the magistrate's name who cured the construction. Cf. SISANI 2006.

[37] Cf. LIVIO VI 21, 4.

359 B.C.[38] Sisani claims that Via Amerina was opened on 329 B.C.[39] when Rome was probably threaten by a Gallic attach. Moreover, this roads eems to retrace the way walked by Fabius Rullianus to conclude his march from the *ager faliscus* to Perugia, where he fighted a battle.

According to Sisani, other evidences come from the discovery sites of coins coming from Roman-Campanian mintage in Umbria; these coins were in use during III-IV century B.C.[40] Another evidence would come from the urban plant of *Falerii Novi,* whose foundation represented was the *"terminus post quem"* of opening the Via Amerina.[41]

In the Sisani's theory *Via Amerina* would be the 1st *via publica* opened by romans in Umbria.

The starting point of via Amerina should be the ancient post station of *Vacanas*,[42] than the street continued towards Nepi (*Nepet*), Civita castellana (*Falerii Novi*), *Castellum Amerinum*, a town near to Orte, Amelia (*Ameria*), Todi (*Tuder*), Bettona (*Vettona*) and Perugia (*Perusia*).[43] Two branches started from Perugia: one was directed to Chiusi and probably arrived to *Via Cassia*, the 2nd crossed Via Flaminia near *Luceioli* passing trough Gubbio.[44]

Amerina road entered Umbria passing trough the plain lying at north of Orte, then proceed runnig along the coast of Vadimone lake. Tiber river could be crossed, probably by boat, at the Seripola harbour where we can still see traces of an dock. In Severinian age, the early pathway

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38 The was finished eight years before, but the peace was ratified only on 359 B.C. by a written agreement (*foedus)*. Cf. LIVIO VII 38, 1.

39 According to Sisani, the focal point is the origin of the alleged attack. The Gauls in this case should not be sought among those who still in the mid-4th century. B.C. were stationed in southern Lazio, nor among the 'recaptured' towards Apulia by L. Furius Camillus in 349 B.C. but in a new horn coming from the north that could attack Rome through Umbria. The consul L. Aemilius Mamercinus is charged with defense. He allocates in Veio an army with the order of not moving and brings a second army in perlustration of other roads. According to Sisani in that case the "*aliud iter*" (LIVIO VIII 20, 2-5) should be referred to via Amerina.

40 Very few Roman-Capanian coins were found at north of Rome; all coins were found in the amerinian territories, thus in the southern part of the Via Amerina in Umbria. Details in MONACCHI 1986; MONACCHI 1999, BERGAMINI, CATALLI 1991 e RANUCCI 2002.

41 The plant of *Falerii Novi* – done on Via Ciminia - is structured with perfectly symmetric and orthogonal blocks that changes only in the southern sector of the city, in the site (correspondent to *cardo maximus*) where Via Amerina goes out of the city walls. In this case the city gate is asymmetrically placed and the blocks close to the gate have trapezoidal layout, see SISANI 2006.

42 This place has several toponyms, as: *Vacanas*, *Vacanae*, *ad Vacanas* e *ad Baccanas*. Cf. CAVALLO 2004, p. 9.

43 Solo la prima parte della strada, dalla *mansio ad Vacanas* fino ad Amelia, è però facilmente individuabile per quasi tutto il suo tracciato, grazie alla presenza di molti tratti di basolato antico ancora conservati. Tra i secoli XIX e XX numerosi rilevamenti e scavi sono stati effettuati dall'Istituto Britannico di Roma fino alla località di Puntone del Ponte (insediamento falisco situato tra Corchiano e Vasanello). Dal 1973 al 1985 l'archeologo T. Potter ha condotto altre ricerche nei dintorni di Nepi, sull'antico abitato di Narce, che sorgeva lungo l'Amerina, e sulla domusculta di *Capracorum*, un insediamento rurale, poi fortificato, fondato da papa Adriano I intornoall'anno 780 poco a nord dell'attuale paese di Formello. Nel 1983 sono cominciati da parte del Gruppo Archeologico Romano gli scavi in località San Lorenzo, Tre Ponti e Cavo degli Zucchi, a sud di Falerii Novi, scavi che hanno rivelato, ai margini del basolato perfettamente conservato e poggiato su precedenti strade ricavate nel tufo, la necropoli della città, con sepolture databili dal II secolo a.C. al IV dell'era volgare. Alcune di queste tombe sono state rinvenute intatte, nonostante la frequentazione bimillenaria del sito. Cf. MUNZI 1994, p.52.

44 MENESTÒ 1999; CAVALLO 2004, pp. 7-13.

was probably brought closer to Orte, and the Tiber crossed thanks a bridge – called Augustus' bridge- , which collapsed during the first half of 16th century.[45] We can still observe the ruins of the mentioned bridge.

Via Amerina joined its early layout slightly more at north, continuing along the river Rio Grande until the Montenero and proceeded to Amelia on the same path of the current district road. Laterally to the pathway we can observe indisputable proofs of the existence of this road, that however is documented till 18th century.[46] Once passed Amelia, Via Amerina crossed the river Rio Grande and proceeded along the right side reaching Ponte S. Leonardo, where newly jumped on left side and went on the valley until Castel dell'Aquila.

Castles, often built overdefensive towers of the Byzantine passageway, gradually made abandoned the walley-floor way, and to fulfillment of a new crest layout, parallel to the old path able to connect the new villages. On the western side, the most important among these were Avigliano, Dunarobba, Sismano, Pesciano, Montenero e Vasciano sul lato orientale e Sambucetole, Lacuscello, Collicello, Canale, Frattuccia, Castel dell'Aquila, Camerata, Torre Gentile, Fiore e Torre Olivola.[47]

Once passed the Arnata creek, Via Amerina entered Todi trough the homonim gate, forming the *cardo maximus* (fig. 15). After having passed the city *forum*, the road went out towards north and was directed to Deruta e Bettona along the left side of tiber river on the pathway now used by Tiberina road.

We have not many documents about the pathway at north to Amelia, probably because it was a *glareata*, that means a cobblestone way. Anyway we can hypotise its design, owing traces coming from Middle Ages. The existence of an ancient street is shown by ruins of bridges, defensive walls, towers, churchs dedicated to S. Giacomo, hospitals and shelters for piligrims.[48]

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[45] After the collapse of the bridge in Orte, the traffic on Via Amerina was consistently lowered. From the collapse of the mentioned bridge to contruction of a new bridge (1860) was done by boat.

[46] The road design is documented by the reports from periodic inspections of the Amelian ruling class to the boundaries of the City territory " starting from gate Busolina went on the roman street up to Montenero." (CAVALLO 2004, p. 14).

[47] Torre Oliviola doveva rappresentare la più imponente e strategica fortificazione posta a vigilare sulla valle dell'Arnata tra Castel dell'Aquila e Todi (MENESTÒ 1999).

[48] The sole toponym remained in some instances.

1.3 Middle Ages sources

I suggest a synthesis of the building regulation and organisation of schools and corporations of arts of "*lapicidi*", stone-cutters and workers of wood, that must have worked in Medieval Umbria and Marques.

My study is based on the analysis of documents about the rules inside the various free-municipia and the rare documents written by the architects their selves. In particular I studied the rulements of the free-cities Allerona (1585), Bevagna (1500), Cannara (XVI century), Fabriano (1415), Foligno (1419), Gualdo Tadino (1522), Montone (1341 o 1342), Norcia (1526), Orvieto (1581), Perugia (1279), Piediluco (1417), Spoleto (1296), Todi (1275) and the rules of Terre Arnolfe (1286) and of Terre di Lugnano (16th secolo).[49]

I was moreover able to read the original pp. of the *Arte della pietra e del legname* ("Art of stone and wood statute") of the municipality of Perugia that was manuscript in late Middle Ages. I also compared the buildings by the *Scuola di marmorarii,* that worked in Spoleto from 11th to 13th century to the studies by Hartmann Grisar of late 19th century.

The collected documentation is an index of a regulatory environment: it did not require many restrictions on extraction and trade of building materials. On contrary other Italian regions approved severe laws on purchase and transport of raw materials and already worked elements. The study of the above rules allowed the researchers to deepen the choices made by local authorities during the design and construction of the structures. A similar in-depth analysis has not been possible in the Umbria-Marques cities and in their respective areas of relevance.

Data obtained from the examined municipal statutes are extremely limited and don't allow for a thorough knowledge of the art of manufacturers unless if not 'negative' by getting information on what might have been the habit, given the absence of legislation on it.

The comparison of studied operas and the written old sources shows that in the Umbria-Marques late Middle Ages, starting from 14th century, it can be observed progressive less accuracy in the fulfilment of facades built in calcareous elements. The various authorities responded with increase of rules regarding the workers in the construction sites and in the workshops connected to these sites.

1.3.1 Municipal building regulation

Some collections of Medieval municipal rules, that can now be seen in the archives of Umbrian and Marques cities, mention the presence of "*Magistri lapidum et lignorum*", that probably were part of the respective Schools and Corporations. The city of Perugia alone not only ruled building sites, but, from 14th century, also the commerce of building materials.

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[49] Present study took into account some statutes of XVI century because often the text comes from proceeding papers. This is the case of the municipal statute of Foligno, dated 1419: its first writing, of early XIV century was only weakly updated in the successive century.

The most effective and useful exempla, that I'll highlight in the section of municipal regulation, have been found in some columns of the municipal statute of Foligno and in the statute of *Arte della pietra e del legname* of Perugia. The mentioned collections are the most precise and complete among those written before the 15th century.

Documents concerning the building regulation or the commerce of materials have not been found in Spoleto. The city of Spoleto is however very intriguing because it is well known that the famous School of *marmorarii* was active in that city.[50]

Coming back to Foligno, rules about the professional ethics of artisans and the building legislation of the city are present in the statutes. The columns LII and LV rule the work of construction workers and concern their commitment to finish the begun works, the prohibition to do subcontracts for the assigned work and to create personal trusts. In the first case the statute concerns only the masters masons and carpenters and establishes that they should finish the work and/or the work for what they had been paid, also if the work had been initiated by another mason of whom the artisan was taking on responsibility. In the case of lack of respect for the above regulation, the artisan had to pay a penalty and or his name will be deleted from the guild of artisans. This detail makes us sure of the existence of a college and a list of members. Therefore only the artisans present in the list were licensed to work in the territory of Foligno. Another rule for the workers in the building site is in the column LV that is addressed to artisans, masons and carpenters, forbidding subcontracts and creation of trusts against the public interest. The penalty for lawbreakers was the payment of 25-pound weight of money and the conclusion of the work.

The regulations of Foligno bring us to suppose that several cases of building sites abandon occurred in Foligno; before the entry of the mentioned legislation, several constructions had probably been designed and initiated by artisans different from those who worked to conclude the construction.

The municipal statute of Foligno also ruled the building plan and the urban decor. These rules concern the conservation of public buildings and the citizens 'right to ask for demolition of a new building in the case of proven illegitimacy.[51] We can presume the great importance gained not only by building and conservation of walls with related gates and bridges but also by the housing standards, the aesthetic and functional qualification of the municipal habitat. Similar laws concerning operas of public utility is documented in the statutes of municipia of Norcia,[52] Orvieto,[53] Montone[54] and Piegaro.[55]

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[50] The sole law about building is the column XVI concerning "building of city walls". This column establishes sites and methods to build the walls, but does not concern the professional requirements to make the work.

[51] These regulation is written in the following columns: XIII "About maintenance and preservation of walls and bridges of the city of Foligno"; LXIII "concerning notification of a new opera"; XLVIII" concerning the maintenance of the floor of the city of Foligno; XLVIIII "concerning people who have houses close to the city walls and how to consider them."

[52] Column CXVII "about what to give by the Camorlengo of the municipality of Norsia" CORDELLA 2011, p. 100.

[53] Column XV "Quod nullus eleuet lapidem de aliquo Ponte, vel muro Communis" (DELLA FINA 2007, p. 255).

[54] BEI, BARTOLI LANGELI 2014, pp. 53-60.

The municipality of Fabriano had only one written rule in its statute. This rule however is important because it makes clear that also this municipality had a college of masons and carpenters. This is the column CVIIII "concerning the division of an house." The column establishes that, in the case of division of a private building with construction of a wall, this had to be built by two master masons and carpenters, nominated by each part.

The statute of Orvieto is well-structured and complete; even in this city the *Arte dei Muratori*[56] is ruled by written columns. Moreover, other columns call for the oath, which had to be done by artisans for permission to work in the city. Orvietan statute is much more complex than all other analysed by me during the present study. It is thus possible that the now available statute is partly or totally due to reforms made in 16th century.

1.3.2 Municipal colleges and the statute of the statue of the *Arte della pietra e del legname* in Perugia

The municipal colleges were well structured associations, formed by workers who did the same art(profession). The colleges were useful to protect the practise and the quality of their work. These colleges earned great expansion in 12th and 14th century and had basic importance in the economic, politic, and social life in Italian and European cities.[57]

Early documents showing the presence of associations of workers can be identified since the roman age.[58] The roman associations were however mainly constituted by busnissmen and their principal task was the defense of their profits towards authorities. In late imperial age Diocletianus ordered the creation of the so-called *collegia opificum* with the aim of improving the social stability after the changes due to the crisis of the 3rd century. The *collegia opificum* were hereditary associations of workers. Probably the early high Middle Ages associations in Rome, Naples and Ravenna were based on these *collegia opificum*.[59]

The typical Medieval *Corporazioni di mestiere* are documented only from 12th century and went on during all the late Middle Ages. From late 15th century we observe the decrease of importance and power of these corporations that completely disappeared in 17th century. During medieval times the corporations were classified as majors and minors based on the time of

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[55] Chap. XIIIII" about the wall of the castle to remake and restore" and Chap. XVII "About who substracts sand, lime, stone, wood, or similars that are property of the municipality or other people" (RIGANELLI 2006, pp. 60-61).

[56] This is a sort of price list, which mentions the most common works. The column X is about the work of masons: "*De rebus pertinentibus ad Artem Muratorum*" da *Statutorum* 1983, p. 287.

[57] The word "*corporazione*" (association) that generally indicates the associations of artisans in literature, was coined only on XVIII century. In Middle Ages the mentioned associations had various names, depending on the politic and linguistic area to which the association belonged. In central Italy (Bologna, Firenze, Perugia) these associations took the name of *Arti*, in Lombardia of *Pratici*, in Venice of *Fraglie*, in Sardinia of *Gremi*. In Europe the name was *métiers* (France), *guilds* (England), *Zünfte* (Germany), *gremios* (Spain), *grémios* (Portugal), *συντεχνία* (Greece).

[58] The associations were probably present and politically active since I century B.C., as documented by some electoral inscriptions found in Pompei.

[59] BRAUDEL 1981, pp. 307-309.

constitution and on the political importance of each association.[60] The earliest and most important were the commercial corporations (colleges) whose existence is documented on early 12th century in Pavia, Genoa, Piacenza, Roma and just after in Milan, where the room of merchants dates back to 1159, Florence (1182) and Bologna (1194).[61] During 12th century, these "major" associations took the role of leader of society and city institutions, extending their influence to the public regulation as the assessment of weights and measurements or monitoring of the streets. All the associations of arts were born following the colleges of merchants. Some corporations directly descended from those of merchants, e.g. the corporation of money change, whereas other colleges, namely the corporations of artisans, showed an independent formation.[62] The associations of artisans had not the chance of ruling the entire society because of stabilization the leading position of merchants, who regularly succeeded in imposing their rules.[63]

Each corporation had each own headquarters and each own statute trough, which ruled the work of members.[64]

Statutes of arts appear in Umbria between 12th and 13th century, equipped with the list containing the names of members, who were the sole artisans admitted to work in the territory of each city. The statutes were mandatory in order to protect the profession, against the non-members, to safeguard the economic equalization of members, to establish the hierarchy among members, to rule the work defending the quality of the supplied products and services.[65] It is evident that the first concern of each corporation was to defend its exclusive access to work orders, even when their exclusivity was challenged.

Very accurate and exhaustive documents on the order and organization of Umbria-Marques *corporazioni* was found in the collection of the statutes of arts held in the archives of Perugia. In Perugia corporations of Artisans benefited from longer life than in the rest of Italy tanks to the peculiar politic system that guaranteed the admission to public offices and to the government of the city only to the members of corporations, even if non-practicing or no more practicing the profession.

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[60] In Florence the arts were classified as "maggiori" (major), "medie" (medium), and "minori" (minor), considering the expected income for associated of each art. In Florence actually the social progression of arts resulted in their full politic victory. The association of arts at the end became the model of the city institutions their selves. Details in the history of Corporations and Arts in Florence. GANDI 1928, p.17.

[61] SOLMI 1931.

[62] About end of 13th century, the corporation of merchants still held all the activities in Milano, Verona, Parma, Piacenza e Cremona.

[63] Hierarchy among corporations can be studied by the participation in the governments, the site assigned in the processions an by the prosperity of their members. Worth knowing that the position and prestige earned by single members of an association had to temporary overcome the possible evidence of economic recession. For more details see BERENGO 1999.

[64] Each association held an organizational chart with a "*Camerlengo*" assisted by some "Rectors", a board, and sometimes a court where to debate cases involving members of the association. Details in BERENGO 1999.

[65] The items made in violation of regulation, consequently were considered as false by the corporation and the offenders were heavily punished.

The study of the statute of the *Arte della pietra e del legname* (Art of stone and wood) was particularly useful for my research.

The statute of Art of stone and wood is a never published manuscript held by the central library of Perugia; it is dated 1385 but obviously had more ancient roots, probably coming from 13th century.[66] By analysing statements and rules of this statute, I was able to observe a cross section of the politic, social and economic life of late Middle Ages Umbria, related to the working life of artisans and businessmen.

The mentioned rules are mainly of administrative nature, aimed to guarantee the corporation. Some rules however have technical and ethical character. The subject of the section IV is, though generically, ethical: each member has work professionally. The section XXVII is more technical: it establishes how and when it was possible to cut trees for supplying wood. In this case it is worth noting the abundance of details in the rules for wood addressed to constructions: the column XXVIIII states that when necessary, it was possible to buy the wood in the market, but the artisan was not allowed to sell the scraps (the waste). On contrary no document, including successive changes, reports any regulation about extraction and supply of stony materials. Probably stony materials were abundant; moreover the associates were certain that every member was perfectly able to find and work the ashlars with techniques stabilized and well known in the artisanal workshops that rather freely and autonomously operated in the field of constructions.

The city of Perugia also stated the rules for permission of artisan's work. The artisan needed a task-work contract certified by a notary of the association for task-works higher than 10 lb. (column XXIII), he had to previously declare the presence of co-workers (column VII) and they had to be registered in the same list. By this way the statute protected the citizens and corporation members, more over the municipality confirmed its power.

The reform of 1428 introduced new and intriguing details. The market should have had an important evolution, also regarding the supply of construction materials.

The columns XI and XX actually state that the *Camerario* must control the standard samples stored in each workshop. Storing up standard samples for doing measurements came probably from a municipal order; moreover the columns LXIV and LXXII formalize that only the *Camerario* was allowed to take decisions on purchasing and contracting.

The documents studied in Perugia show that in this municipality the artisans were able to provide themselves with building materials directly or by buying it in public markets; they were probably also allowed to sell the materials, after having respected some rules. Due to the deregulation of technique, the artisans freely used it. However the artisans should respect the municipal rules about cutting wood and economic administration, as well as buying/selling materials. Also weights and measurements were controlled since 1428.

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[66] (…) The first document on the existence of statutes of the arts is dated 1260. These statutes had to exist from long time if the Great Board made an act of respect toward these statutes (…) among the corporations, in 1294 we can see the *Petraioli* (stone workers) and the "*Artieri dei panni vecchi*" (textile workers) (BRIGANTI 1910, p. 25).

1.3.3 The school of *marmorarii* in Spoleto

According with the studies of Hartmann Grisar a school of *marmorarii*, similar to the roman *'cosmatesca'*, worked in Spoleto during 11th and 12th century. This school is also called Melioranzio school, honouring Gregorius Melioranzio,[67] who was its most important master. This school seems to prefer the Greek instead of Latin forms, so it was slightly different from the Roman school.[68] The recurrent art motives, which outline an original style of Spoletian school are the ornamental design with leaves and the cross decorated with scales,[69] that probably indicate Longobardian influences or possibly they were influenced by the miniatures of manuscripts.[70] The mentioned *stilemata* are present in all the operas of the school of Spoleto and make these operas unique and anyway different from the works of the contemporaneous roman schools (fig. 16).

In Spoleto as well as in Rome, the raise the school of *marmorarii* evolved in correspondence with the Gregorian reform and the so-called 'rebirth' (Rinascita) of 12th century. This is an historic phase in which, starting from the Pope Pasquale II (1099-1118), the entire central Italy showed the awakening of masonry. The above cited chronological correspondence, when set against the aesthetic and formal solutions used by *marmorarii*, allows us to hypothesize a relationship between the will of supremacy of the Church and the *modus operandi* of *marmorarii,* actually they developed style and arguments of their operas finalized to show the new universal and theocratic conception of Papacy.[71] The reproduction of ancient models did not take place as simple imitation, but by fusing the Medieval aesthetics and faith with the classic Greek and Roman standards of beauty. *Marmorarii* made a sort of re-examination of the ancient classic art anticipating – in agreement with Grisar - the themes that will be developed by the proto-renaissance of Florence.[72]

The birth of this peculiar school moreover coincided with the siege and fall of Spoleto in 1155. During the siege and successive fall, the city and its buildings underwent serious damages,

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[67] The name of this author is engraved on the left marble jamb in the central gate of S. Maria Assunta in Spoleto

[68] Grisar suggests that the original character of *marmorarii* is recognizable in many decorations (friezes) of gates and frontons in the area of Spoleto and is characterized by "knowledge and safety not present in preceding Christian centuries" and "the ornamental design is more similar to Greek than to Latin forms" (GRISAR, p. 45).

[69] "squamme". Cf. GRISAR 1985, p. 48.

[70] Hartmann Grisar found intriguing affinity between the ancient "*lezionario*" of Spoleto and the Meliorazio's sculpture. GRISAR 1985, p. 46.

[71] The study of political and social events shows the peculiarity of Rome and of territories under roman influence in the 12th and 13th century and explains why, in this zone, we observe autonomous and apparently retarded standards of beauty with respect to what was done in the rest of Europe.

The architecture of the roman area is characterized by the permanent use of planimetric and spatial solutions of paleo-christian origin where we can find some ideology-driven decisions. The buildings and the artistic manifestations of primitive Christianity represented the constructive and figurative expression of those principles which, beginning with the Lateran *Sinodus* (1059) and the subsequent *Dictatus Papae* of Gregorio VII.

[72] GRISAR 1895, p. 46. Referral to buildings and artistic works of early Christianity, transfer on buildings and figures the principles that, starting from the *Sinodus Lateranensis* of 1059 and the successive *Dictatus Papae* of *Gregorius VII*, were aimed to ratify the leadership of the roman Pope.

thus it was necessary restoring civil buildings and especially to build new churches and to restore the old ones.

Tough these artisans acted principally as sculptors/ decorators, they also made small architectural actions and figurative mosaic works. As done by the roman artisans, Spoletian *Marmorarii* made friezes on the gates of the major Spoletian churches, coverings with coloured marbles, and some, rare, architectural works, as small covered walkways with the top beard by arches on small columns which were decorated by sculptures and mosaics.

Similarly to romans, the Umbrian artisans took from ancient operas *stilemata* but also the material itself. Differently from what happened in Rome, however, neither in Spoleto nor in other umbrian cities exist documents regarding the permissions to extract marbles from ancient structures or concerning the eventual exclusive access to ancient marbles by artisan workshops

The operas due to the corporation of *marmorarii*, not only are present in Spoleto, but even in other Umbrian cities as Narni, Terni, Sangemini, Bovara, Bevagna, Foligno and Assisi.

The marble frieze on the prime gate of the Spoletian cathedral is one among the most refined works of the *marmorarii* (fig. 17). This frieze is signed – it is not just a coincidence - by the Master Melioranzio (fig. 18). In the central part of the architrave we can see a cross made up of leaves, a typical *stilema* of this school and at both sides are present other decorations with leaves, that continue also inside the jambs. The volutes are of unquestionable classic inspiration, but can be dated at late 12th century,[73] owing the presence of details with typical Middle Ages style. In particular we can consider the decoration with leaves coming out from the lateral mouth of a head provided with three faces, as a symbolic and innovative character. It is possible to observe this figure, together with the cross also in a lunette, coming probably from a church of the same city that now is enclosed in the stairwell of the city hall. Another low relief made in the time of maximal expression of the *marmorarii* is the work done with design and figures on the facade of the church of S. Pietro in Spoleto (fig. 19). This relief is considered one of the most mature works of the school of *marmorarii*, because not only it shows great variety of decorations, with entire stories with animal and human figures, but also shows extremely pure drawings. Dating at 12th century is supported by the figure of small columns on each side of the major gate: these columns are clearly similar with the roman cosmatesque columns of 12th-13th century (fig. 20). Inside Spoleto, a very important opera is the great relief on the lateral left gate of the church of S. Gregorio Maggiore where, beside the cross, is also present the Christ's monogram, that is another symbol frequently used by *marmorarii* (fig. 21).

Outside Spoleto we can found other religious buildings with decorations done by Melioranzio or artisans coming from the same school. Each of the three churches in Narni shows a bas-relief presenting the stilemata of spoletian decorations. The S. Giovenale cathedral has a decoration on the main gate that was made in 1123; on lateral gate, the same church shows a more mature work with a central cross and leaves. The church of S. Maria in Pensole has a bas relief on facade showing deep and important affinities with S. Pietro and S. Ansano in Spoleto: same affinities can be found in the decorations of the Church of S. Domenico that can probably

[73] Decorations of Spoletian gates can be identified with the re-building during the XII century, after the devanstation done by Federico Barbarossa.

be dated on 13th century (fig. 22). The decoration on the gate in the facade of the church of S. Nicola in Sangemini, belongs to the maximal splendour of the *marmorarii's* school; we can actually see the typical design with leaves of extra fine manufacture, similar to the decoration of S. Maria in Pensole and S. Pietro in Spoleto.

Mandatory documents for dating the above work are the tympanum of the church of S. Pietro in Bovara, whose appearance is absolutely similar to Spoletian *marmorarii* style and the epigraph certainly datable 12th century (fig. 23).

Other exemplum of very accurate work, can be assigned to Melioranzio's school is the bas-relief in the gates of S. Michele a Bevagna signed by the architects Rodulfus e Binellus. This relief have some common features with the facade of S. Bartolomeo in Spoleto and with the cathedrals of Foligno and Assisi.[74] These cathedrals were made by the same architects who worked at the churchs of Bovara and Spoleto: their style shows several common characters with the spoletian works done by Melioranzio.[75]

Grisar suggests that it would also be assigned to *marmorarii*'s school the bas-reliefs on gates and on apsis inside the Tempietto sul Clitunno, the decorations on the facade of S. Salvatore's church and of the S. Ansano's gate, both in Spoleto.[76]

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[74] The master Atto for the chatedral of St. Feliciano in Foligno and of St. Peter in Bovara, whereas Giovanni da Gubbio was the master of building in Spoleto and Assisi.

[75] Hartman Grisar claims that the main gate of the chatedral in Assisi shows the same style as the works by Melioranzio.

[76] GRISAR 1895, pp. 127-146.

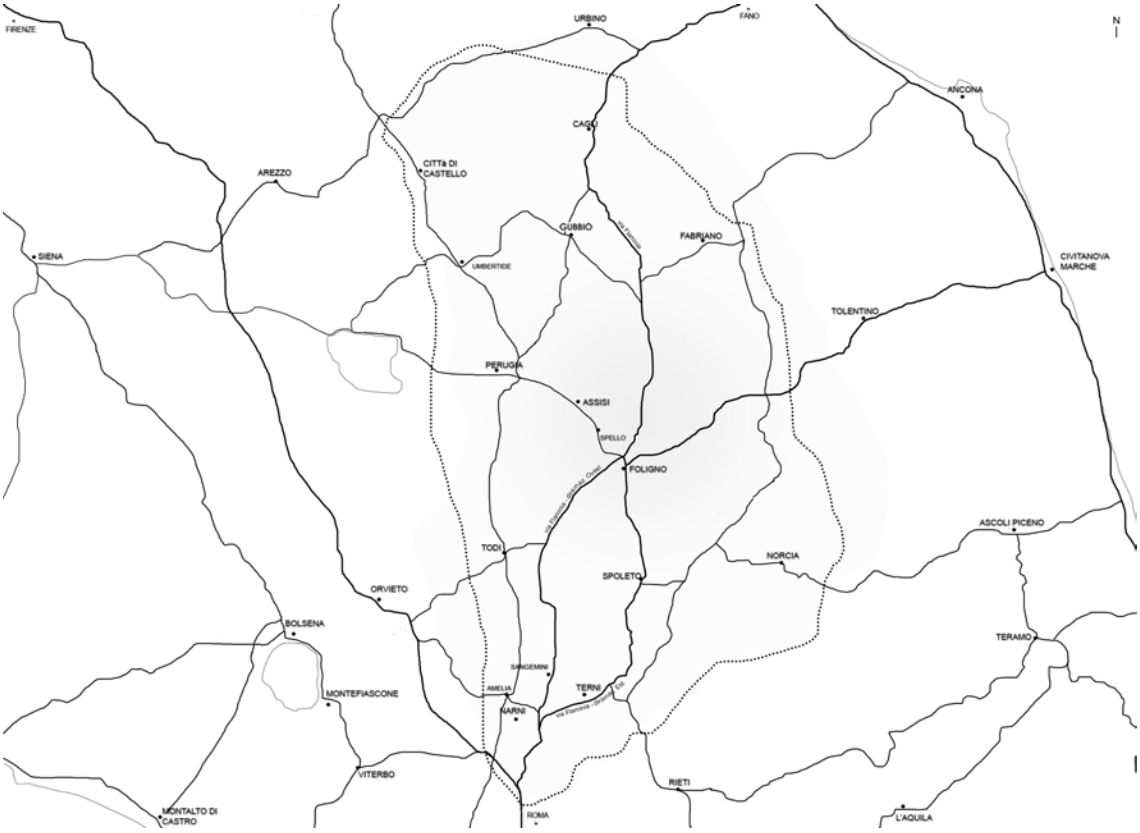

Fig. 1. Borders of the Umbrian-Marques area. Graphic processing E. Scopinaro 2017.

Fig. 2. The division of Italic territory operated by Emperor Augustus. Detail of Central Italy (WELLS 1712).

Fig. 3. Italy longobards between the 6th and 8th centuries. The Byzantine corridor. Graphic processing ZANICHELLI 2013.


Fig. 4. View of the city of Gubbio. Below the remnants of the Roman settlement, in an overhead position the present-day medieval city. Photography E. Scopinaro 2017.

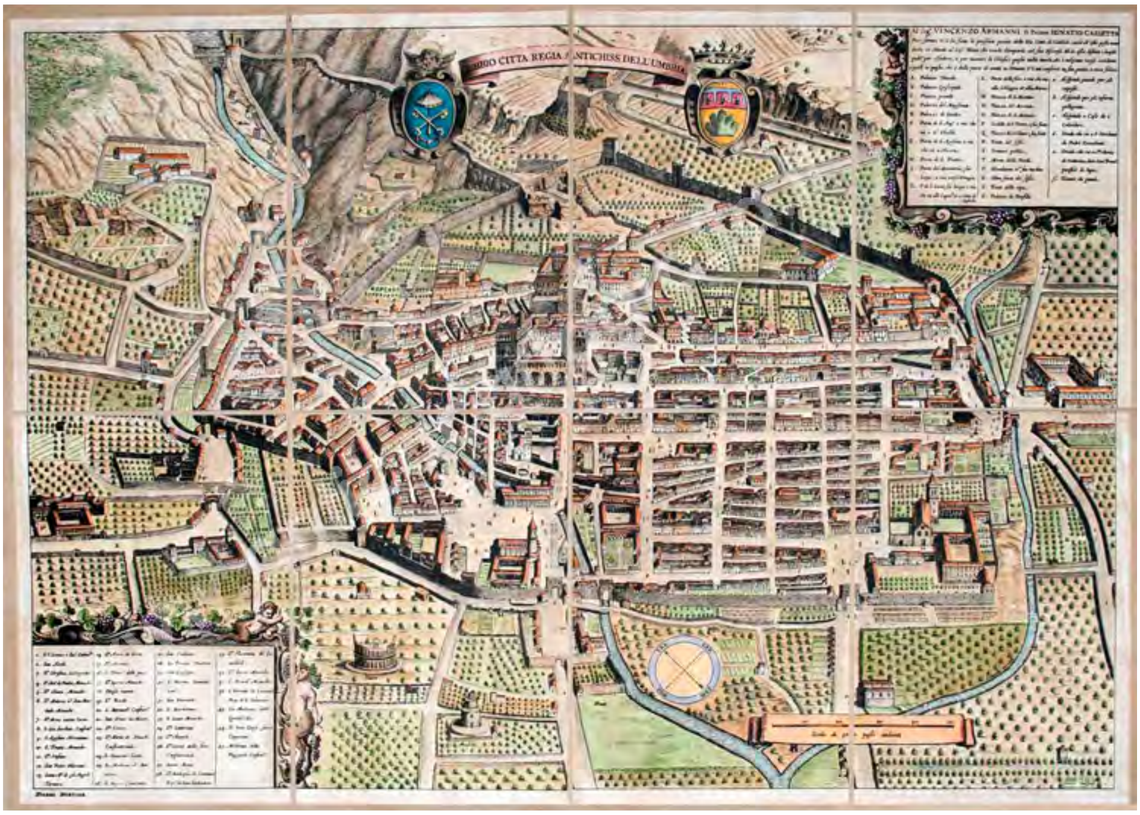

Fig. 5. The city of Gubbio in a map made by Ignatio Cassetta during XVIII century.

Fig. 6. The Upper Basilica of St. Francis to Assisi. Photography E. Scopinaro 2016.

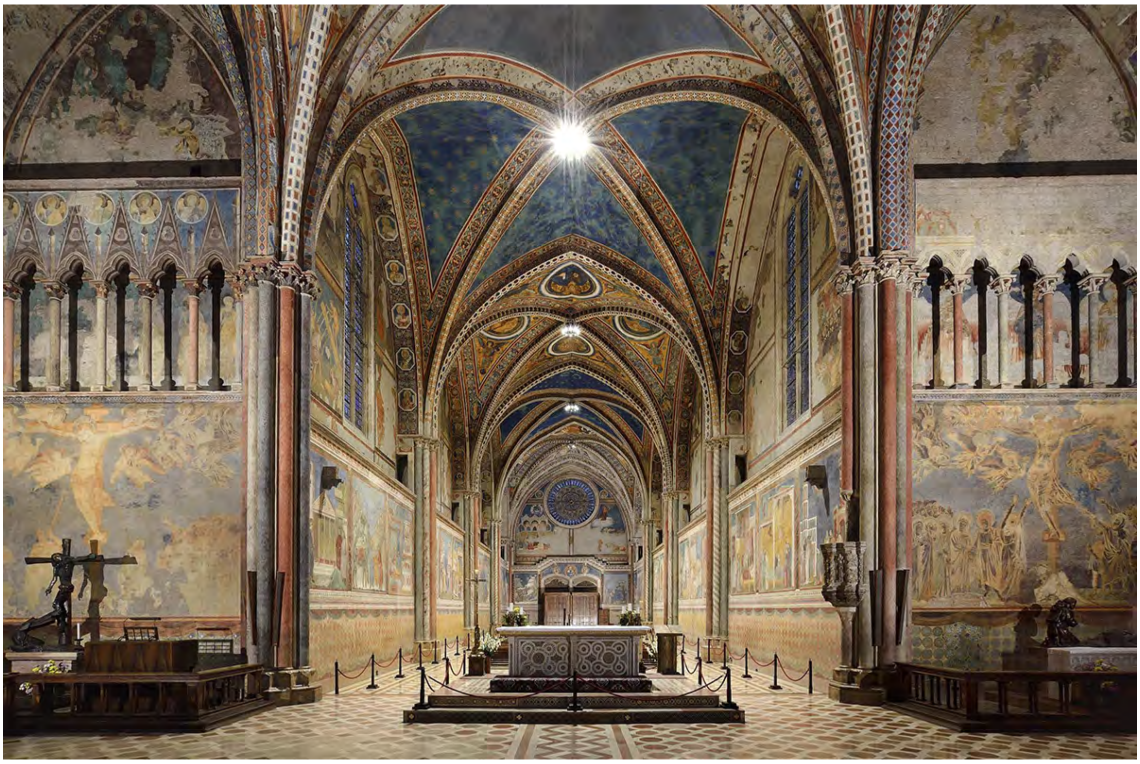

Fig. 7. The Upper Basilica of S. Francesco in Assisi (http://www.camminodifrancescoetommaso.it).

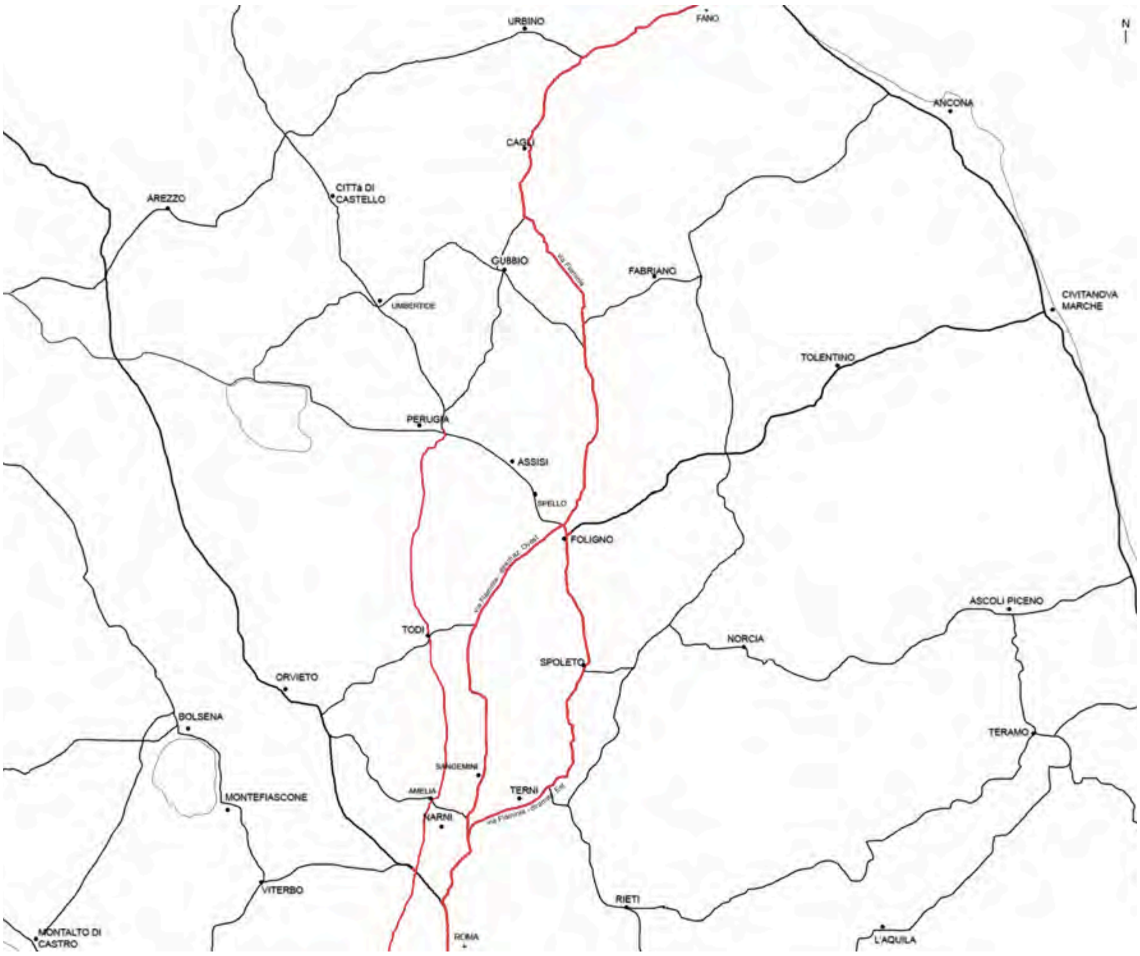

Fig. 8. The ancient paths of via Flaminia and via Amerina. Graphic processing E. Scopinaro 2017.

Fig. 9. The path of Lauretana road.


Fig. 10. The Flaminia Street from Rome to Fano in the *Tabula Peutingeriana* (PRONTERA 2003).

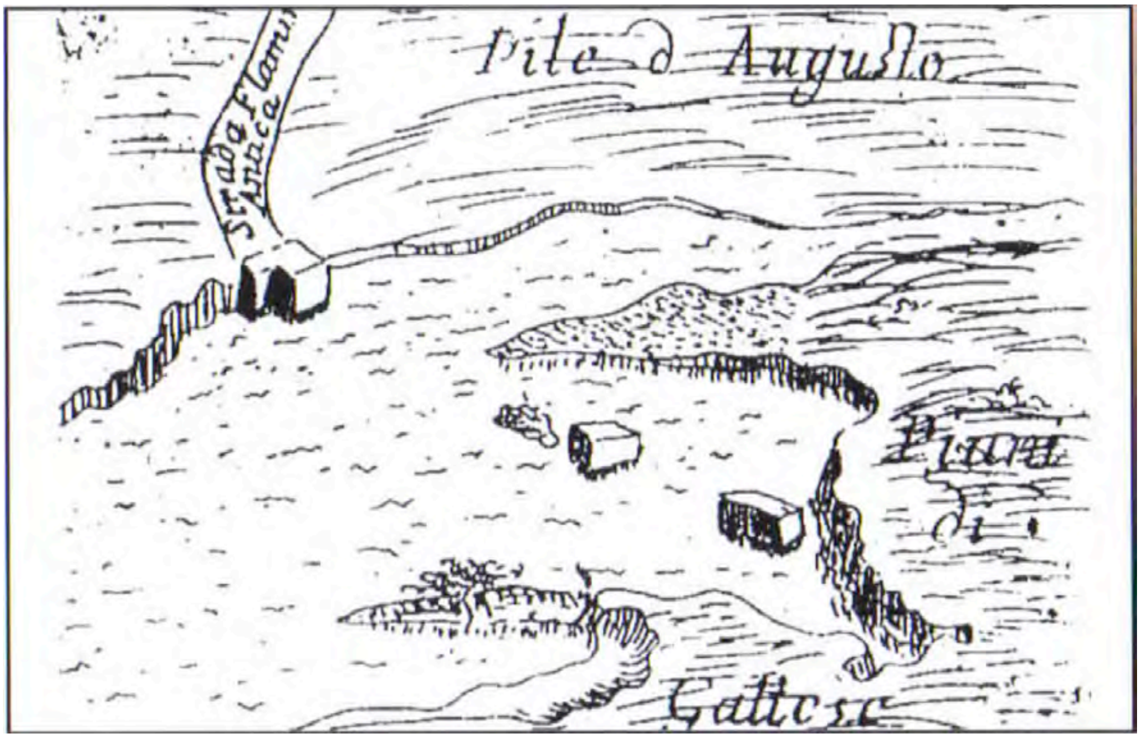

Fig. 11. Pile of Augusto (PINESCHI 2007, p. 29, f. 4).


Fig. 12. S. Damiano's arch on ancient Flaminia *in Carsulae*. Photography E. Scopinaro 2017.

Fig. 13. The ancient via Flaminia in *Carsulae*. Photography E. Scopinaro 2017.

Fig. 14. The church of S. Giovanni de Butris. Photography E. Scopinaro 2017.

Fig. 15. Porta Amerina in Todi. Photography E. Scopinaro 2017.

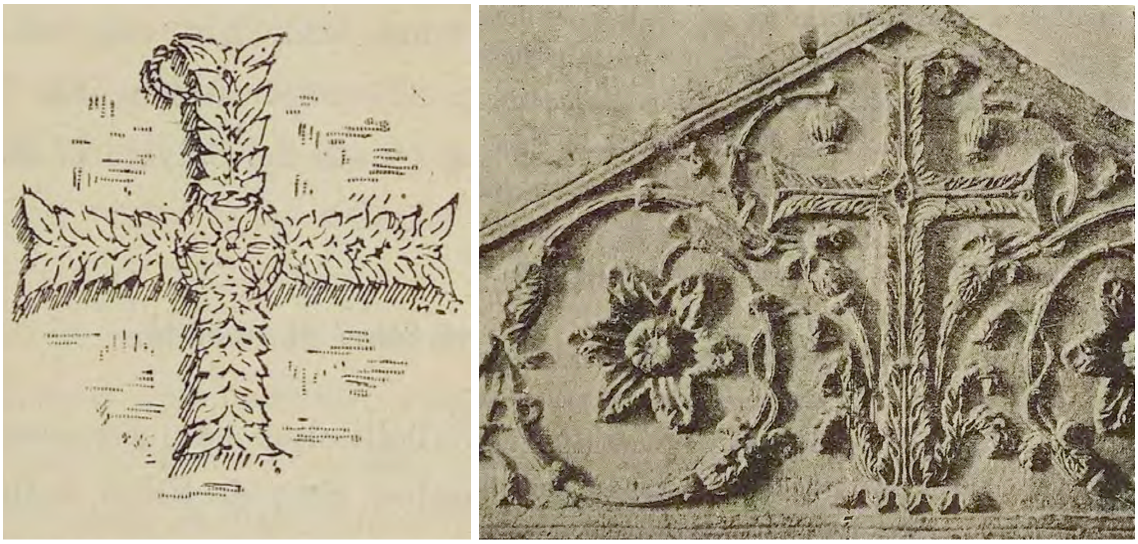

Fig. 16. Styles of the Spoleto Marble School according to Hartmann Grisar (GRISAR 1895, pp. 49).

Fig. 17. The portal of Spoleto cathedral. Photography E. Scopinaro 2017.

Fig. 18. The portal of Spoleto cathedral. Detail of of Maestro Gregorius Melioranzio signature. Photography E. Scopinaro 2017.

Fig. 19. The church of S. Pietro in Spoleto. Photography E. Scopinaro 2017.

Fig. 20. The church of S. Pietro in Spoleto. Detail of the relif. Photography E. Scopinaro 2016.

Fig. 21. The ornament on the left gate of S. Gregorio Maggiore in Spoleto. Photography E. Scopinaro 2016.

Fig. 22. The church of S. Maria in Pensole in Narni. Photography E. Scopinaro 2016.

Fig. 23. The *tympanum* of the church of S. Pietro in Bovara. Photography E. Scopinaro 2017.

2 BUILDING MATERIALS

The relationship between landscape and the architecture, that characterizes it, is strongly influenced by the geology of the territory and consequently by the raw materials which people can found inside.

The history of building techniques in Umbria-Marques area depends on local raw materials. This is similar to what happened in Italian and European regions during the pre-industrial development. During present research actually, it was always possible to link the colour and the appearance of cities and characteristic buildings to the structure of the ground.

In some instances, it was possible to find intriguing exceptions: these exceptions allowed us to identify the way of exchanges of materials and know-how and to highlight that the above-mentioned exchanges go parallel each own.

2.1 Geographic-morphological, geologic and lithological outline

Geography of the studied area caused the development of two systems: Tiber Valley at west and Umbria Valley at east. The two lands show lithological and environmental differences due to their orography and hydrography; actually, the territories at west of Martani mounts seem similar to Tuscany whereas lands at east of Appennines show more lithological analogies to Marques (fig. 24).

Appennines of Umbria-Marques are the main morphologic character of the hereby-studied area. Oriented north-west to south east, these mountains are the southern part of the northern Appennines, being positioned between Tuscanian-Emilian and the Abruzzi Appennines, which are part of the central chain.

Physiography of the area under study shows hills and mountains cut by a complex hydrographic network. This arrangement is due to various factors: climate, lithology, remodelling tank earthquakes.[77] From south-east we find small hills positioned among Chiana Valley, Trasimeno Lake and Tiber Valley, still its confluence with the River Paglia, which is a boundary. After the Tiber Valley there are the Umbrian pre-Appennines with the Narnian-Amerin chain, which arrives to the Valley of Nera River. At north of Terni we find the Martani Mountains limited by the River Topino and the Umbra Valley.

The hydrographic network shows substantial differences between the internal or Tyrrenic sector and the external or Adriatic one. The Rivers of the Umbrian part, Tiber particularly, present long straight tracts-parallel to the mount chain and sudden changes of direction with erosion of the mountains thus creating a rather 'rectangular' network. Rivers of Marques, the Metauro, Esino, Potenza, Chienti and Tronto have short courses, run rather parallel each other and orthogonal to the mount chain. Such a difference is mainly due to different tectonics of the

[77] BARTOLINI 2012.

area, in which we found ridges of mounts[78] and tectonic graves[79] in Umbria, whereas we can mainly find folds and scrolling[80] in Marques (fig. 25).[81]

The principal appennines chain is placed between the Umbrian pre-Appennines and the appennines of Marques. The inner arch, going from Umbria to Marques boundary, includes the mountains Nerone, Catria, Strega, Cucco Penna and Pennino. At the end of Umbra and Nerina Valley we can recognize a second arch, which is formed by mounts Serrano, Cammoro and Maggiore; this arch is discontinued by the small basin of Colfiorito that divides the above arch from the mounts Primo, Igino Cavallo e Tema. A long depression, placed between Camerino and mountNebbiano, separates the second arch from the Marques external arch. The latter is formed by the mounts Pietroso, St. Vicino, Lavacelli, Letegge, Fiegni and Meta; It merges in the chain of Sibillini mounts, which are the highest mountains of the area.[20] The chain of Appennines is finally cut by basins of Gubbio and Gualdo Tadino that are smaller than other Umbrian ones.

The Umbria-Marques section of the Appennines earned a peculiar attention by the Italian geologists since first half of 19th century, when they started with the studies. The layers and the tectonics of this area still are the object of several scientific papers and update partly owing continuous earthquake (fig. 26).[82]

Umbria-Marques Appennines come from distortion of different paleo-geographic and depositional domains of the Adriatic plaque basement. These domains are the Tuscanian, Umbrian and Latium–Abruzzian. The Tuscanian domain can be observed on the western Umbrian mounts and is tectonically superimposed to the Umbrian domain due to over scrolling by Cervarola Unit. Along the over scroll system of Olevano-Antrodoco-Sibillini mountains, the Umbrian domain is superimposed over the Latium- Abruzzi domain, which is characterised by the enormous over scroll (system) of Gran Sasso. Nowadays however the south-western part of the above domains is covered by vulcanian phenomena of quaternary era, as we can see in the Umbrian section near Orvieto.[83]

Folds and over scrolls cause an arrangement done by concentric arches, that we can also recognise at morphologic-structural analysis. From west to east we can categorize five main structural districts: western Umbria, Umbrian pre-Appennines, Umbria marques chain, basal

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[78] Mounts or chain of mounts, characterised by a very rough ridge originated by a tectonic grave.

[79] Zones of engulfment, limited on sides by detachment faults. The districts characterised by tectonic graves can also be called rift zones and have a detachment tectonic behaviour.

[80] Thrust fault is due to overlapping of two parts of earth's crust, called tectonic units, owing horizontal pushes which in turn cause folds or faults of the rocky masses.

[81] The reconstruction of the structure in this area took advantage by a large quantity of geologic cartography and related vertical sections. Recently the geologic knowledge took also advantage by deep perforations of geophysical survey (in particular the seismic analysis with reflexion and rephraction) and seismologic data (distribution of hypocentre and focal mechanisms of earthquakes). Details in ANELLI *et alii* 1994.

[82] Among the published syntheses: Geology of Marques by University of Camerino (CENTAMORE, DEIANA 1986) and the regional geologic guides by the Italian Geologic Society, concerning the Umbria-Marques Appennines (PASSERI 1994), the Abruzzi (CRESCENTI, 2003) and Lazio (COSENTINO *et alii* 1992). For geologic cartography, consult the site of Istituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA) (http://www.isprambiente.gov.it/it/cartografia).

[83] An up-to date and complete sight of Umbria-Marques, Latium and Abruzzi Appennines is reported in the cited cartography CARG-ISPRA 1:50000.

marques Appennines, and peri-Adriatic zone (fig. 27).[84] In the Umbrian sector people can note a dense network of regular faults generally over imposed to the compressive structures.[85]

The western Umbria is characterised by overlapping of Tuscanian tectonic unit (mainly torbidites) over the Umbrian units. The compressive distortion, which took place on High Miocene is represented by a network of tin tectonic flakes, without developing folds which on contrary can be observed in the Umbrian pre-Appennines. Next extensive tectonics consists in systems of regular flakes with direction north-west to south east, merging at north as well as at south (fig. 28).[86]

The Umbrian pre-Appennines is totally covered by Miocenic torbides (*marnoso arenacea*) with the exception of the large hollows of Tiber and Umbrian Valleys, filled with more recent continental sediments of Pliocene. As happens in western Umbria, the compressive features are discontinued cut by the more recent regular flakes. The eastern edge of Umbrian pre-Appennines is characterised by concave downwards whose concavity is directed downwards.

The Umbrian chain of Appennines, where we observe the highest mountains and the Tyrrenian-Adriatic watershed, is characterised by large, impressive folds, connected to underlying over scrolling structures. In the northern part of the chain, the combined actions of folding and erosion has destroyed the torbidic cover and of the underlying pelagic layer where we can recognise more ancient rocks as the majolica (lower Cretacian).

The central section of the Umbrian chain, which is shown in the sections 8-8', 9-9' e 10-10' (fig. 29), is characterised by folds connected with over scrolls of triassic evaporites or even with the highest Palaeozoic levels. In the pre-Appennines the Umbria-Marques succession plays differently, because of a thick layer of miocenic torbitides that covers the pre-Appenninian hills. In the main chain of Appennines this cover were destroyed, thus allowing the emergence of Mesozoic rocks as the 'driving level,' which in turn is characterised by the presence of *Calcari e Marne a Fucoidi*. The frequent earthquakes, even crushing and destructive, are mainly due to regular and trans tension flakes, cutting the preceding compressive structures. The distribution of ipocentres of main earthquakes suggests that the seismic sources are located inside the Triassic evaporites, which reach important thickness partly due to doubling, in turn caused by over scrolling.

The structural arrangement of the basal Appennines of Marques and of the contiguous peri-Adriatic basin is principally due to the thickness of more recent sediments (fig. 30).[87] The basal Appennines have a very complex composition of earth crust, caused by over scrolling of various geologic systems that arrive to the peri-Adriatic basin.

On surface, the deep, upward convex folds related to deep over scrolls, make a pleasant topography corresponding to the internal and coastal chains. The most ancient layers of the

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[84] DEIANA, PIALLI 1994.

[85] Most recent studies revealed that inverse and strike-slip faults assigned to Miocene–Pliocene could be normal Mesozoic faults re-activated by tectonic inversion.

[86] This structure is particularly clear in the zone of Perusian mounts towards the Tiber basin between the Acuto and Tezio mounts.

[87] The reconstructions are principally based on seismic soundings and on data provided by drillings for the research of hydro-carbons under the Adriatic Sea.

Umbrian –Marques chain, remain hidden under layers belonging to lower cretacean era and to Miocene that form the coastal elevations in the Conero promontory near Ancona.

2.2 Characteristics of local building materials

In the last few years several researchers carried out detailed studies in order to know character and location of building materials: these studies not only were focused on current practice but also on their use in Ancient or Middle Ages. Object of the cited studies were local materials as well as materials coming from other Italian or Mediterranean sites thanks to commerce, that was facilitated by the roman empire.[88] Building methods were different during ages. Our awareness of chosen methods is thus important to study the history of single buildings and of different techniques, which is in turn of maximal importance to acquire the consciousness during conservation and restore of surfaces and structures.

In Umbria, particularly along Via Flaminia, it is possible to observe that builders used the same raw materials, which in turn correspond to what was easily locally quarrying. These raw materials are rather exclusively limestone, sedimentary calcareous rocks which belong to the Stratigraphic Succession of Umbria-Marques (SSUM) (fig. 31).[89] As already described in the 1st chapter, the geology of this region is characterized by the presence of the limestone Apennine chain, which represent the opportunity of easily extracting great amounts of stony building materials.

The limestone of the studied territory belongs to rocks formed between Jurassic and Eocene – 190 to 35 million years ago- these rocks come from stockpiling of sediments in marine environment. Their composition is calcium carbonate with great quantity of micro and macrofossils, the remaining of animals that habited the original sea. The sedimentation created the so-called sedimentary pile, which reaches the thickness of 4 Km in the Umbria Marques stratigraphic succession.

The rocks most used as building material for civil or religious buildings by the middle ages construction teams were: Calcare Massiccio (solid limestone), Corniola, Rosso Ammonitico (red limestone with ammonite fossils), Majolica, Scaglia and Travertine also called 'sponga' stone.[90] All these rocks have good physic-mechanic properties. Builders often selected materials only looking at colours; however all the Appenninian rocks come from different sedimentation process that give to these rocks different characters, depending by the type of rock and site of formation.

In the studied territory, the rock showing the most ancient formation is the *Calcare Massiccio* (CM). This rock is constituted by grey and white limestone with few silica inclusions and frequent fossil incorporations of corals, molluscs and cephalopods (fig. 32). It is a very compact limestone, which can be found in very tick slices; thus extraction of this rock is rather

[88] There are found in all the Umbrian-Marche region marbles from other regions of Italy, Greece, Turkey and North Africa. These precious and exotic materials all come from structures of Roman origin that - in most cases - were in the territory under consideration. However, there are also interesting examples of the import of recovery material from Rome, as is the documented case of the decorations of the cloister of the Abbey of Sassovivo in Foligno. Cf. BARELLI 2014, pp. 14-17 e SCOPINARO 2014, pp. 87-88.
[89] Geologic regional magazines: Umbria-Marques Appennines. Fifteen itineraries, the Italian Geology Society, BE-MA publishers, 7 (1994) 1-301.
[90] SPERANDIO 2004, pp. 40-42.

difficult. The above material is scarcely used, despite its very good technical characteristics. It is possible to find the *Calcare Massiccio* in the walls done by large blocks or as stone chippings in mortars. People can observe an important example on the use of this material at Amelia, where the material was probably taken from the acropolis of the city that was built on the "rocky cone" circumscribed by the loop of the River Rio Grande. Large outcropping of *Calcare Massiccio* are still visible along the slope of the hill and even inside the city and on foundations of some buildings.[91]

The sedimentation environment of this rock is shallow sea influenced by tides; the *litofacies* present in this rock and dependent by the geologic formation, are exactly due to the influence of tides. The geologic formation can be: subtidal (always submerged by sea), intertidal (submerged when tidals have medium intensity), supratidal (submerged only by very high, sigizial tides). Subtidals can be of high or low energy: they are formed by massive units more than 1 m. tick, whereas all the other Jurassic rocks are thinly stratified. The high energy "*facies*" have blocks constituted by carbonate grains of variable size, from sand like to grain like (from 0.06 to 2 mm), with scarce or absent matrix. Low energy subtidals contain considerable amount of micrite, showing variable content of grains. Intertidal zones contain sedimentary structures as grainstone blocks with oolite and oncolite. Supratidal zones are due to long periods when the sedimentation occurred above the sea level with short time of high tide in which water covered the ground. Supratidal zones show fine-grained pinkish or yellowish limestones, containing several nodes (fig. 33).

Corniola (COR) is the second rock for formation time and is made of grey limestone with frequent fossils and some silica inclusions (fig. 34). It is a homogeneous stone in 20 to 40 cm tickslices, which allow extraction and manufacturing, that are hard, though easier than for *Calcare Massiccio*. The Corniola was generally used for works of building foundation, and as reuse material in Late Ancient and Middle Ages.

The sedimentation environment of Corniola is that of a open marine basin. This means that micrite present inside the rock was produced by the water columnar by muds coming from the neighbouring continental platform (fig 35).[92]

Some limestone rocks of local slices are made by clay mixed to carbonate muds (micrite) in so variable ratios that the composition of the above rocks vary from rather pure clay to marble limestone, with several intermediate terms. This is the case of Marne del Monte Serrone (MMS), which are marls belong to Serrone Mount. The *litofacies* can wary from 60 meters in the sites of strong subsidence, to thickness of 3 meters in the more elevated marine sea, which show thin limestone slices, not higher than 40 cm (fig. 36-37). This kind of sedimentary rocks is favourable in order to acquire raw building materials, because it is possible to obtain all the materials useful to make the buildings: slabs, small blocks and aggregates for mortar production.

The Rosso Ammonitico Umbro-Marchigiano (RAUM) is a limestone with interbedded of red clays and fossil ammonites. RAUM is constituted by alternate levels of marls and red limestone. The slabs of RAUM are rather thin (5 to 20 cm). It is thus possible to easily extract of resistant sheets. This rock was largely used for floor and finishes owing the aesthetic

[91] Solid limestone was probably used to build the city, since IV-III century B.C. as rusticated ashlar or large squared blocks. SPERANDIO 2004, p. 281.

[92] An accurate analysis of fossils shows that the sea bottom was located between 50 and 200 meters.

characteristics due to high nodularity that produced yellow or pink spots (fig. 38). In the wall facing of the Perusian cathedral, people can observe a refined exemplum of the use of RAUM. In this case slabs of ammonite red and white limestone were overlapped to draw accurate geometric images (fig. 39).

The *Calcari Diasprigni* (CD) are constituted by very thin - 5 to 10 cm levels - and are rich of silica microfossil (fig. 40) s. The *litofacies* is constituted by limestone levels spaced out by istes or nodules of chert with variable percentage of calcium carbonate, from 50% to negligible amounts. In the Umbria-Marques Appennines, the *Calcari Diasprigni* show variable thickness, from dozen od meters to less than 1 m, or can be absent in areas raised by tectonic activity. This material tends to fracture in slivers of few centimetres (fig. 41). This is why CD was of little use in wall hanging and of more frequent use in filling walls up.

Maiolica (MAI) is represented by levels of 30- 40 cm thick; it is composed by well-stratified white limestone with nodules and listes of chert (fig. 42). The micrite of MAI is fine-grained, without sedimentary structures, showing regular stratification (fig. 43). Thanks its compactness and resistance, *Maiolica* has been largely used to build bridges and wall facings.

Calcari e Marne a Fucoidi (FM) are characterized by clays and marls with colours variable from red to green and also black, because the sedimentation environment was subject to different degrees of oxygenation: red clays indicate well oxygenated environment during the sedimentation, green indicates scarce oxygenation, black clays settled in anoxic, oxygen deprived, environment (fig. 44-45).[93] As is the case of the *Marne di Monte Serrone*, even here we can observe the succession of clays, clayish marls, marls, marly limestone; consequently it was possible to quarry more than one building materials (fig. 46).

Scaglia Bianca (white Scaglia) (SB) is the most ancient rock, we can find it in levels or strata of rocks 5 to 40 cm thick and can show black or grey cherty nodules (fig. 47). Scaglia *Rossa* (red Scaglia) (SR) has physic characters similar to the previous one, but it shows red colour due to high concentration of iron oxides (fig. 48).[94] Differently from white and red, *Scaglia Variegata* (muti-coloured) is a more marly limestone; actually it is done by alternate slices of marls and limestone, with colours varying from red to grey and green. The presence of calcareous violet, grey, ochre, red marls marks the passage to the overlying *Scaglia cinerea* (grey Scaglia) (SC). This is the most 'young' *Scaglia*: it is characterised by thin sheets of limestone levels and of abundant grey clay beds.

The *Scaglia*, as red (*Scaglia Rossa*), white (*Scaglia Bianca*), multi-coloured (*Variegata*) and grey (*Cinerea*) is probably the most employed lithotype in the Umbria-Marques area, because it is easy to extract and easy to handle. It has good technical resistance, even if it shows problems as breakage produced by crioclastic process and decolouring in the case of the *Scaglia Rossa* (fig. 49).

Travertine in the Umbria-Marques is a white-greyish or pale hazel phytobiohermal limestone. Researchers found intensive use of this limestone as large blocks in the roman age. The blocks used by romans were then reused for late-ancient and high medieval buildings.

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[93] This peculiar event of anoxia in seabed occurred in the Tetide and also in the Atlantic Ocean. It is related the opening of the central Atlantic Ocean phenomenon (Ocean rift).

[94] Sheets of black chert - which document an anoxic oceanic event occurred in the Atlantic and *Tetide* oceans in high cretaceous, anticipate the shift between the first and the second type of *Scaglia*

In late Middle Ages, Travertine was reused to make ashlars and slabs for external cladding of masonries. The reuse of Travertine was mainly due to its handling ease (fig. 50). Travertine is a continental rock whose formation happened by precipitation of calcium carbonate from oversaturated water. Its deposits are thus mainly located where a river is born, or the outline of a river becomes irregular, at confluence or at the outlet of valleys from the limestone ridge; all these sites have different *litofacies* depending by local characteristics.

Bricks were not the most used material in middle ages masonries in the Umbria-Marques; above all, the use of bricks did not significantly influenced the building techniques with limestone wall facing. Ceramics were mainly recovery materials; only from 14th century it is possible to document early masonries made with cooked bricks, as in the examples of changes done by the Trinci family on the palace of 'old' municipality and the enlargement ordered by the Abbot Filippo Bigazzini in the cloister of Sassovivo Abbey, both in Foligno (fig. 51).[95]

[95] In both cases the bricks were done starting from clays coming from the slices of Serrone Mount.

2.3 Quarrying of building materials

In the studied area, the sites for building material supplying are mainly located close to construction yards. This is easily verifiable everywhere the raw materials are abundant and even clearer on late ancient and high middle ages, because the transport had a great impact on the final cost of the building.

The cities, built up areas and especially the solitary buildings - e.g.: monasteries-seem having had access to each own mining site, as close as possible to building theatre. Frequently, the materials came directly from excavation for foundation or construction. Some exempla can be observed in the monasteries of Fonte Avellana and Sassovivo, built with materials extracted on the same site of construction and close to a water source.[96]

Some villages were built with the same method: among these, the hamlet of Genga is fascinating: the houses of ordinary citizens and also the monumental civil and religious buildings, followed and continued the underlying rocky layer modelling and integrating it. In the city of Orvieto still now exist the district "*della cava*" due to the presence of a tuff quarry, from which were mined the ashlar blocks for house building (fig. 52).[97]

Quarrying fronts and terracing of medieval carving sites and modern age can be still seen close to most of city centres of Umbria-Marques zone. Stone was taken as large blocks for solid limestone or corniola, slabs or small blocks for other rocks. Once extracted and laid down at the base of the quarry, the blocks was loaded on *Tregge*, a freight vehicle frequently used by peasants in mountainous locations, and brought to the carriageway. The material was then transferred to wagons driven by oxen and brought to the final destination.[98] Sites for building material supplying were also the riverbeds and landslide channels; the latter especially useful for finding fragments of limestone, useful as aggregate for the composition of mortars or of mosaic mixtures present in the inner core of the masonry.

Scaglia, the most used stone in the Umbria-Marques area is scarcely present in southern territory part of this. The not only monumental architecture, in Terni, makes extensive use of travertine. In the cities of Perugia and Bevagna, given the scarce outcrop of limestone, the materials used were often imported from neighbouring areas. In Perugia, throughout all the middle ages, was extracted the sandstone, from the quarries outside Porta Pesa, just outside the eastern boundary of the city. This stone was preferably set up as a filling of masonry and /or lateral structures, as in the case of the church of S. Maria di Monteluce. Wall facing of main façade and generally of all the most prestigious buildings in the county seat, were made with blocks, blocks and slabs of white and pink limestone, almost exclusively *Scaglia*, imported from the areas among Mount Malbe, Lacugnano and Monticelli.[99] Similarly in Bevagna common

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[96] About the construction materials of the Abbey of S. Croce of Sassovivo see BALDANZA forthcoming

[97] The method of building with the materials extracted *in loco* has also recent exempla: The *Pro Civitate Cristiana* building, done in the past century, was made with travertine taken from the dig for foundations. Cfr. SPERANDIO 2004, p. 28.

[98] The *treggia* was a means of transport widely used by peasants in mountainous locations. This was made up of a wooden floor under which two sleds of the same material were being towed by oxen or cows. Cf. *ivi*, p. 30.

[99] Ricci 1969, p. 81.

houses were made in local sandstone blocks, but the Wall facing of the most prestigious churches are made of limestone, mostly travertine and *Rosso Ammonitico*, mainly coming from Mount Subasio and Tuderte area.[100]

The materials used in Assisi and in its neighboring territories come almost entirely from the quarries present on Mount Subasio and along its slopes.[101] From this mountain it has been possible to extract some of the best and most sought-after construction materials throughout the region for centuries. These materials deal almost exclusively with limestone stones, among which the most famous is the red *Scaglia*, universally known as 'rose stone of Assisi', which is unquestionably the most used material for the realization of all city works.

The buildings of all other towns of the eastern route of *Via Flaminia* - from Spoleto to Spello - have been made by using materials extracted from the western flanks of the Sibillini Mountains.

In Foligno it is possible to find wide use of all kinds of local limestone, including the *Scaglia*. The most exploited quarries in the middle ages are located at the foot of Monte Serrone (east of the city) and in Pale, where people extracted the travertine and Corniola limestone.

The exploited quarries in Roman times and middle ages for constructing Spello are just outside the city walls. Digging fronts are still visible between Spello and Collepino.

In Spoleto most of the buildings were done with what is called 'Castellaccio' limestone. [102]

In the area between the cities of Gubbio and Gualdo Tadino there was need to use almost limestone of white color, even in this case almost always *Scaglia*, given the low compressive strength of the red *scaglia*. In the outskirts of these areas, the red *Scaglia* is deeply fractured and less durable if subjected to freeze and thaw cycles. For the city of Gualdo Tadino the most used extraction sites were in San Marzio, Fonte della Rocchetta and Vaccara. In Gubbio most of the building material was extracted from the open quarries on the Ingino and Calvo mountains near the Bottaccione Gorge.

[100] For the construction of the church of S. Michele Arcangelo the travertine was imported from Todi, while for the realization of the churches of S. Silvestro and S. Francesco the materials came from the caves of Spello and Assisi. Cf. SPERANDIO 2004, p. 61.

[101] Below the fortress of Assisi and the hill of San Rufino are still visible the faces of today's abandoned quarries that were to be used in medieval times. Cfr. *ivi*, p. 57.

[102] SPERANDIO 2004, p. 90.

2.4 Provenience and use of reuse materials

In the Umbrian-Marques region, many of the building materials were recovery materials. This is especially true in the case of a city with Roman foundations where, due to the size of blocks and workmanship in operation, it is clear that the blocks had to be extracted from abandoned structures of the Etruscan or Roman times used as quarries of already worked material.

Although reuse of architectural materials dates back from the Costantinian age,[103] it is only from the fifth century that this technique became a common constructive procedure. Since then and until the beginning of the modern age, the reuse of architectural materials has been the most (or one of the most) prevailing technique in the history of construction in Europe owing to the enormous amount of available abandoned structures.[104] The availability of such amount of ready-made pieces that made the manufacture of decorative elements for a number of centuries unnecessary was not the only reason for the spread of this architectural technique. Other reasons for reuse of ancient materials and architectural constructions are related to a reverence for preserving every possible trace of the Western part of the Roman Empire together with undeniable economic and utilitarian motivations.[105]

In the Italian peninsula there was a widespread attempt to preserve ancient materials even when buildings were disused, ruined or spoiled. According to Cassiodoro, during the Ostrogoth Kingdom we have evidence of attempts to preserve classical heritage by means of recommendations concerning the use of Roman ruins. Permission for sale of the abandoned buildings was allowed only to those who promised to respect at least the form of these buildings.[106] This 'maintenance policy' seems to have disappeared between the 8th and the 10th centuries, especially in the Apennine areas of Central Italy, where the passage of Roman ruins from the Ostrogoths to the Spoleto Dukedom and then to the papacy led to great changes. An emblematic case of the passage of power is documented by the transformations of the Spoleto amphitheater, which became a military fortress in A.D. 545 and during the 12th century a place

[103] Cf. PENSABENE 1998, pp. 13-42.

[104] Research findings on different typologies and valences provide evidence that this phenomenon became the almost unique construction technique in late antiquity and in the medieval age. Some of the most recent studies on the reuse techniques in architecture consulted for the present study are the following: ALBANESI 2014; PENSABENE 2015; PERGOLI CAMPANELLI 2015; PERGOLI CAMPANELLI 2013; ESPOSITO, PENSABENE 2013; ESPOSITO 2012; BERNARD, BERNARDI, ESPOSITO 2007.

[105] "Rather, what is unique to our period is that the material reused were not hidden in foundation or so extensively reworked as to be unrecognizable, but instead were placed unaltered in full view in the new buildings, so that they are easily detectable as classical pieces despite their new setting" (da WARD-PERKINS 1984, pp. 213-214).

[106] Flavio Magno Aurelio Cassiodoro, civil servant of Teodorico's kingdom and his personal secretary supplies documentary evidence of the request of alienation for three dismissed buildings. Two of them belonged to the city of Rome and Spoleto. The latter refers to deacon from Spoleto who applied to transform an abandoned portico and adapt it for domestic use. Cf. CASSIODORO, *Variae*, IV, 24. For further investigations on 'maintenance policies' during the Ostrogoth Kingdom see: about conservation *ivi*, III, 31 e VII, 13; about alienation *ivi*, III, 29 e IV, 24.

of worship. Finally it was transformed in a quarry for the Albornozian fortress and for other urban civilian and religious structures.[107]

Between the 8th and the 10th centuries, many of the structures that remained unused during the Late Antiquity were handed over to private individuals who, in the majority of cases, used them as quarries for building materials. In the Umbrian-Marques region, such materials were mainly blocks or small blocks of limestone and bricks largely local materials. However exotic import marble could also be extracted from the richest buildings.

By looking at the structures made with recovery materials, it is easy to see that, throughout the Middle Ages, a real 'deconstruction' of the ancient buildings was carried out, resulting in recycling and reusing elements even in remote factories. "Disfattura" (dismantling) of the structures that would have been dismantled for parts of the works in order to conserve the building pieces.[108] For this reason, we are now in the position to study recovery operations by means of careful observation of the state of the recycled materials. In addition, depending on the degree of care used during disassembly operations, we can also make hypotheses on the commission and the use of the pieces.

The recovery of materials and structures resulted in an apparent loss of symmetry and unity in the construction technique during the high Middle Ages. From the second half of the eleventh century all rules and norms in juxtaposing and assembling the constituent elements of masonry seemed to have been lost.[109]

The gradual regularization of the rows of layers of the elements in wall facing, obtained by means of a careful selection of the pieces in operation caused a gradual abandonment of elements of recovery or rework.

If we consider this phenomenon more carefully, we find that the reuse of ancient works never ceased throughout the Middle Ages, though in varying forms and often in disguise. This is documented by the prohibition to destruct ancient monuments ratified by the Roman Statute of 1363 and confirmed by the apostolic letter of April 28, 1462 and by the records of the *Fabrica* of the Orvieto cathedral, report massive import of recovery materials.[110]

The reuse of building materials and structures can be different in different historic-geographic zones.

In Umbria-Marques area, the recovery elements used during Middle Ages came from sites close to the new construction yards. Sometimes dismantling of a single building provided all the

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[107] For more information on the transformations about the amphitheatre of Spoleto, see MORIGI 2003.

[108] "dismaking (dis-facio) was linguistically different from distruction (*de-struo*) of a building .To this end and to preserve the elements which had been removed and the remaining of the building which was not going to be dismantled, provisional (o "appontellamenti") works such as stair cases, wooden scaffoldings and other wooden artifacts to make the dismantling procedures possibile" (ESPOSITO 2012).

[109] Use of elements similar to the original context was not longer a rule to follow. In general any possible necessary adaptation according to procedures not dependent on the lack of materials from antiquity, as it has been stated, was dismissed. "Reuse" Treccani medieval art Enclopedia.

[110] The Statute of Rome of 1363 for bod spoliation and destruction of ancient monuments with the exception of individual cases allowed by the Senate and by the Apostolic Chamber. Such norms have been adopted and later confirmed in the following centuries. The apostolic letter of April 28th 1462 forbids to destroy all antique monuments in the city of Rome and in its district, even in the for of ruins a case in point. To further examples see RE 1880, p. 188 and ESPOSITO 2012, p.59.

construction materials; in some others cases the construction sites arose around shred of partially conserved structures.

An exemplum - still unconsidered- of reusing local building materials in Perugia is a small part of masonry made on end XIII century in the basement of the ex Hospital *Misericordia*. [111]In this case the new structures incorporate a section of the IV century Etruscan walls, and lean on the ancient walls. This was in agreement with a larger plan: to build a great wall called "*Sopramuro*" including the *Botteghe* (medieval ateliers) inside the building. The *Botteghe* were then fullfilled in the square.[112] The XIII century masonry was built in continuity with the ancient wall, where the latter fell down. The building materials were Etruscan travertine blocks, Roman bricks and small limestone blocks of various size and shape. Also the small blocks were probably reuse materials (fig. 53-54-55).

As was the case of new building materials, the reuse materials also could be trasported and traded. [113] Transport was generally local[114] but exceptions are already present, as the S. Croce in Sassovivo cloister, built in early 13th century. In this instance the design has the typical constructive and decorative features of the roman *marmorarii,* who worked in Roma in 12th e 13th century. It is possible to state that the same artisans who worked in Sassovivo had worked in the basilica of SS. Quattro Coronati in Rome. Interestingly the Umbrian Abbey was property of the Roman basilica on 1138. [115] Considering the so far published documents, the marble decorations was made in Rome with roman reused marbles, then transported and assembled *in situ* (figg. 56-57).[116]

Besides the reuse of construction elements and building materials in Umbria and Marques we can observe the reuse of entire special parts of buildings, whose morphology is linked to the original function. In these cases we can hypothesize three aims: 1) recovery of their function; 2) translation of their function; 3) evocative and/or aesthetic use. The greatest concentration of such reuse can be found in the tombs made between the 11th and the 12th century, because in these ages many tombs were adorned by reusing ancient decorations.

Here we find the simple reuse of squared blocks as well as search and reuse of decorated pieces, which were mostly used for evocative and aesthetic aims, thus with differently from the

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[111] Nowadays this masonry is visible in the "Umbrò" Restaurant.
[112] The construction of the *Sopramuro* in Perugia begun during the 13th century. The work was aimed at supporting the Etruscan wall, creating a new line of walls, built three meters further downstream. The yard lasted for about four centuries with many interruptions and modifications to the original project due to the high groundwater abundance. For more information about the medieval city of Perugia and the Etruscan wall, see BILANCIA 1988, pp.5-106.
[113] In medieval times the transport of recycled materials and spools is documented throughout Europe. For example, constructive elements from Rome were commissioned by Montecassino Abbey in the 11th century, in Pisa, according to a supply contract of 1158, in the cathedrals of Winchester (12th century) and Durham (13th century) and in Orvieto in the 14th century.
[114] Examples are the Roman cities of *Ocriculum*, *Carsulae*, *Fulginia* e *Iguvium*.
[115] In the cloister of Sassovivo Abbey we find the stylistic novelties that were affirmed, in the same years, in the Cosmati workshops of Rome, such as: the integral use of marble for the coatings, the use of columns connected with *nenufari* leaves capitals and the affixing of little pilasters on the pillars, the *lacunari* decoration in the arches and the adoption of *tortilius* columns. For more information about the history of the cloister, see BARELLI 2014; BARELLI 2009 and SCOPINARO 2014, p. 87-88.
[116] Cf. DE DONATO 1975, doc. 97.

original functions. One exemplum is the crypt of S. Ponziano Church in Spoleto, where reversed capitals and a slice of Doric columns became the basis for the new columns. Interestingly, the shape of 2 of 4 columns is not the established form, but this shape is more similar to a *meta* caught from a circus (figg. 58-59).

The evocative reuse of building material became increasingly rare in the 12th century; In the 13th *spolia* can no more have an autonomous value inside the gothic architecture, thus disappeared or only became building materials.

Fig. 24. Physical map of central-northern Italy (MANTOVANI *et al.*, 2013, p. 9).

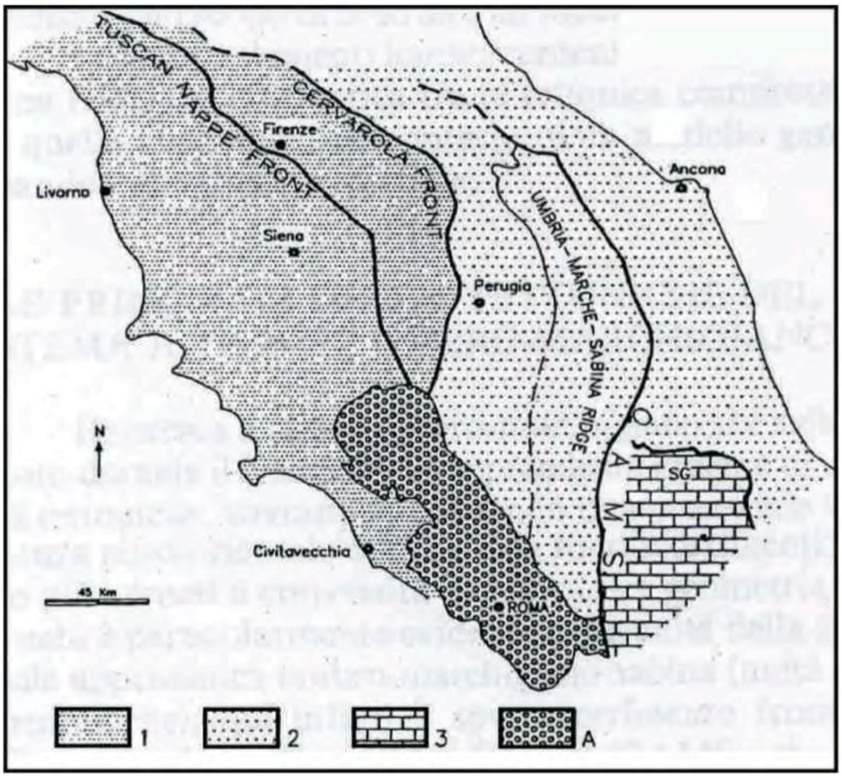


Fig. 25. Umbrian-Marche domain. (MANTOVANI *et al.*, 2013, p. 13).

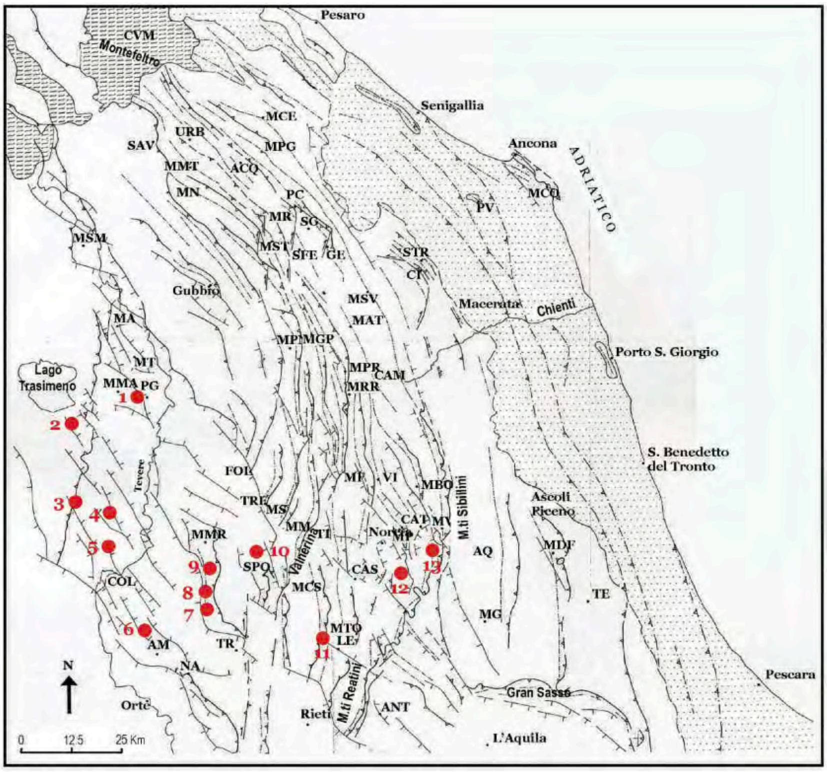


Fig. 26. Structural Tectonic layout chart graphics by DEIANA PIALLI 1994 in MANTOVANI *et al.*, 2013, p. 15.

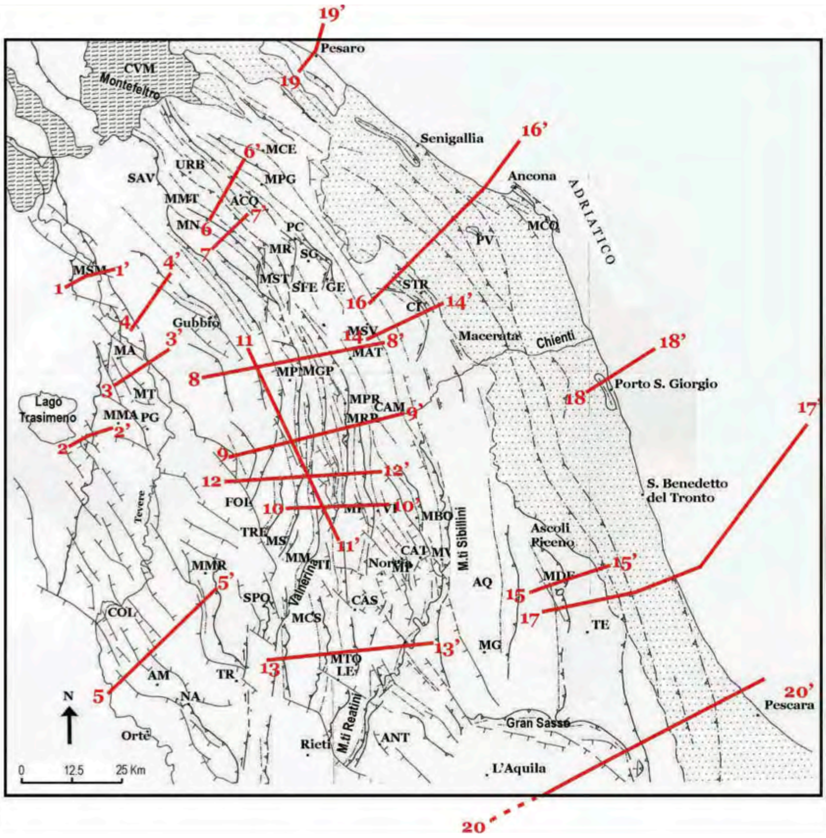


Fig. 27. Location of the traces of the geological sections commented in the text and below. Graphic processing by DEIANA, PIALLI 1994 in MANTOVANI *et al.*, 2013, p. 17.

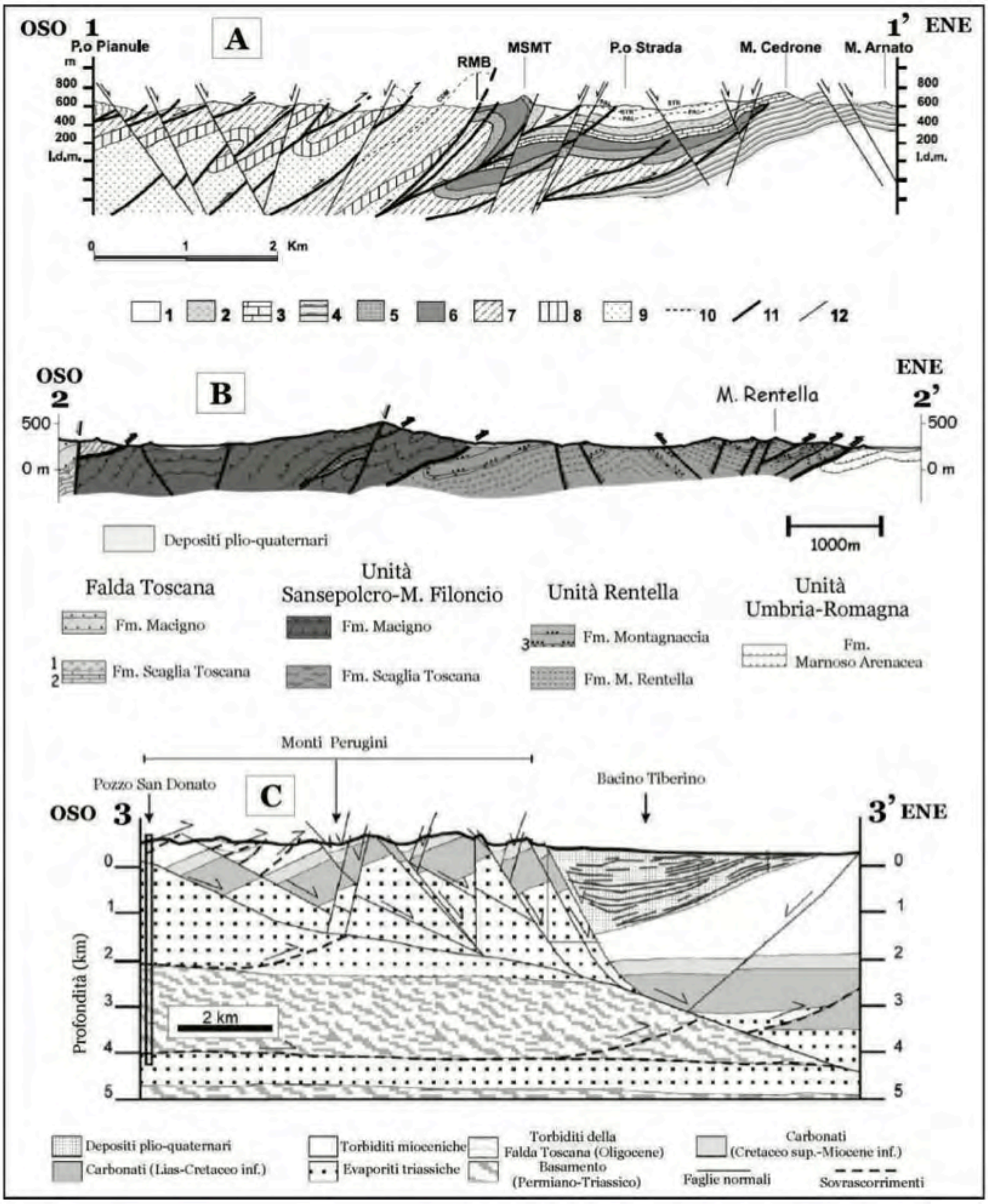


Fig. 28. Geological sections through western Umbria, whose traces are shown in figure 15 A) Section 1- 1 'in Alta Valtiberina (from Brozzetti et alii, 2002). 1) Formation of Monte S. Maria Tiberina (MSMT), member of Poggio Strada 2) Fm. MSMT, member of Serrone 3) Fm. MSMT, member of S. Lorenzo 4) Marnoso Arenacea 5) Sandstones of Celle 6) Marne di Vicchio 7) Boulder (superior pelitic-arenaceous menbro) 8) Boulder (intermediate of arenaceous-pelitic bone) 9) Boulder (lower limestone arenaceous) and Scaglia Tuscany 10) Main guide layers (CDM = Col de Mura calcarenite, STR = Strada, PAL = Palazzetto) 11) Overruns 12) Normal faults. B) Section 2-2 'at Lake Trasimeno (from Barsella et alii, 2009). C) Section 3-3'press the Monti Perugini (COLLETTINI, BARCHI 2002).

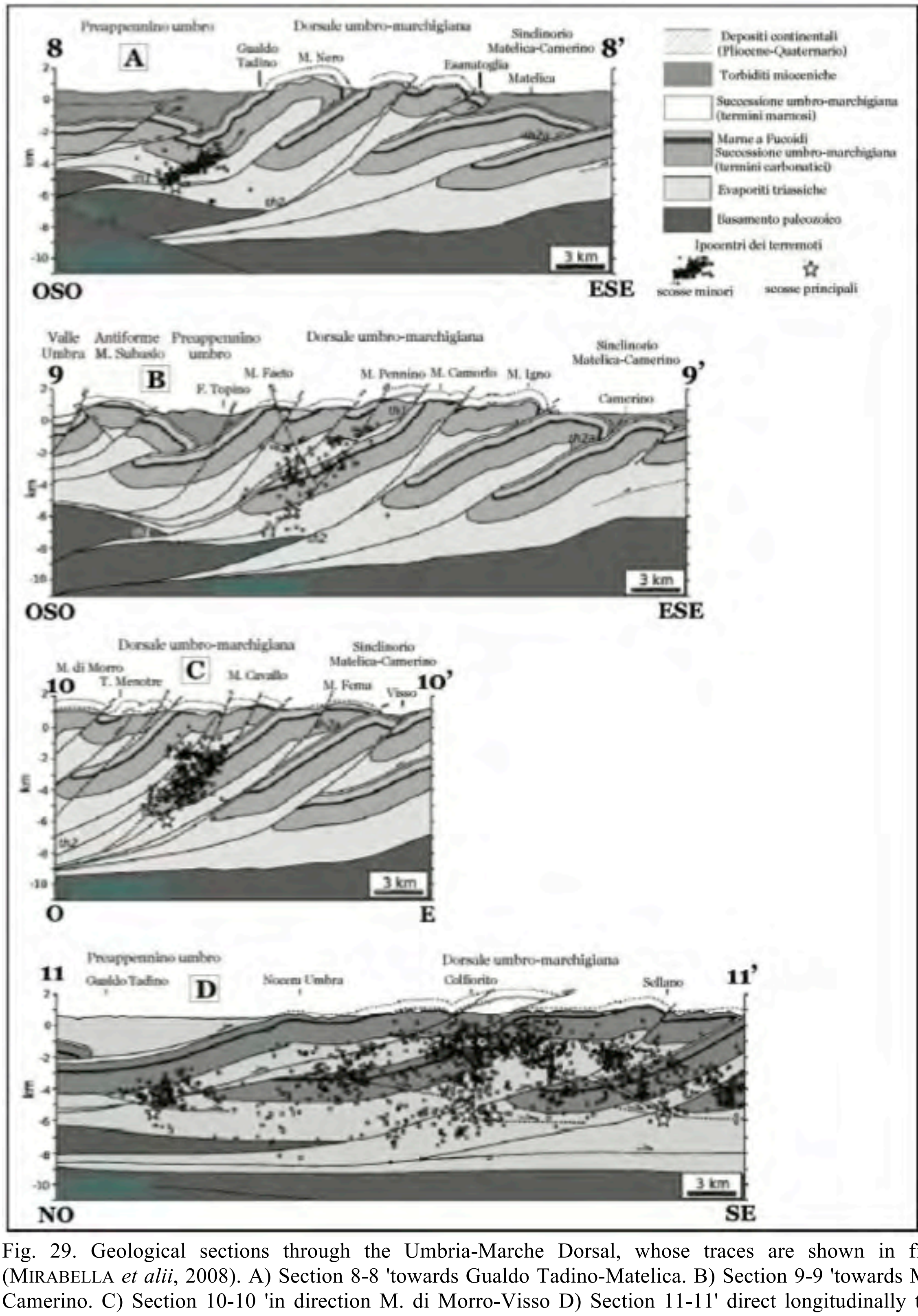


Fig. 29. Geological sections through the Umbria-Marche Dorsal, whose traces are shown in figure 1.3.6 (MIRABELLA *et alii*, 2008). A) Section 8-8 'towards Gualdo Tadino-Matelica. B) Section 9-9 'towards M. Subasio-Camerino. C) Section 10-10 'in direction M. di Morro-Visso D) Section 11-11' direct longitudinally through the chain. Graphs from MANTOVANI *et al.*, 2013.

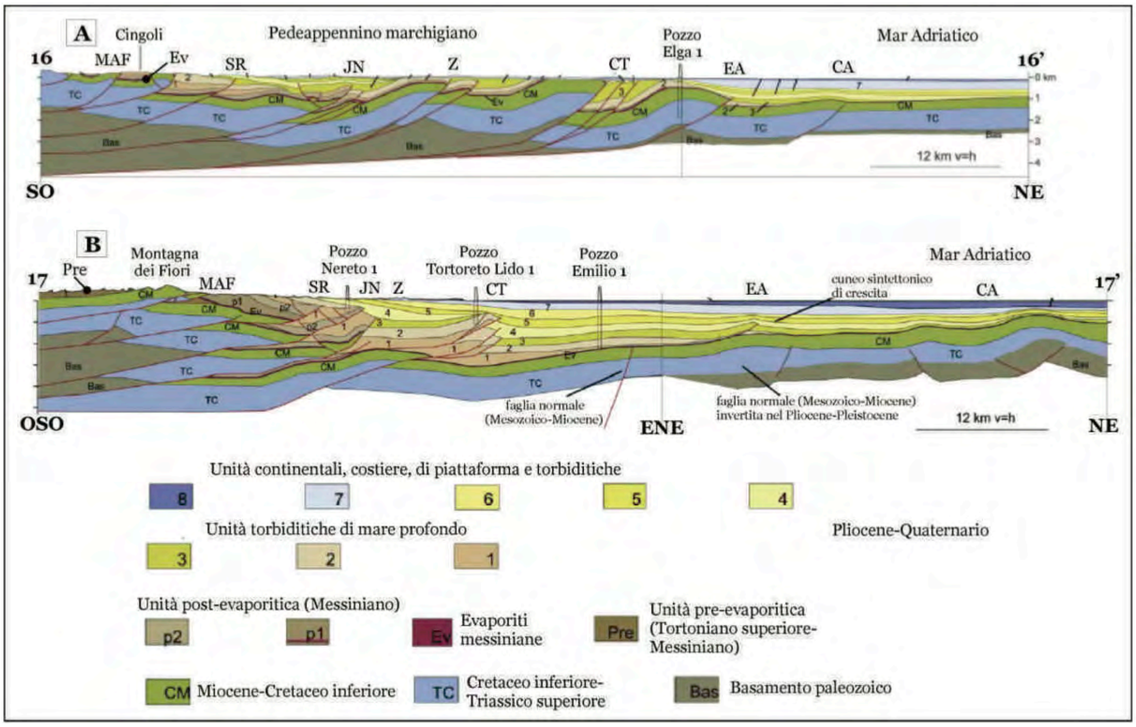


Fig. 30. The structural conformation of the Pedeappennino Marche and the Periadriatico basin. The geological architecture of this sector of the Apennines corresponds to a stack of tectonic layers separated by overhangs. An example is the geological section that concerns the southern part of the area under examination, and crosses key sectors such as Valtiberina, Valnerina, the Sibillini mountains and the Laga mountains. The general arrangement is given by the overlap of tectonic flakes, derived from the deformation of the Meso-Cenozoic sedimentary cover through some primary overlapping surfaces (Cervarola, Narnese-Amerina, M.ti Sabini, Olevano- Antrodoco- Matti Sibillini, Gran Sasso, Laga and Coastal Structure) and many other secondary ones. The innermost overthrust front (Cervarola) is covered by the Quaternary volcanites of Lazio, while the outer fronts (Laga and Coastal Structures) are buried under the plio-quaternary sediments of the Periadrial Basin.

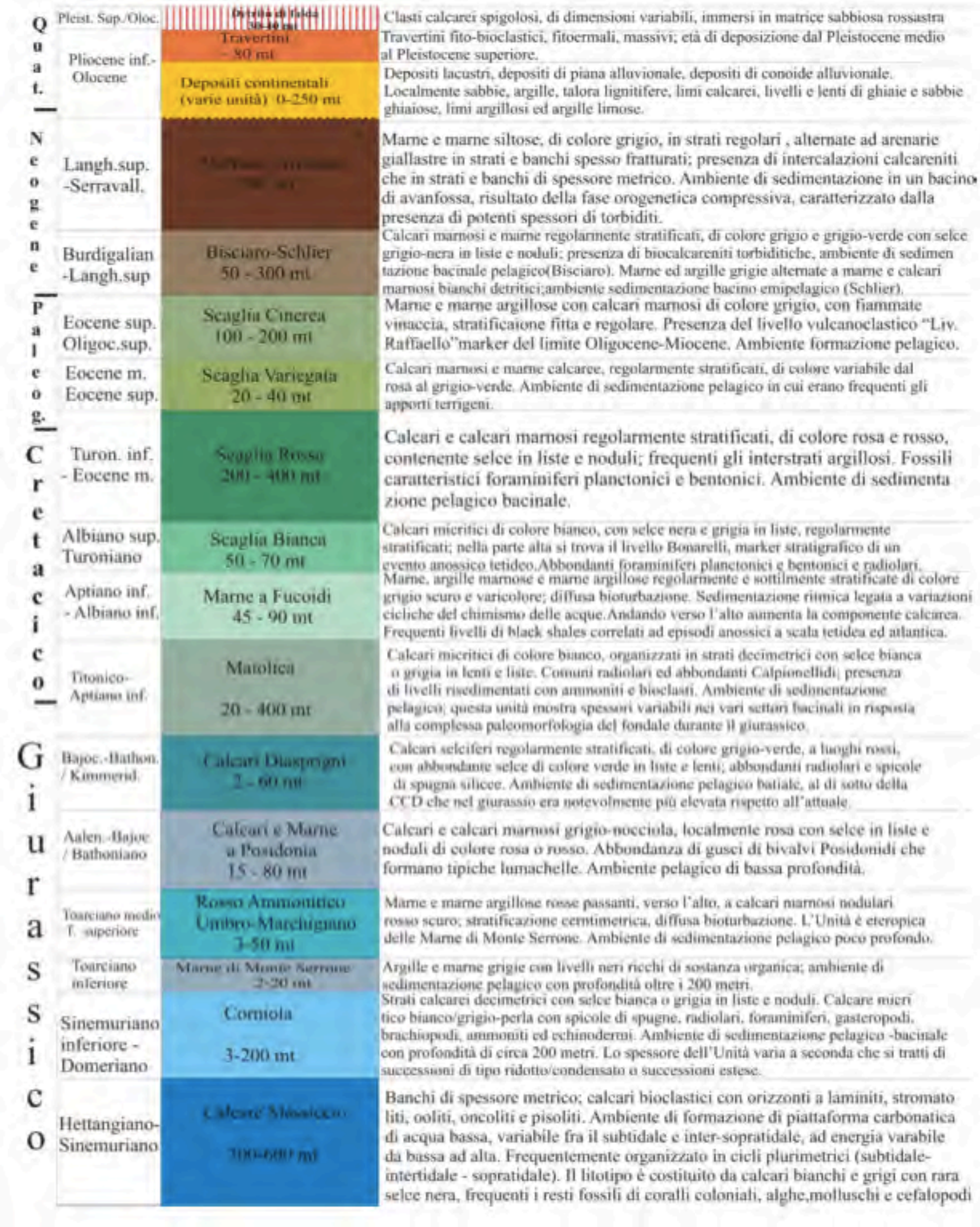


Fig. 31. Umbrian-Marques stratigraphic Sequence: thicknesses, sedimentological characteristics and stratigraphic formations that consider (VANTAGGI, BALDANZA 2006).

Fig. 32. View of Bosso Gorge. The sides of the valley are made of Calcare Massiccio. Photography A. Baldanza 2006.

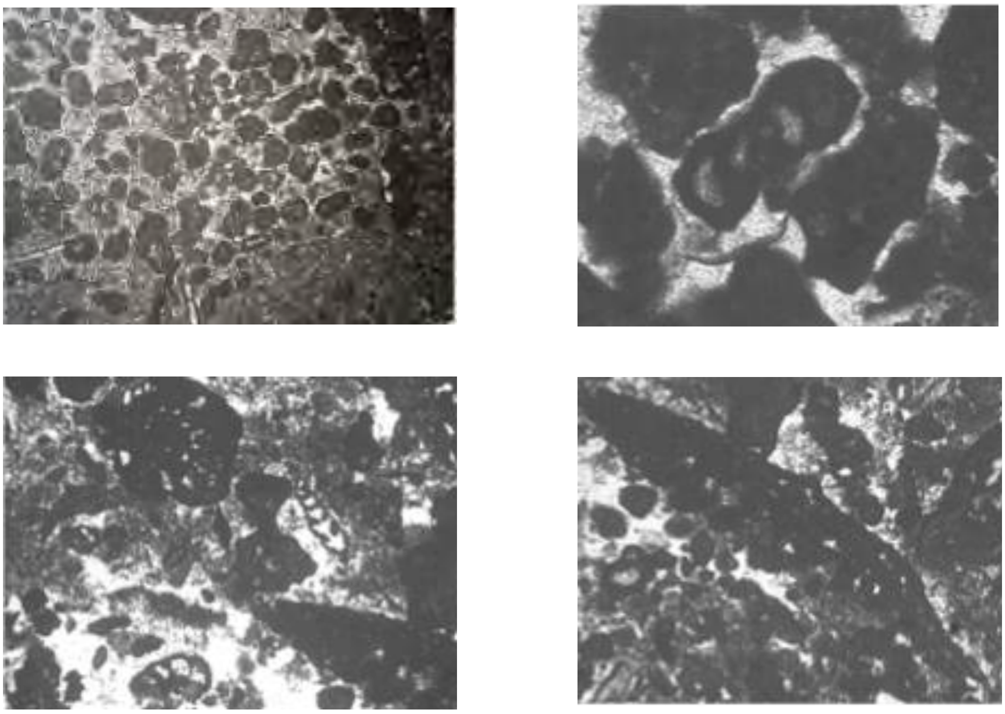


Fig. 33. Examples of *microfacies* typical of the Calcare Massiccio. In the subtidal facies there are ooids, peloids, oncoides and bioclasts (often fragments of *algae*, gastropods and *foraminifera*), while in the intertidal ones there are subtle levels full of small ammonites and nautiloids (*Lumachelle ad Ammoniti*) that were deposited during storms. Microphotos of thin sections were taken under an optical microscope (10x). VANTAGGI, BALDANZA 2006.

Fig. 34. The Corniola benches emerging in the Burano Gorge. Photography A. Baldanza 2006.

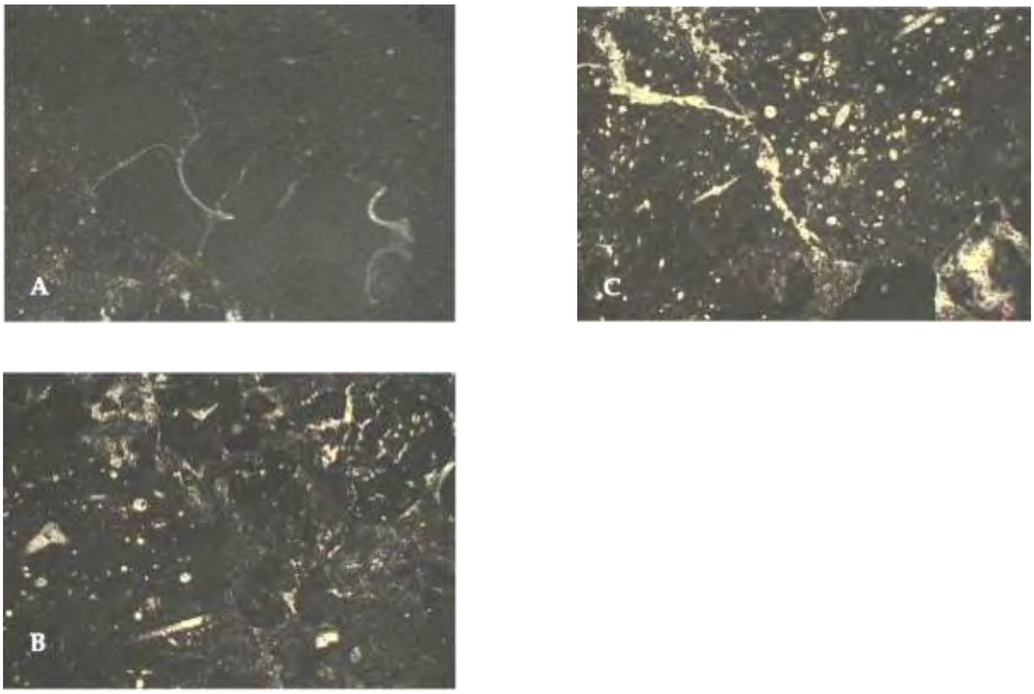


Fig. 35. Examples of *microfacies* of Corniola. a) micrite with ammonite embryos; b) biomycritis with foraminifera, fragments of echinides, small oncolites; c) biomycritis with foraminifera, sponge sponge and rare radiolar. The layers contain a frequent bioclastic component consisting of foraminifera, gastropods, fragments of echinoids and rare ammonites. In some very condensed sequences (units with very low thicknesses), the Corniola has microfacies with brachiopods and corals that indicate a sedimentation in a less deep environment. The first genera of calcareous Nannofossils appear in this formation. Microphotos of thin sections were taken under an optical microscope (10x). VANTAGGI, BALDANZA 2006.

Fig. 36. Outcrop of Marne del Monte Serrone in the Gorge of Valdorbia. Photography A. Baldanza 2006.

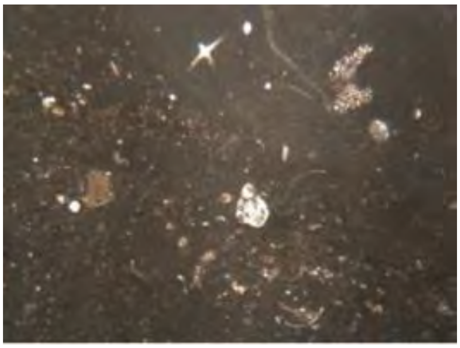


Fig. 37. Example of microfacies of the Marne del Monte Serrone. The most calcareous component levels are common, containing fragments of crinoids, benthic foraminifera, sponge spicules and small ammonite embryos. Microphoto of thin section was taken under an optical microscope (10x). VANTAGGI, BALDANZA 2006.

Fig. 38. Ammonite Red outcrop on Mount Subasio. Photography A. Baldanza 2006.

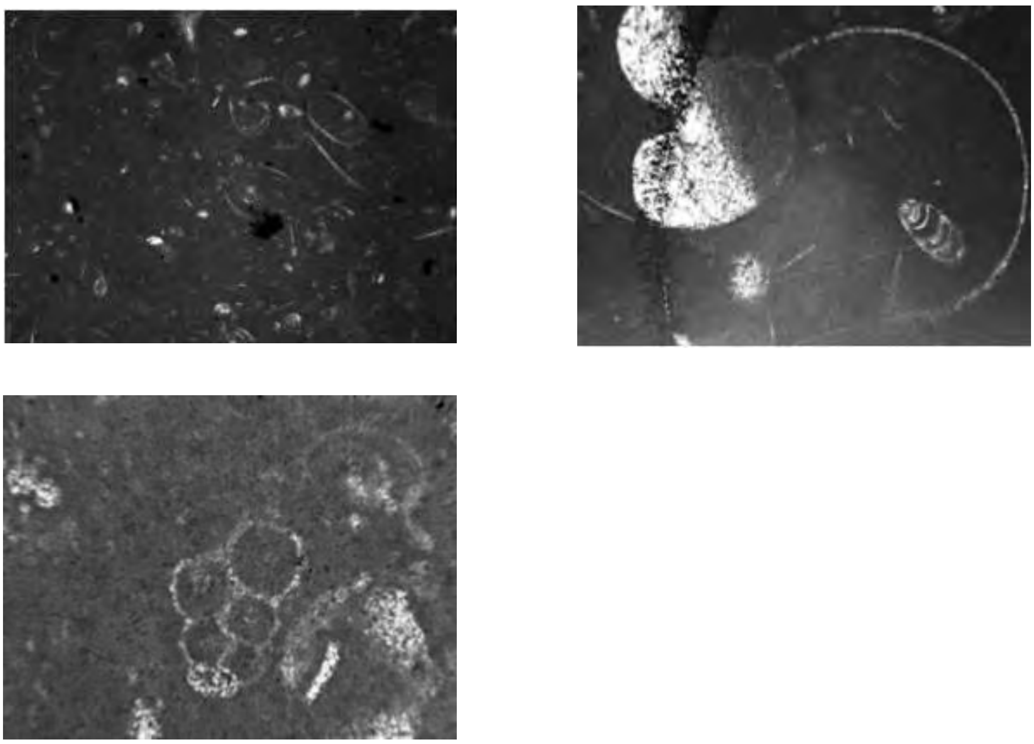


Fig. 39. *Microfacies* are dominated by the presence of abundant ammonites associated with bivalve shells, benthic foraminifera, small gastropods, ostracods, radiols and echinoid plaques. Microphotos of thin sections were taken under an optical microscope (10x). VANTAGGI, BALDANZA 2006.

Fig. 40. Calcari Diasprigni outcrop. Photography A. Baldanza 2006.

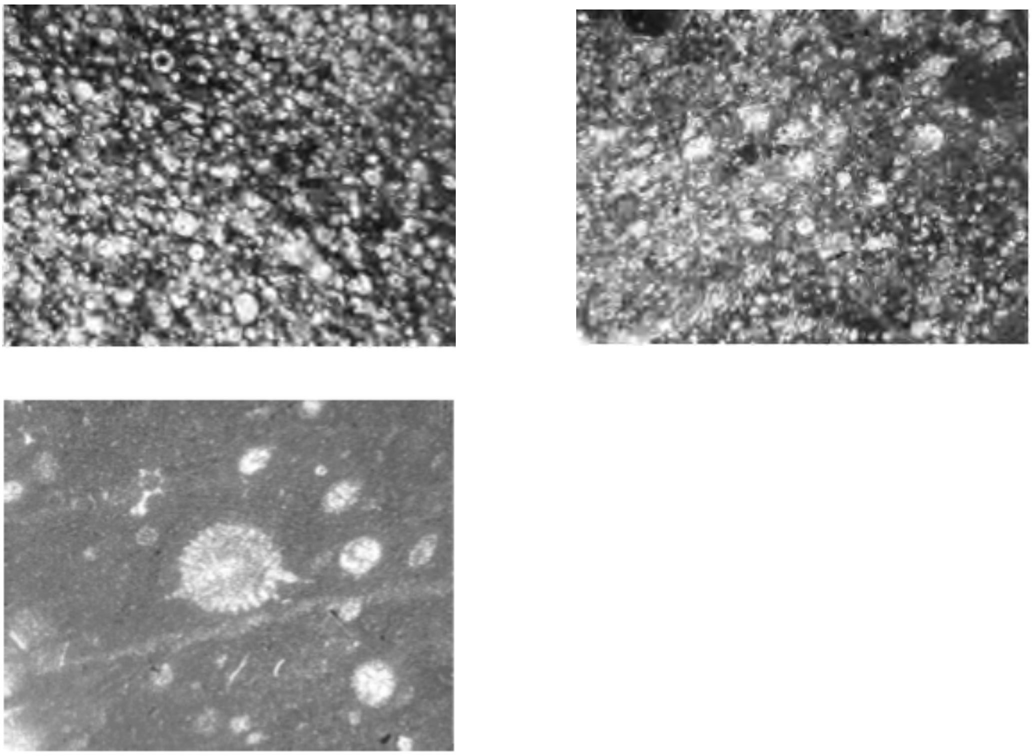
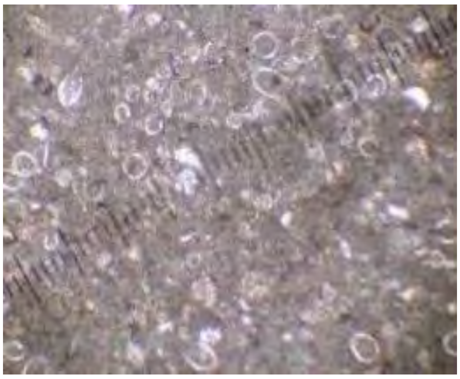
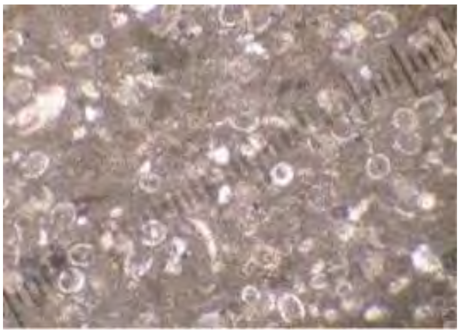


Fig. 41. Calcare Diasprigni (*microfacies*). Microphotos of thin sections were taken under an optical microscope (10x). VANTAGGI, BALDANZA 2006.

Fig. 42. Maiolica outcrop. Photography A. Baldanza 2006.





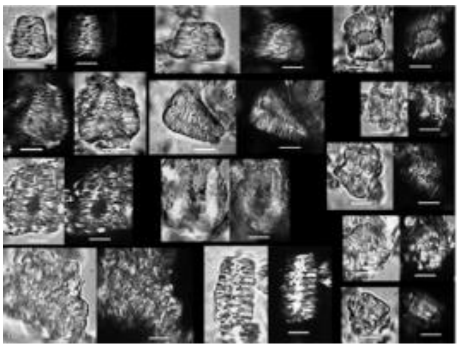


Fig. 43. Majolica (*microfacies*). Thin section microphoto of a Calpionellid biomycrite. Microphotos of thin sections were taken under an optical microscope (10x). VANTAGGI, BALDANZA 2006.

Fig. 44. Calcari e Marne a Fucoidi outcrop. Photography A. Baldanza 2006.

Fig. 45. Marne to Fucoidi (*microfacies*). Microfilm from thin sections was taken under an optical microscope (10x). VANTAGGI, BALDANZA 2006.


Fig. 46. Marne del Monte Serrone outcrop in Casale (Foligno). Image from Google street view (http://www.googlemaps.com)

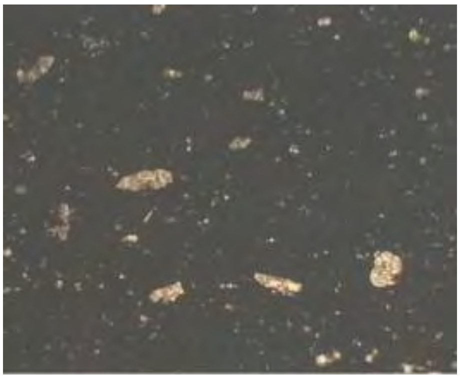


Fig. 47. Scaglia Bianca microfacies. Microphoto of thin section was taken under an optical microscope (10x). VANTAGGI, BALDANZA 2006.

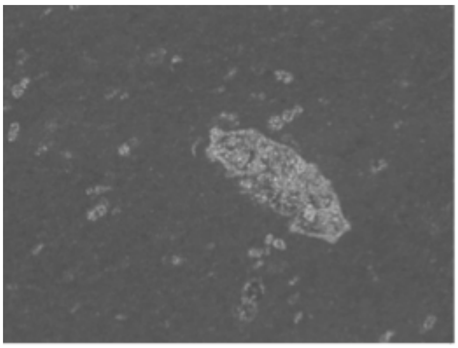
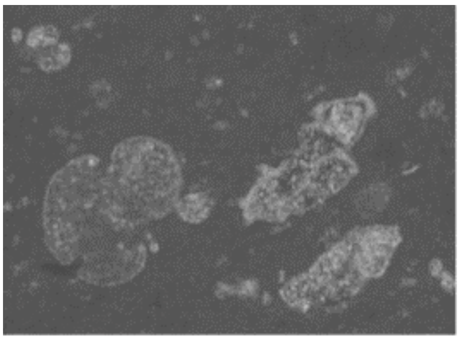



Fig. 48. Scaglia Rossa *microfacies*. Microphoto of thin section was taken under an optical microscope (10x). VANTAGGI, BALDANZA 2006.

Fig. 49. Quarry of Scaglia Rossa with discoloration phenomenon. Photography E. Scopinaro 2017.

Fig. 50. The church of S. Lorenzo in Ninflis. Detail of masonry made with reused ashlars. Photography E. Scopinaro 2017.

Fig. 51. The 14th century gallery of the Sassovivo Abbey in Foligno (PG). Photography E. Scopinaro 2013.

Fig. 52. Buildings in Genga. The construction was built on the natural rock. Photography R. Loreti 2014.

Fig. 53. -1 floor of the Umbrò restaurant in Perugia. Detail of Etruscan masonry. Photography E. Scopinaro 2016.

Fig. 54. -1 floor of the Umbrò restaurant in Perugia. Detail of medieval masonry made with constructive restoration elements. Photography E. Scopinaro 2016.

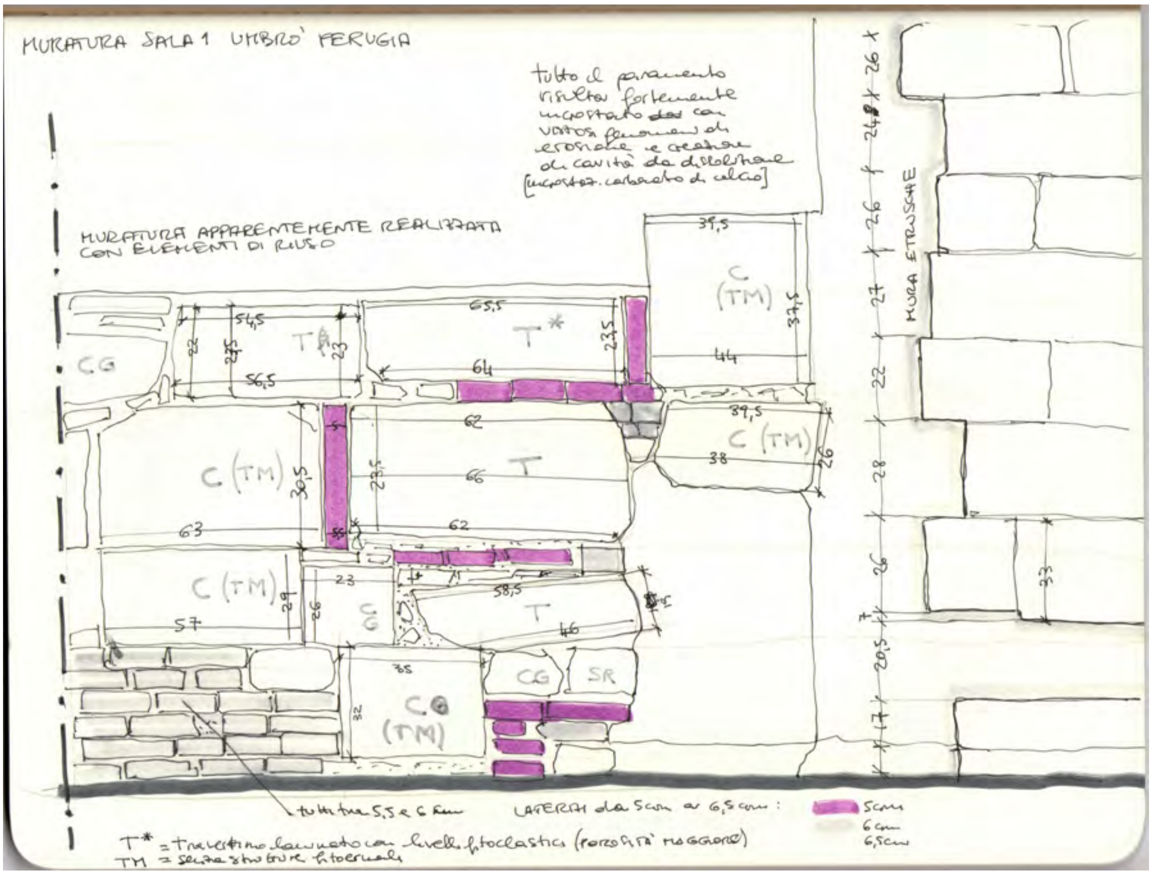


Fig. 55. -1 floor of the Umbrò restaurant in Perugia. Study of medieval masonry. Sketch E. Scopinaro 2016.

Fig. 56. The cloister of the Abbey of S. Croce in Sassovivo near Foligno. Photography E. Scopinaro 2014.

Fig. 57. The cloister of the Abbey of S. Croce in Sassovivo near Foligno. Detail of the base of a column made of recycled material. Photography E. Scopinaro 2014.


Fig. 58. The crypt of the church of S. Ponziano in Spoleto. Photography E. Scopinaro 2016.


Fig. 59. The crypt of the church of S. Ponziano in Spoleto. Photography by E. Scopinaro 2016.

3 THE BUILDING TECHNIQUES WITH LIMESTONE WALL FACING

3.1 Building techniques from Classical antiquity to Middle Ages

The basis of late-ancient and middle ages building techniques has been indirectly laid in the Umbrian-Marques region through the recovery of structures and building materials belonging to the Umbrian, Etruscan and, above all, Roman works. Here we propose a synthesis of the techniques used on antiquity in the cities studied, in order to analyse the changes that characterized the various techniques over time.

3.1.1 Building techniques before Middle Ages

The *opus siliceum*, is the oldest among the constructive techniques considered. It was used since the end of the 7th century B.C.[117] This technique was frequently used by the Italic populations of the Apennine areas. It consists in overlapping, untreated or slightly worked limestone boulders even of considerable size, without the use of mortar or other binders.[118] The pre-Roman foundations were very often built on hills and fortified with masonry in polygonal work done by the stone of the hill itself. The work of realization of the walls was generally made by two groups of workers who started working at a common and then continue in opposite directions and eventually meet other groups of workers.

According with Lugli's classification, which is confirmed by recent studies,[119] it is possible to split the constructions made in *opus siliceum* in four different manners, depending on form, manufacturing and laying of the pieces (fig. 60). The first manner consists of roughly worked boulders that were collected on the construction ground and coupled with discontinuous joints. The material was blanched with cups or other stones in order to remove excessive bosses, leaving both the outside face and the rough sides. First manner *exempla* are found inside the tombs, in some portions of town fortifications and in foundations of large road.[120] The second manner was characterized by the polygonal form of the blocks that, after having been detached from the rock by chisels and wooden wedges, underwent smoothing of the outer surface that took directly place in the construction site with a kind of rusticated ashlar. The blocks were almost straight, but with different lengths and bevelled edges. Lying was therefore still

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[117] For a closer look at the construction technique and the chronological timing issues, see DE ROSSI 2009(a), pp.41-53 e DE ROSSI 2009(b), pp. 55-73.

[118] As stressed by many scholars, the use of *opus siliceum* is closely related to the presence of limestone rocky benches characterized by cracks that allow the release of large blocks with the help of wedges and levers only. Cf. VALCHERA 2012, p. 271.

[119] LUGLI 1957; COARELLI 1982.

[120] Some examples of Etruscan masonry are still visible in the structures of the Montecalvario mound in Castellina in Chianti and the remains of the walls of Cortona.

imperfect, improved by the insertion of wedges, as in the examples of the oldest parts of the walls of Amelia and Spoleto (fig. 61). In the third manner, blocks of polygonal shape with carefully polished external surface by mallet and chisel. The laying planes were perfectly aligned, partly thanks to small triangular blocks inserted into the possible remaining spaces. The boulders were transported from the excavation to the construction site by means of small machines. These boulders were carefully worked, bringing back the angle measurements of the corresponding blocks, to obtain perfect matching.[4] Thickness of single blocks and care in the operations were proportional to the static function, as is often seen in the corner angles of towers and in the door/window post. The external surfaces, smooth and coplanar, were worked by *gradina* (tooth chisel) and aligned with the lead wire, showing a perfect mastery of the tools. An exemplum of this manner is the southern part of Amelia walls (fig. 62). The fourth manner showed juxtaposition of quadrangular parallelepipeds with non-parallel sides on semi-parallel and discontinuous laying planes. The surfaces of blocks were slightly convex, sometimes worked as an ashlar work, similar to "an imperfect *opus quadratum*".[121] This manner of polygonal work probably had contemporaneously been used together with the III and the IV manner of *opus quadratum.* It is still possible to observe some well-conserved exempla in the city walls of Perugia, Orvieto and Todi, in the terracing for the construction of *Via Flaminia* near Narni and in the foundations of a *Villa* at Cesi (fig. 63).

Roma offers the Initial exempla of transformations in the building technique between half 6th and the beginning of 5th century B.C. with the first wall facing in *opus quadratum*.[122] This technique prescribed the overlap of blocks squared as parallelepipeds of same height continuously and regularly leaning on homogeneous rows; the mentioned technique was even used in imperial age together with the other building methods (fig. 64).[123] Also in this case, several constructive manners were classified: Etruscan; Greek and Roman.

The Etruscan manner is characterised by blocks of variable height, without homogeneous measurement units. These blocks have an about cubic shape placed on semi horizontal layers, often discontinued by the different size of the blocks. This is the case of Perusian city wall at west of the Etruscan Arch (fig 65). Walls made by Etruscan method were of limited thickness, because of placement against hills, as happens in the polygonal work. The Greek method has two variants: the first consists of lines of two, three or four blocks side by side in the direction of length, discontinued by one block put in the direction of width and the second, used for thin walls, has blocks put in the sole direction of length with the vertical joints that on each row correspond to half side of underlying blocks. No Greek method was however used in the studied area.

The roman method is different from the two others because of accuracy of the measurement units, which not only defines the size of blocks, but also the width of walls due to alternate arrangement of rows. The blocks were actually arranged on first row in the direction of length and in the consecutive in the direction of width, in order to make integral and firm the constitutive parts of the walls.

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[121] LUGLI 1957, p. 66.

[122] Some of the first masonry made in *opus quadratum* in Rome are the wells and *tholos* warehouses present on the Palatine and the stands of the temples of Saturn and the Jupiter.

[123] The dating criteria are mainly related to the type of stone and unit used and the installation of blocks.

A variation of masonry made in *opus quadratum* was to make use of large squared blocks only for external wall facades, filling the inner part (*nucleus*) with concrete (*opus caementicium*) that was a mixture of mortar and stone fragments.[124] This new technique started on early 2nd B.C. century and brought to changes of leading importance for development of roman and medieval building techniques. Throughout the Middle Ages, the use of mortar and rubble masonry was the foundation of all civilian and religious buildings.

One of the earliest facings for the *opus caementicium* was the wall facing in *opus incertum.* This was made with small, irregular, sometimes polished on external surface stones irregularly arranged and connected each other with mortar of lime and, rarely, of gypsum. Maximal diffusion of this technique occurred between the 2nd and the 1st century B.C., when we have also the most accurate exempla.

The arrival the methods as *opus pseudo reticulatum* and *opus reticulatum* in which romans made wall facades by using small squared blocks more and more regular, caused the abandon of *opus incertum.*[125] Owing to standardization of pieces, the work of structures, became simpler and faster and the composition of the facade became more compact with thinner mortar coupling.

The *opus reticulatum*, whose maximal perfection occurred in the buildings of Augustan age, [126] was made by *cubilia,* small elements of truncated pyramidal shape, placed side by side along parallel lines 45° slant with respect to the horizontal plane. The *opus reticulatum* had never been done in the entire length of a wall.[14] In the majority of *exempla,* the buildings show corners, heads and arches made with small parallelepiped blocks or with bricks.

Cubilia were mainly done by tuff, a rock abundant in Latium and Campania. In Umbria and Marques however the blocks were of limestone. This rock, more compact and less easy than tuff to cut and polish, made slower and more difficult the evolution from the *opus pseudo reticulatum* to the *opus reticulatum* in the entire central Italy[13]. In Umbria some exempla of these techniques can be found in some walls of the city of *Carsulae* and in the radial walls of the roman theatre in Gubbio (fig. 66).

The *opus vittatum* consists of small quadrangular blocks of same height on horizontal parallel rows. Despite apparent easiness, this technique had great diffusion only since the Augustan age. One of the earliest exempla is the defensive wall of Spello (fig. 67). In this case also the building materials are driven by local availability. In present study was documented the rather exclusive presence of limestone.[127]

The *opus spicatum* owes his name to the alternate arrangement of the stones put together. Tough scarcely used, this technique is very interesting because of its continuous use along late ancient and early Middle Ages, mostly thanks to reuse of roman structures. The stones were actually arranged on lines tilted at 45° angle. This technique is mainly present in territories

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[124] VITRUVIO, II, 8,7.

[125] The *opus incertum* disappeared in the Republic time, but remained in use for the construction of rural and rustic buildings of any age. For more information of the use of *opus incertum*, see LUGLI 1957 e ADAM 1988, pp. 140-141.

[126] «Structurarum genera sunt haec: reticulatum, quo nunc omnes utuntur, et antiquum, quod incertum dicitur» (VITRUVIO, II, 8).

[127] An exception is the Roman wall of Bevagna, which is made of sandstone.

where people were able to easily find flat stones and was used by romans in basements, foundations and cladding of floors and streets.

The introduction of the cooked brick deeply changed the construction technique. The brick caused the gradual abandon of other building methods in Rome and neighbourhood,[128] but it had not similar impact on Apennine districts, where employing local rough materials, often was cheaper. The *opus testaceum* has wall facing done with triangular bricks with tip inserted in the mortar by improving the method of toothing.

In the Umbria-Marques area the *opus testaceum* is frequently used together with the *opus reticulatum* in alternate manner and is called *opus mixtum.* The latter technique were used in Rome on first half of II century and is present in Umbria in the amphitheatre of Carsulae (end I century) and in the structures included on sides of the church of S. Maria in Pantano at Massa Martana (fig. 68).

3.1.2 Continuity and renovation

The development of building techniques on centuries successive to the fall of Roman Empire was based on the Roman techniques.

A characteristic of roman building method, then largely used along all the middle ages, was to make walls showing tripartite section: a central cement core and two lateral wall facings. Wall facings were made with small or regular blocks, bricks or both. These building materials were arranged in alternate rows or according to other drawings, provided that the location of single pieces was able to guarantee the perfect toothing between facings and core. This technique obviously included the use of mortar, the production of which does not seem to have been set aside. In some cases we can detect wedge-shaped pieces positioned in the curtains to improve the grip.

Due to the use of same building materials, when analysing the masonry with limestone facing, we have not the impression of clear discontinuity among roman, late ancient and middle ages walls. Maria Romana Picuti highlighted one exemplum of this similarity during the digs in the archaeological site of Cancelli, near Foligno.[129] In this case, masonry have facings in *opus vittatum* wit small blocks of white limestone that - tough dating back to I century - has much in common with Umbrian masonry done by small blocks on 11th century (fig 69). In the 12th and 13th century masonry of the churches of of S. Benedetto al Subasio and S. Croce in Sassovivo in Foligno, it is worth to note the use of the same building materials, the same work on the blocks and the same arrangement of the wall. In both instances the walls consist of facing done by pyramidal- shaped limestone blocks and cement core, arranged in the Roman way (figg. 70-71).

The link among techniques of different ages is reinforced by the occurrence that sometimes the masonry have been made in continuity with pre-existent structures, as is the case of several urban settlements along Via Flaminia and Via Amerina. One of these links was documented

[128] La prima grande fabbrica in laterizio realizzata a Roma è stata quella dei Castra Praetoria, voluti da Tiberio tra il 21 e il 23 d.C.. In seguito si può dire che tutte le più grandi architetture imperiali nella capitale sono state costruite con la stessa tecnica (ADAM 1988, p. 157).

[129] ALBANESI, PICUTI 2014.

during the excavations near the Church of S. Maria in Campis at the eastern periphery of Foligno, the possible site of the ancient *Fulginia*.[130] Structures of early imperial age were found in this area, together with early medieval reuse, linked each other by intermediate transformations, which show the living and building continuity in that zone.

Technical continuity can also be observed when the ancient structures had been completely dismounted to reuse the building materials. The early Middle Ages masonry of S. Maria Assunta in Otricoli is a very intriguing case of material reuse and it is ideal in the examined district. The first building phase, that can be dated 8th-9th century, is constituted by a base in *opus quadratum*; walls in *opus listatum*, with alternate rows of bricks and tuff lie over this plinth. Over the same plinth we can also find *opus mixtum* walls made by *opus listatum* and *opus reticolatum* (fig. 72).[131] Materials are entirely reused, and come from the near *Ocriculum*. The facings recall the ancient building techniques still now visible in the roman ruins of this town.[132] In the above mentioned walls, people can recognise conscious evocative will and good mastery of the ancient roman construction techniques, despite the lack of uniformity and the installation on wavy rows, that is typical of the Charlemagne Age. The longitudinal walls of the S. Maria in Pantano church in Massa Martana - due to reuse of previous roman structures in *opus mixtum*- are a second exemplum of reuse and technical 'know how'. In this case the work of integration and modification of the prior *fabrica*[133] occurred on 10th and 11th century respected the roman arrangement and maintained the belt framework (fig. 73).

In the S. Feliciano cathedral of Foligno and in the S. Lorenzo church in Spello, both built on 12th century, it is possible to observe a peculiar and intriguing technical revival of the *opus reticolatum*. Master bricklayers did some square-shaped masonry, which were made up by square based elements of white or pink limestone and arranged in the ancient way over the main facade of the buildings (figg. 74-75). In both cases the building materials do not seem reused because of evidence of accurate and dedicated work; every piece still has sharp edges on each side and smooth external surface, moreover all the pieces are coplanar each other. In both cases we were not allowed to do a study of the inner part of masonry, nor we could find descriptions written during the construction time, able to help us to understand the actual shape of the mentioned elements and/ or methods of laying. Owing this limitation, we can only hypothesise that medieval master bricklayers reproduced the roman *cubilia*; this hypothesis is however plausible, due to the pyramidal shaped blocks in the above-mentioned masonry and the geographical proximity of roman sites.

Even later masonry made on 14th and 15th century, show the same motif on entire facades and seem to be made up by small square sheet arranged in a similar way as the *opus quadratum*, but the arrangement of the sheets does not reproduce the structure nor the dimensions of the roman *opus*. The side of squares are actually longer than the roman ones and the overall appearance is nearer to other typical late medieval facades with sheets than to facades done by

[130] ALBANESI 2014, pp. 559-576.
[131] According to the studies of Daniela Esposito, the masonry equipment and the lashing holes on the facade and on the northern side are referred to a single construction phase characterized by a succession of different equipment. For more information, see ESPOSITO 2005, pp. 47-48.
[132] Cf. *op. cit.*, p. 50.
[133] The church of S. Maria in Pantano was probably founded on a *statio* along Via Flaminia.

ancient techniques, as is the case of the external facade of S. Domenico in the homonymous church in Perugia (fig. 76).

It is worth noting that, as opposite to the ancient masonry, middle ages facings with *opus reticolatum*, were probably designed for decoration, as shown by the accurate work on surfaces and alternating colours, that has analogies with other decorated walls raised on same time in Umbria-Marques. These facades were probably designed to be uncovered with any kind of plaster.

3.2 Medieval building techniques with limestone wall facing

In order to categorize the medieval masonry, the most significant characteristics are the nature of building materials, the methods for their use, the changes of dimensions, manufacturing and installation of pieces, the arrangement of facings and the potential presence of particular building expedients.

At the end of analysis we have classified six different types of medieval building methods characterized by the use of local limestone in the Umbria- Marques districts:

1. masonry with wall facing made of materials of various origin, shape and dimensions;
2. masonry with reused ashlars;
3. masonry with wall facing made of limestone blocks arranged in rows, with thick mortar joints;
4. masonry with wall facing made of limestone ashlars arranged in parallel rows;
5. masonry with wall facing made of mixed ashlars and slabs of limestone;
6. masonry with wall facing made of bi-chrome limestone slabs.

1. Masonry with wall facing made of materials of various origin, shape and dimensions.

This technique shows irregular arrangement, due to the different dimensions of building elements, varying from large blocks - 40 to 100 cm side- of calcareous breccia or travertine to rough *scaglia* stones – 4 to 15 cm side- or to bricks and ashlars. The treatment of surfaces, when done, is also heterogeneous, because of large presence of reuse materials; consider that these masonry were contiguous with or in proximity of ancient structures.

These masonry were mainly built in continuity or in close proximity to ancient structures since the eighth century and for a very long time span. The last example, amongst those belonging to the masonry sample chosen during present study, dates back to the middle of the 14th century (Chart 191), but it can easily be assumed that the above mentioned technique - testimonies of which were already present in Roman times (Data Sheet 060) - has never been abandoned throughout the Middle Ages.

Exempla of this technique are: the external masonry of S. Angelo 'temple' in Perugia (Data Sheet 091) construction of which comes before the 8th century[134] and the facade of the church of S. Maria di Plestia in Colfiorito (Data Sheets 051 and 052) that dates back to early 12th century (fig. 77).

Depending on the different nature of the arranged recovery elements, we can distinguish two possible variants, the first one concerning the reuse of non-decorative material; the second characterized by the presence of reuse material with many decorated 'special pieces.'[135]

[134] GIGLIOZZI 2013, p. 17.

[135] The analysis of masonry and building phases of St. Maria di Plestia are based on the studies by Ivan Rainini (RAININI 2014, pp. 206-361).

Wall facings of some parts of St. Mary in Pantano at Massa Martana, could represent a further variety of the type 1 technique. In this church some inserts in *opus spicatum* discontinue the wall facing with irregular arrangement. In this instance the reused materials are small limestone blocks and brick wedges (Data Sheet 141-142). Similar cases are very rare in Umbria and Marques and always circumscribed to few rows or small parts of the walls. Similar cases, in which the *opus incertum* has diagonal inserts, are very rare in the territory under study and can be attributed to two different kinds by type and dating. From the 6th to the 11th century, we find structures made with recurrent bands of diagonal lay out often covering all the width of the masonry, as in the above-mentioned case of S. Maria in Pantano. In later structures, however, the diagonal lay out become inserts inside masonry by the more regular arrangement as a kind of embellishment or constructive play.[136]

2. Masonry with reused ashlars.

The structures made by large reused blocks show regular and accurate arrangement with rather thin mortar joints; the blocks generally are of travertine, accurately squared and smoothed, coming from Etruscan or Roman structures.
Based on the results obtained by present study, it is possible to estimate that the reuse of ashlars from ancient buildings occurred at least until the 12th century.
This technique had two variants: the first involved the almost exclusive use of large pieces (height 40 to 60 cm, width 70 to 120 cm) made with the help of any brick wedges, as in the walls of the church of S. Lorenzo a Montecastrilli, built in the 11th century (Data Sheets 144-145), and the entrance of the current Piermarini palace in Foligno, whose dating is uncertain at the moment; the second is characterized by the juxtaposition of ashlars and blocks (height 18 to 25 cm, width 25 to 50 cm), also these usually reused. An example of this second variant is the masonry of the crypt of the S. Maria di Plestia church, done between the end of the 11th and the beginning of the 12th century (Data Sheets 053-054-057) (fig. 78-79).
It is assumed that the different composition of the two variants may - in some cases - conceal a different internal structure, for example the masonry formed only to connect probably had full section, unlike the others that required the existence of an inner nucleus. At this time this supposition remains a theory, because we were not allowed to investigate the internal structure of the mentioned masonry.

3. Masonry with wall facing in limestone blocks and arrangement as lines with thick mortar joints.

Wall facings with blocks arranged as parallel rows are made by parallelepiped elements, arranged in parallel or semi-parallel lines 8 to 25 cm high with mortar joints 1 to 5 cm thick. These rows never are perfectly isodomic, but it is often possible to observe the

[136] In the S.Croce in Sassovivo Abbey, close to Foligno, it was possible to observe two walls with inserts of blocks in *opus spicatum,* belonging to medieval phases probably later than that of St. Maria in Pantano.

presence of blocks simply similar, with tolerance within 5 cm. The blocks were rough-hewn by percussion instruments similar to chisels. According to the local extractive possibilities the blocks were almost exclusively made of *scaglia* limestone. The apparently rough manufacturing was probably due to a no more present finishing layer (fig. 80).
A precise exemplum of the third type masonry is the external wall facing of the masonry of sacristy at S. Chiara Church in Assisi, where the builders always used the same materials, arranged in parallel and rather isometric rows (Data Sheet 002).

4. Masonry with wall facing made of ashlars of compact limestone arranged in parallel rows.

The building technique with limestone ashlars is closely linked with the previously described block technique, of which it seems to be the 'refinement'. A careful study however, shows that the working changes on the arranged elements correspond to a different 'will' and the two techniques actually though distinct were contemporaneous. The first documented examples of use of the two different techniques were actually found in the masonry of the crypt of the S. Maria Maggiore church in Assisi. According to the latest studies, both were built on same construction phase and both dated back to middle 10th century.[137] Examples of these construction methods can be found until the end of the Middle Ages.
Masonry with compact limestone ashlars can be divided into two different categories according to the accuracy of work and the arrangement of the elements. The first type involves rough smoothing of the pieces, obtained with *subbia* (point chisel) and *martellina* (bush hammer). The ashlars were then arranged in parallel or pseudo-parallel rows with mortar joints of a thickness of about 0.5 to 2.5 cm; this method was used throughout the entire period. The second method concerns wall facings with perfectly coplanar surfaces and ashlars smoothed with precision indirect percussion instruments, such as the chisel and *gradina* (tooth chisel) or *martellina* (bush hammer). In some cases the elements show anathyrosis and very thin mortar joints (from 0.1 to 0.5 cm) without special finishing (fig. 81).
The work on surfaces of blocks or small blocks, the attention for chromatic aspect of facades, the position of wall facings inside the buildings, brings us to suppose that these wall facings were exposed to eyesight. This circumstance however does not exclude the probable presence of a layer of surface finishing touch.[138] The masonry of the second

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[137] Secondo le trattazioni di Renzo Pardi e Gisberto Martelli la cripta di S. Maria Maggiore ad Assisi, si vorrebbe parte della precedente fase carolingia della chiesa e andrebbe datata alla fine del IX secolo. Dalle le ultime acquisizioni di Maria Teresa Gigliozzi, che vedono la presenza di una tipologia costruttiva più articolata e più tarda, la struttura risulterebbe essere ascrivibile alla metà del X secolo, in accordo con i confronti stilistici operati con la cripta della chiesa di S. Pietro a Perugia. Per approfondimenti si veda GIGLIOZZI 2013, pp. 183-184.
[138] A partially covering, thin plaster could be used on accurately smoothed or even relief-decorated surfaces. In Umbria, fragments of lime and fine limestone sand finishing touch have been found by several researchers on the consular gate of Spello and on the facade of S. Pietro *in Vineis* at Spoleto.

category was made mainly between the 12th and the 14th century in the main prospects of the most important civil or religious structures.
This building technique has two variables: height of rows and employed building materials. Independently from the manufacturing quality of the external surface of ashlars, the rows can show absolutely different heights, as is the case of the 14th century walls of the church of S. Venanzio in Fabriano (Data Sheet 065- 066) or, on contrary isodomic, as is the case of the wall facings od S. Chiara church in Assisi, dated on second half of 13th century (Data Sheet 001). Building materials were almost always white or red *scaglia*. It is possible to classify: 1) masonry with wall facing made by different colour elements, without any peculiar chromatic choice as it can be seen in the church of. S. Maria Maggiore in Assisi (Data Sheet 016); 2) wall facings made only by white or only by pink limestone, or with a so called 'structural' decoration, that is obtained by juxtaposition of materials with different colours, as it can be observed in the facade of S. Salvatore in Foligno (Data Sheet 082).
In the Umbrian-Marques region the spread of structures with squared block core probably started with this kind of masonry, as is the case of the church of S. Domenico (Data Sheet 173) and the cathedral of S. Lorenzo both in Perugia (Data Sheet 186).

5. Masonry with wall facing made of mixed ashlars and limestone slabs

We can hypothesize that some masonry with limestone wall facings had a different type from the already described masonry, because of wall facing done by slab rather than ashlars coatings. This hypothesis comes from considerations about the size (sometimes far higher than the normally used size of blocks and/or ashlars), the shape and the random orientation of the pieces, which are sometimes placed according to the rock natural cutting lines. The examples of masonry made with this technique come from the second half of the 12th century to the early Renaissance and can be divided into three variants that differ by type of building materials and figurative aim.
The first variant in chronological terms was found on the facade of the church of S. Nicolò in Sangemini (Data Sheets 204) dated to middle 12th century and in the facades of the churches of S. Silvestro (Data Sheets 048-049) and S. Michele Arcangelo in Bevagna, both realized between end 12th and early 13th century. The material of the wall facing is almost exclusively travertine and the size of the visible section of the elements in operation is extremely heterogeneous. It is not possible to exclude the use of travertine ashlars for the base of these structures, as in the case of the church of S. Michele Arcangelo (figg. 82-83); It is however more difficult to think that elements of such dimensions - and weight - were used in the upper masonry portions, especially if they had to lean on much smaller rows of blocks (fig. 84).

Architectures of Latium and Abruzzi, with same style and date also show similar findings Cf. FIORANI 2006, p. 38.

In these cases the materials may be first extracted or reused,[139] the outer surface of the pieces is finely chiseled and laying is very accurate with thin mortar joints even when the pieces are no more arranged in parallel rows. This compositional accuracy, the presence of epigraphs, and the perfectly smoothed surface of the outer wall facing suggest the intention of not plastering the external facade of the mentioned churches.

This second method shows greater accuracy in the composition of the wall facing and in the laying of alternate rows of ashlars and slabs. An example is the outer face of the left side of the church of S. Francesco in Gubbio (Data Sheet 124), made during middle 13th century. Here, we can observe a row of white limestone slabs discontinuing two bundles of ashlar masonry. It is extremely probable that it is a slab because, as the stone elements are scaled, the size of the exposed section (41,2 x 46-47 cm) would be excessive for a depth greater than 15 cm.[140] In this type, the difference between ashlars and slabs is sometimes suggested also by the different manufacturing, which could also sometimes be accompanied by a different surface finishing. The most sophisticated and late variant of this building technique is the bi-cromatic vestment of the 'network type': examples are in the cities of Assisi, Perugia and Foligno, made between the second half of the 13th century and the end of the 15th century (fig. 85). The masonry is made by white limestone (*Scaglia* or travertine) ashlars and squared or pseudo-square slabs of pink limestone (*Scaglia* or *Rosso Ammonitico*).[141]

In all of the mentioned cases, despite the particular accuracy of manufacturing and of arrangement of pieces, we cannot exclude the presence of a finishing layer or other minor 'finishing' chromatic operations lost over time.

6. Masonry with wall facing made of bi-chromatic limestone slabs.

Decoration with bi-chromatic slabs is typical of the most important structures built on late middle ages and on renaissance in central Apennines Italy (fig. 86).[142] These slabs are the external walls facing of very thick (60 to 90 cm) masonry. The mentioned walls were often built by means of small limestone blocks arranged in alternating protruding rows.[143]

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[139] The building materials for S. Silvestro and S. Michele Arcangelo in Bevagna, comes from the quarries of Spello, Assisi and Todi (from SPERANDIO 2004, p. 61), whereas the building materials for the facade of S. Nicolo in Sangemini was probably of reuse from the roman city of *Carsulae* (from GIGLIOZZI 2013, p.150).

[140] It is not possible to obtain a so large block: actually the geologic layers of white *scaglia* measure 5 to 35 cm.

[141] A discussion on the 'network' bi-chrome wall facings, is contained in the paragraph 3.2.3 concerning the structural decoration.

[142] Umbrian buildings show affinities with architectures of Abruzzi, which are similar for construction and decoration; the natural raw materials also are also similar for colour and shape. Exempla are some constructions in the city of L'Aquila: the Ninety-nine Faucet fountain (1272); the facade of Collemaggio Cathedral, (early XV century); some masonry of S. Domenico Church and cloister (early XIV century); S. Maria *del Soccorso* Church (XV century). Cf. FIORANI 2006, pp. 25-26.

[143] Detailed study on the technique of wall *nucleus* arrangement and on the relationship between *nucleus* and wall facing in the paragraph 3.2.2.

This constructing technique was always addressed to produce decorated surfaces by matching elements of different colours, mostly pink and white, with extremely thin mortar joints. In order to obtain very complex geometric drawings, the slabs were placed each other side by side and/or drilled and overlapped, as we can observe in the left side of Perusian cathedral (Data Sheet 185).

3.2.1 Spread of techniques in Umbria-Marques region

Spread of building techniques across the Apennine regions of central Italy was influenced by ancient techniques, by available building materials and exchange of artisans.[144] The work in building sites not only were conditioned by clients but even by the proximity of preexisting building up areas and commerce roads, so creating varieties inside ordinary techniques.

Despite several local peculiarities, anyway it is possible to identify at least three change times for the medieval construction techniques inside the examined area.

The first change concerns the buildings or part of them made in late ancient or high medieval ages. This is a very large time interval however more precise temporal identification is not possible, because present study has some critical nodes in dividing late ancient from high medieval ages: the first is lack of written documents, the second concerns the masonry techniques; It is actually very difficult finding masonry which are typical of one of the two considered ages. Moreover, even when dating was un-doubtful, the structures showed common characters to masonry done on the long time going from the 6th to initial 11th century. During this time span people adopted a number of methods for reuse of ancient building and decorating materials, as reaffirmed by Gisberto Martelli in his studies on crypts of the most important churches of eastern Umbria built - following this author - between the 8th and 11th centuries.[145] In these centuries we can find the simple reuse of ashlars and blocks as well as the search and arrangement of generally decorated 'special pieces' often used for functions different from the original role, aimed to aesthetic and evocative purposes.

New fulfillment architectures were mainly located in proximity or even in continuity with ancient Umbrian, Etruscan or Roman structures and include large percentages of reuse materials. These architectures follow the first three above described masonry types. Intriguing examples have been found in all the ancient villages, that might be isolated as the churches of St. Mary in Pantano or St. Lorenz in Ninflis, or still inhabited cities as Perugia, or even abandoned as in the famous example of *Carsulae* (fig. 87). Another example are masonry found in the archeological excavations made by Matelda Albanesi near the Church of St. Mary in Campis in Foligno. The post-roman phase of this village is documented by a significant enlargement of the buildings, erected on early imperial age. This enlargement was made by fulfilling three settings within an area, which was part of the pre-existing building. The date of construction work is indicated by masonry type: this is characterized by wavy rows of reuse bricks and blocks, sometimes with a diagonal lay out scheme, a very frequent arrangement in late ancient and early Middle Ages (fig.

[144] As already stated in the preceding chapters, neighbouring regions, as Abruzzi and Lazio shared some techniques with Umbria and Marques, e.g.: masonry with limestone squared blocks. FIORANI 2005, p. 37.
[145] MARTELLI 1966.

88).[146] As already described in the preceding paragraphs, the shape itself of the ancient elements determined the arrangement.

Since the end of 11th century we document changes in the trend of supplying building materials and observe the gradual disappearance of reuse materials and the standardization of wall facing by means of the use of pieces directly extracted from the quarries.[147]

These transformations are linked to regional and national geo-political changes that culminate between the 13th and the 14th century, according with the literature already present on the building sites in all central Italy, but also in the rest of Europe. The evolution observed in the area under study, as in the entire central and northern Italy, cannot be considered as simply local or isolated changes. In all the Europe we can document transformations of methods in construction sites: more and more specialized masonry masters worked to erect more and more refined architectural structures of the great religious and civil buildings.[148]

Maria Gigliozzi claims that it was with the *fabrica* of the cathedral of S. Feliciano in Foligno that the architectural renovation started in Umbria. This renovation arose in Foligno and Assisi, after their economic expansion, of course started with erection of the respective cathedrals. Renovation then spread in the rest of Umbria- Marques.[149] Between 12th and 13th century the significant edifices were built by large and expensive construction sites, which saw the succession of several technical innovations throughout the Europe and were the focus of attention in citizen's life.[150]

The most ancient medieval exempla of wall facing with perfectly squared blocks showing structural bi-chrome decorations can be seen in S. Feliciano masonry at Foligno. The bi-chrome facades were obtained by combination of blocks of white and pink limestone. This technique was designed and accomplished along with the elevation of the structures themselves, probably with the aim to leave facing out the outer front wall.

Despite confirmation of maximal accuracy in the medieval building technique between 12th and 14th century, we have to recall that perfect manufacturing and arrangement of ashlars was subordinate to the function that single masonry had inside the entire architectural plan (figg. 89-90). In the majority of instances we observe different types of wall facing depending on position of the single wall in the building: if on front or lateral elevation or inside the building. Probably different surface locations were linked to different quality of finishing, as occurred in several Italian and European buildings.[151] In order to make the surfaces and eventual geometric drawings as homogeneous as possible, a very thin plaster or a *scialbatura* (lime milk) could be

[146] ALBANESI 2014, pp. 560-561.
[147] The reuse of building materials, mainly taken from Etruscan and Roman structures, never completely ceased during the entire Middle Ages. However, the large majority of authors and documents show that this phenomenon substantially decreased after XI century. Maria Teresa Gigliozzi says that the practice of reuse from early Romanic age to XIII century is progressively running out (GIGLIOZZI 2013, p. 90).
[148] FIORANI 2006, p. 331-332.
[148] GIGLIOZZI 2013, p. 72.
[149] According to Gigliozzi's studies the urban and construction development in Assisi mainly concerned the religious building yards, starting from the reconstruction of the cathedral of S. Rufino (1140). Similarly the renovation stared with re-building of the cathedral of S. Feliciano. Cf. GIGLIOZZI 2013, p.72.
[150] BERNARDI 2011, p. 8.
[151] FIORANI 2006, pp. 18-19.

applied in the case of decorated fronts. The facades of the Cathedral S. Feliciano in Foligno or of the S. Chiara Church in Assisi probably were treated in this way. In the longitudinal structures of the above churches - that, with all like hood were made by the same masters bricklayers and in the same construction sites- when the masonry shows roughly worked blocks rows with irregular heights and thick mortar joints, it is very probable that builders had planned plastering of surfaces. Plastering of internal wall facings is easier to hypothesise than plastering of longitudinal structures: sometimes actually we can still observe part of plasters and even some painting.

At the end of middle ages we observe a general decay of work and arrangement quality in the technique of wall facing with limestone blocks. During the 15th century the interest for limestone front wall facing decreased, due to the growing interest for plastered and when possible *fresco* painted front walls.

The city of Perugia, whose economic expansion was delayed in comparison of that of centres located along the Via Flaminia thus delaying of at least one century the start of various techniques, for example of the technique with bi-chrome wall facings. Some of the wall facings showing maximal accuracy are the front facade of S. *Maria di Monteluce* (1415), of the chapel of S. *Domenico* inside the church of S. Domenico (1454-'59), of the chapel of *Gonfalone* in the St. *Francesco al Prato* (1464) church, of the facade of S. *Agostino* (1473) church and left side of the cathedral (first half of 16th century).

3.2.2 The wall structure

My study is aimed to analyse both the external facing and the internal conformation of masonry, in order to examine the different building methods three-dimensionally. Frequently I was not allowed to gain access to the inner part of masonry. In these instances the exam was carried out by comparison with known local masonry or with building methods of neighbouring districts showing similar building methods during middle ages. It is actually possible to observe that, despite the variable internal conformation of the studied masonry sections, owing to used materials, time and site of fulfilment, many techniques for internal composition of masonry were repetitive in Umbria and Marques.

All the load-bearing structures have thickness between 65 and 150 cm. The section can be 'full' for masonry made by large reuse blocks or divided in three parts with an internal *nucleus* and two curtains.[152] The last masonry in turn have three different types for tooting *nuclei* to curtains: the first, typical of walls with reduced thickness, does not require systematic links between nucleus and curtain; the second shows truncated pyramidal shape of wall facing blocks; the third consists in making a nucleus with parallel lines marked by rows of small ashlars, designed to create an indented surface for the adhesion of a curtain done by blocks or slabs.

In several instances the wall facings were fulfilled with blocks of different nature, dimensions and shapes, arranged in alternate rows. This method was probably due to aesthetic/decorative intentions, but has some static advantages. Wall facings made by blocks and

[152] The church of S.Lorenzo in Ninflis in Montecastrilli shows large blocks masonry on sides and apse; the wall facing is made by same building materials, but reduced element dimensions on the façade.

slabs of different materials have discontinuous framework that - in some peculiar instances - could even give a structure to the nucleus itself of masonry. Examples of wall facings made by different materials are the 'minor' facade of the S. Feliciano cathedral in Foligno (Data Sheet 068). The right part of the church of SS. Battista e Gemine in Sangemini (Data Sheet 202). In both cases the internal thickness of travertine and of pink limestone (*rosso ammonitico* and *scaglia rossa*) is probably different, according to the dimensions of the facade. In detail, it is possible that travertine was used as blocks and other rocks as slabs and/or small overhanging blocks, creating a section characterised by alternate, overhanging rows.

In the most accurate works, the masons produced mortars with different granulometry for *nucleus* and arrangement of wall facing ashlars. This method was probably used in most of the late medieval architectures, which have accurate manufacture and arrangement of the wall facing elements, particularly when the wall was very thick (more than 50 cm). In these instances the very thin - 1 to 2 mm - grains of aggregates present in mortars that are visible on facades, would not be compatible with the technical requirements for very thick walls (fig. 91).

In the present research were analysed some samples of mortar taken during the digs in the S. Croce di Sassovivo near Foligno by the upgrade school in architectural and landscape goods of Sapienza University of Rome.[153] Interestingly, samples of mortar belonging to the same Romanic wall of the church confirm our hypothesis. Actually, where the study of masonry shows a single building time, the analysis of mortar points out the variability of mixture. Despite colour, binder and materials were the identical; the grains are coarser in the nucleus and thinner in the curtain, by the way suggesting an excellent organisation of the construction site.

We analysed also some masonry of modest thickness, not load bearing, without nucleus. In these cases the masonry were filling in or walls made against ground. When the walls had not load bearing functions, the arrangement was not generally very accurate and – in the basement structures - the mortar was often mixed with soil.

3.2.3 Structural decoration in the civil and religious architecture

Since 8th century, the use of bi-chromatic decorations in the middle ages architecture is largely documented in Europe.[154] At first, manufacturers alternated colours to characterize the architectural space and to highlight the most important structural elements; this method became one of the decorations more used in middle ages. In order to colour the architecture, manufacturers used different building materials and tapestries or they painted the single building elements.[155]

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[153] Analysis on mortars were performed by the Architect Elisabetta Giorgi in the laboratory for building materials analysis of the Dpt. 'Storia Disegno e Restauro di Sapienza Università di Roma' and by prof. Angela Baldanza of Dpt. 'Physics ans Geology', University of Perugia.

[154] In central Italy the bi-chromatic walls with limestone ashlars have been influenced by north-western European masonry. A complete study about Italian and European decoration methods of wall facing is on FIORANI 2006, p. 24 and on FIORANI 2008, pp. 18-26.

[155] The most frequently used techniques or decorative painting were: the fresco, the lime and lime casein painting, rarely the oil painting. More refined techniques arose in late Middle Ages. Among them:

In Umbria and Marques bi-chromatic structural decoration appears since 10th century, with the alternate arrangement of local white and pink limestone. Following other European methods, the above technique was initially used only for single decoration elements such as arches, pillars, portals and rose windows.[156] Structural decoration reached its maximal spread and highest level of accuracy between the 13th and the 14th, with appearance of wall facings characterised by regular alternation of naturally differently coloured materials. The mentioned decoration methods then fell into disuse, completely disappearing in the 16th century.[157]

In the districts studied by present research, it was possible to classify five different types of chromatic alternation of the elements arranged in the wall facings.[158] Such types are: arrangement as rows, as belts of rows, generally formed by three recurrent lines, as alternating squares arranged on diagonal lines, a kind of medieval revision of the Roman *opus reticolatum*; as a network, with belts of white stone framing squares of pink blocks; as pierced slabs overlapped so that the underlying colour emerges (fig. 92). At first sight the categorised techniques only differ in drawing, however sometimes we can also find different methods of toothing between wall facing and nucleus, depending on the different morphology of pieces. In order to obtain continuous rows and belts of rows, the thickness of mortar was extremely decreased, until disappearance, by putting together ashlars with trunk-pyramidal section.[159] The same method could be the basis of other types of chromatic alternation, with the exclusion of that of framing pink limestone squares with white limestone sheets. The latter can be considered the most refined method, it however represent also the time in which wall facing becomes cladding.

The major and more refined concentration of decorated masonry can be found on external facades of churches in Perugia, Assisi and Spoleto; less frequently in Spello, Todi, Gubbio and Sangemini[30]. All the cited sites show wall facings with white and pink rows, but only in Perugia, Assisi and Foligno it is possible to document all the typologies (fig. 93).[160]

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painting decorations with the aid of pre-formed moulds, the etched plaster and the glazed *terracotta* (clay). More details in AUBERT 1957, pp. 111-117.

[156] Double tone were obtained by making pink elements contrasting the rest of facade white plastered or built with white stone, as is the case of St. Maria Maggiore facade in Assisi. Another method was: to alternate the colour of ashlars when making some parts of the building, as is the case of the double toned arches in the Narni cathedral.

[157] More details in GIGLIOZZI 2013; PARDI 2000.

[158] Detection and study of these peculiar masonry are still object of research, due to the decolouration of red *Scaglia*. When this stone partially or completely lost its original colour, the knowledge (comprehension) of the decoration design can be really difficult. The decolouration of red *scaglia*, is analytically treated in chapter 5, that summarizes the laboratory analyses made by us in order to examine in depth the decay process.

[159] This is a hypothesis suggested by comparative studies performed by other authors who were allowed to study the internal section of Umbrian masonry made in same years. Exempla of this building method can be observed on the remains of some walls of the avant-garde masonry in the S. Croce church in Sassovivo, near Foligno and on the remaining masonry of the S. Benedetto church in the mount Subasio.

[160] In the church of S. Francesco al Prato in Perugia it is possible to observe all the double tone decorations used in the medieval Umbria.

The main facade of the Foligno's cathedral that was built on 1133 is the first example of wall facing fulfilled with 'structural' decorations.[161] The wall facing shows an arrangement with rows and belts of rows; a frame in *opus reticulatum* was aligned with the portal. The accuracy in working and in placing the pieces side by side, when related to the present decorations, indicates the intention to leave (to put) the wall drawing at sight, may be on all the extension of the façade.

Some wall facings with bi-chromatic rows and belts of rows can be found in successive enlargements of the already cited Foligno cathedral; on the facade and on the right side of S. Chiara church in Assisi (1256-'65); on the facade of S. S. Andrea in Spello (1258); on the apse and on the north-western side of S. Francesco in Gubbio (1259-'92); on the facade of the church of S. Domenico so called 'old' in Perugia (1333); on the walls of S. Damiano in Spoleto (half 13th – early 14th century); on right side of the facade of SS. Giovanni Battista and Gemine in Sangemini (14th century) and on the facade of S. Salvatore (14th century) and of S. Giacomo (1402), both in Foligno. In all the cited instances, the coloured parts show their own symmetries, signifying the decorating intention, still present when this intention was not homogeneous in all the building.

The other types of wall facing show smaller temporal and geographic span. We can find revisions of roman *opus reticulatum* on the facade of the church of S. Lorenzo in Spello (12th century) inside the chapel of S. Domenico in the church of S. Domenico in Perugia (1454-'59). Network shaped decorations were observed on the walls of S. Agnese chapel in the church of S. Chiara in Assisi (first half of 14th century) and on facades of the churches of S. Giuliana, S. Maria Monteluce and S. Agostino, and on the external wall facing of the Gonfalone's chapel of the church of S. Francesco al Prato (1464) in Perugia. The last type has fixed proportions: the width of white belts is half of red square sides. In the case of S. Agostino and S. Francesco al Prato the red square sides is close to the size of the *"piede da legname e da fabbriche"*. It is not probably a casualty that the mentioned exempla concern a later decoration.[162]

Construction of wall facings with overlapped and pierced slabs, as in the cited case in the cathedral of Perugia, is rare and often replaced by paintings repeating the decorations In some late medieval architectures of Umbria-Marques area, it is still possible to observe entire facades painted with geometric motives similar to the geometric figures made with stone decorations. Sometimes were added particular colours, which it would be impossible to obtain with local materials (figg. 94).[163] These wall facings, often painted by means of fresco technique, can be nowadays observed in some internal walls of civil and religious buildings. Painting however had to largely be used even for decoration of external facades. Well preserved exempla of this kind of decorations in the indoor and originally external (nowadays indoor) spaces built between 1389 and 1407 in the Trinci family palace in Foligno, on superior and inferior S. Francesco in Assisi, on S. Bevignate in Perugia, where we can also observe a false wall facing painted by large blocks.[164]

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[161] PARDI 1993.
[162] For a closer look at the results obtained by measuring the construction elements, see Chapter 4.
[163] The most common drawing was the pink gothic compass on white background.
[164] The false-curtain wall shown on the internal walls of S. Bevignate church in Perugia and made with white stone ashlars would be interpreted according to intentions different from decorations because it had to represent the ashlar masonry of the holy sepulchre in Jerusalem. SCARPELLINI 2008, p. 205-284.

During the study of these particular masonry, new and interesting research ideas have emerged. These ideas have expanded the horizon of analysis and restoration of the wall surfaces in question.

From a historical point of view, it has not yet been possible to trace the reasons that led to the this kind of masonry. While it is easy to assert that the choice of materials and their colours may have been dictated by the availability of the site, it is difficult to understand how much the materials, the technical know-how of local workers, and/or political decisions influenced the choice of different decorative designs.

As regards the conservation of building materials, however, red and pink limestone can undergo irreversible differential discoloration, which leads the stone to turn from pink to white (most common) or ochre (very rare and present only near Gualdo Cattaneo), so confusing in some instances the formal readings of the decorations.[165] Such chromatic changes in the material depend on the structure of the chemical elements of which the rock is formed and are still under study, but appear to occur within a time ranging between 40 and 100 years after stone extraction.[166] It can therefore be assumed that the reaction of some types of red rock to the atmospheric agents would not be unknown to the medieval builders but that it was difficult to control, resulting in the creation of structures with decorations that today appear not 'regular' precisely because of the colour changing of the stone.

This research topic is totally new, especially when related to the architecture of Umbrian medieval buildings, and has required a specific scientific study whose results are reported in Chapter 5.

[165]If the surface has lost the original color, the different lithotypes can be recognized by non-invasive petrographic analysis. The fossils present in the structure of the limestone under examination are visible with a magnifying glass (10x) and allow to date the rock and establish its possible alteration.

[166]With water the oxides in the stone can react and generating hydroxides and thus losing the typical red colour. Cf. VANNUCCI *et al.*, 1986, pp. 414-415.

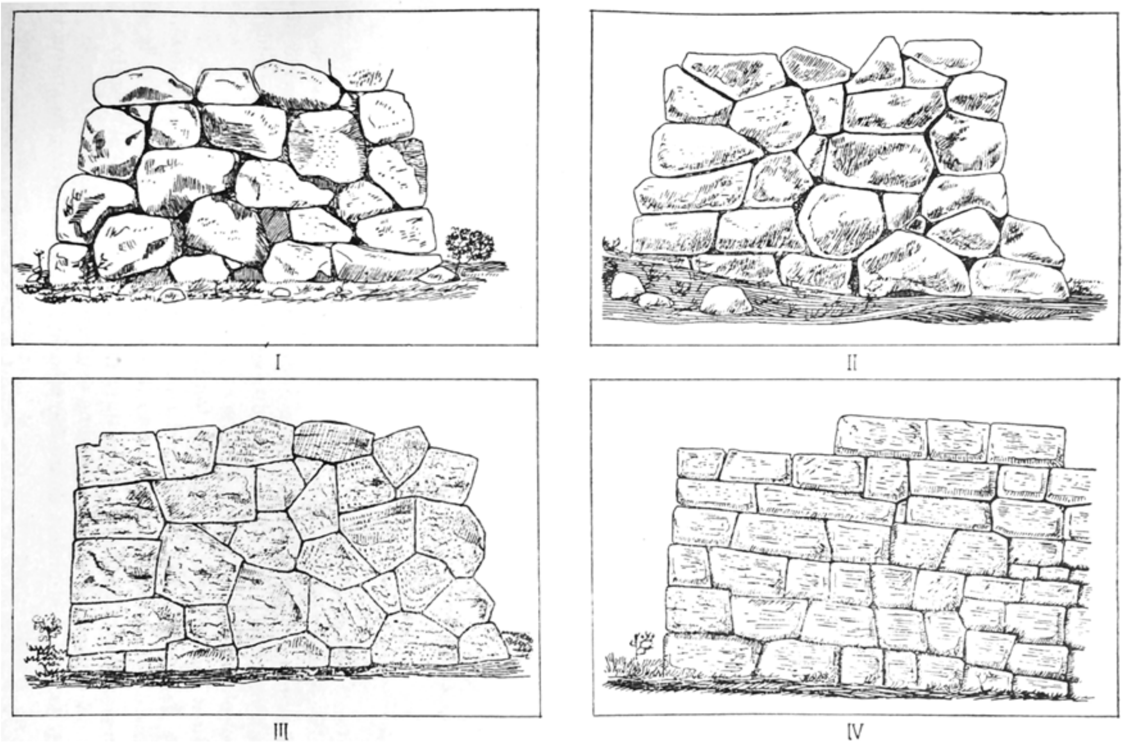

Fig. 60. The four manners of *opus siliceum* (LUGLI 1957, p. 67, f. 1).


Fig. 61. The spoleto walls. Exemples of masonries of first and third manners of opus siliceum and opus quadratum. Photography E. Scopinaro 2016.


Fig. 62. View of the southern section of the Amelia walls. Photography Eleonora Scopinaro 2016.


Fig. 63. View of the city walls of Perugia. Photography E. Scopinaro 2016.

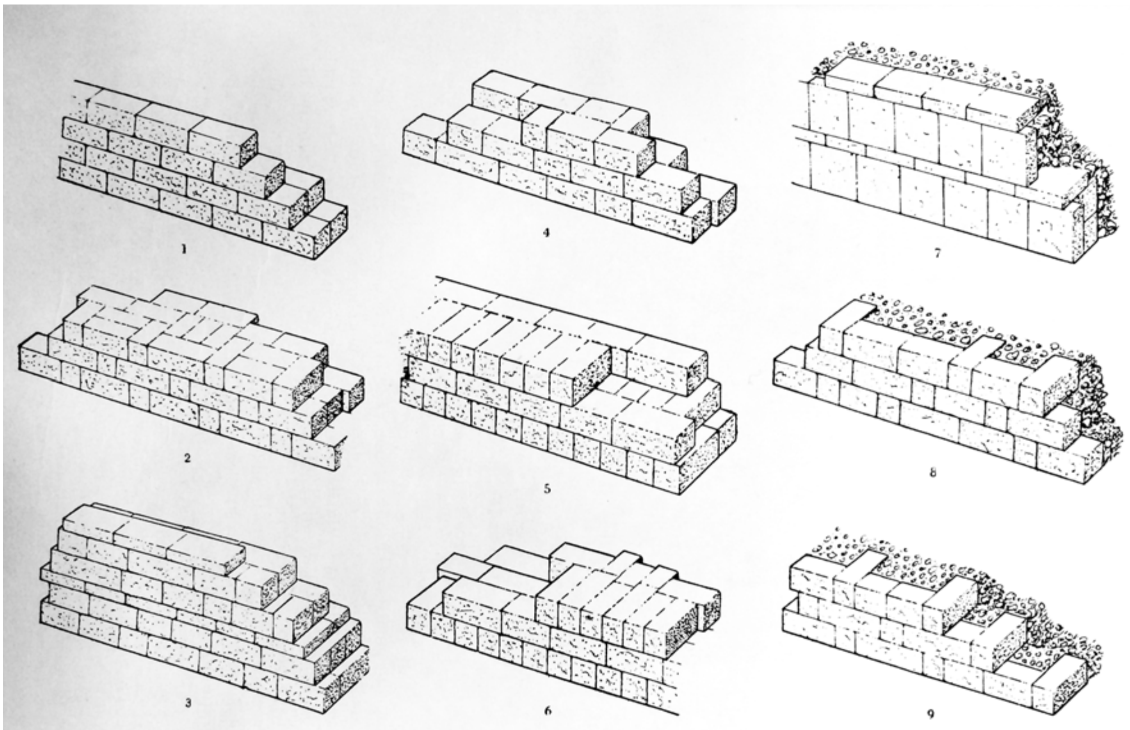

Fig. 64. The *opus quadratum*. LUGLI 1957, p. 177, f. 17.


Fig. 65. Etruscan walls of Perugia. Photography E. Scopinaro 2016.

Fig. 66. The masonry of the Roman theater of Carsulae. Photography E. Scopinaro 2017.

Fig 67. View of the fortification of Spello. The nothern section with the Venus Gate made in *opus reticulatum* during the Augustan age. Photography E. Scopinaro 2016.

Fig. 68. The *opus mixtum* of a roman masonry embedded during the construction of the right flank of the church of S. Maria in Pantano in Massa Martana. Photography E. Scopinaro 2016.

Fig. 69. Picture of Roman walls made during the 1st century B.C. and discovered during the archaelogical excavation of Cancelli near Foligno. Photography by M.R. Picuti (PICUTI 2014, p. 24, f. 19).

Fig. 70. The archaeological excavation site in the S. Croce di Sassovivo abbey in Foligno. Photography M.R. Picuti 2014.

Fig. 71. The archaeological excavation in the S. Croce di Sassovivo abbey in Foligno. Detail of Romanesque avant-corps masonry. Photography M.R. Picuti 2015.

Fig. 72. Masonry in *opus mixtum* in the church of S. Maria Assunta in Otricoli. Photography L. Barelli 2016.

Fig. 73. Masonry of the right flank of the church of S. Maria in Pantano. The down part, built between the 10th and the 11th century seems to re-propose the different pose in work in bands according to the Roman example. Photography E. Scopinaro 2017.

Fig. 74. The main façade of the cathedral of S. Feliciano in Foligno. Detail of the bi-chromatic decoration. Photography E. Scopinaro 2016.

Fig. 75. The facade of the church of S. Lorenzo a Spello. Detail of the bi-chromatic decoration. Photography E. Scopinaro 2016.

Fig. 76. View of the outer wall facing of the chapel of S. Domenico of the church of S. Domenico in Perugia. Photography E. Scopinaro 2016.

Fig. 77. Tempio S. Angelo in Perugia. Photography E. Scopinaro 2016.


Fig. 78. S. Maria di Plestia. Photography E. Scopinaro 2016.


Fig. 79. The crypt of the church of S. Maria di Plestia in Colfiorito. Photography E. Scopinaro 2016.

Fig. 80. View of the interior pert of the church of S. Agostino in Montefalco. Photography E. Scopinaro 2016.

Fig. 81. Detail of the masonry of the right flank of the church of S. Benedetto to Gualdo Tadino. The rocks are smoothed with *martellina* (bush hammer) and flat chisel on the edges. Photography E. Scopinaro 2016.

Fig. 82. View of the church of S. Michele Arcangelo in Bevagna. Photography E. Scopinaro 2016.

Fig. 83. View of the church of S. Michele Arcangelo in Bevagna. Detail of the façade. Photography E. Scopinaro 2016.

Fig. 84. The main facade of S. Nicolò a Sangemini. Photography E. Scopinaro 2016.

Fig. 85. The church of S. Maria di Monteluce in Perugia. Photography E. Scopinaro 2016.

Fig. 86. View of the left side of the cathedral of S. Lorenzo in Perugia. Photography E. Scopinaro 2016.

Fig. 87. The church of S. Damiano in *Carsulae*. Photography E. Scopinaro 2017.

Fig. 88. Detail of late antique and early medieval masonry found during excavations at S. Maria in Campis in Foligno. Soprintendenza per i Beni Archeologici dell'Umbria (SBAU) (ALBANESI, p. 569, f. 4).

Fig. 89-90. Church of S. Salvatore in Foligno. On the right the detail of the attack of the masonry on the side of the church. Photography E. Scopinaro 2016.

Fig. 91. The masonry of the Romanesque avant-corps appeared during excavations at the Abbazia of S. Croce in Sassovivo near Foligno. Photography R. Loreti 2014.

Fig. 92. Tipologie di alternanza cromatica nella tecnica costruttiva medievale in area umbro-marchigiana.
Chromatic alternation types in the medieval construction technique in the Umbria-Marche region.

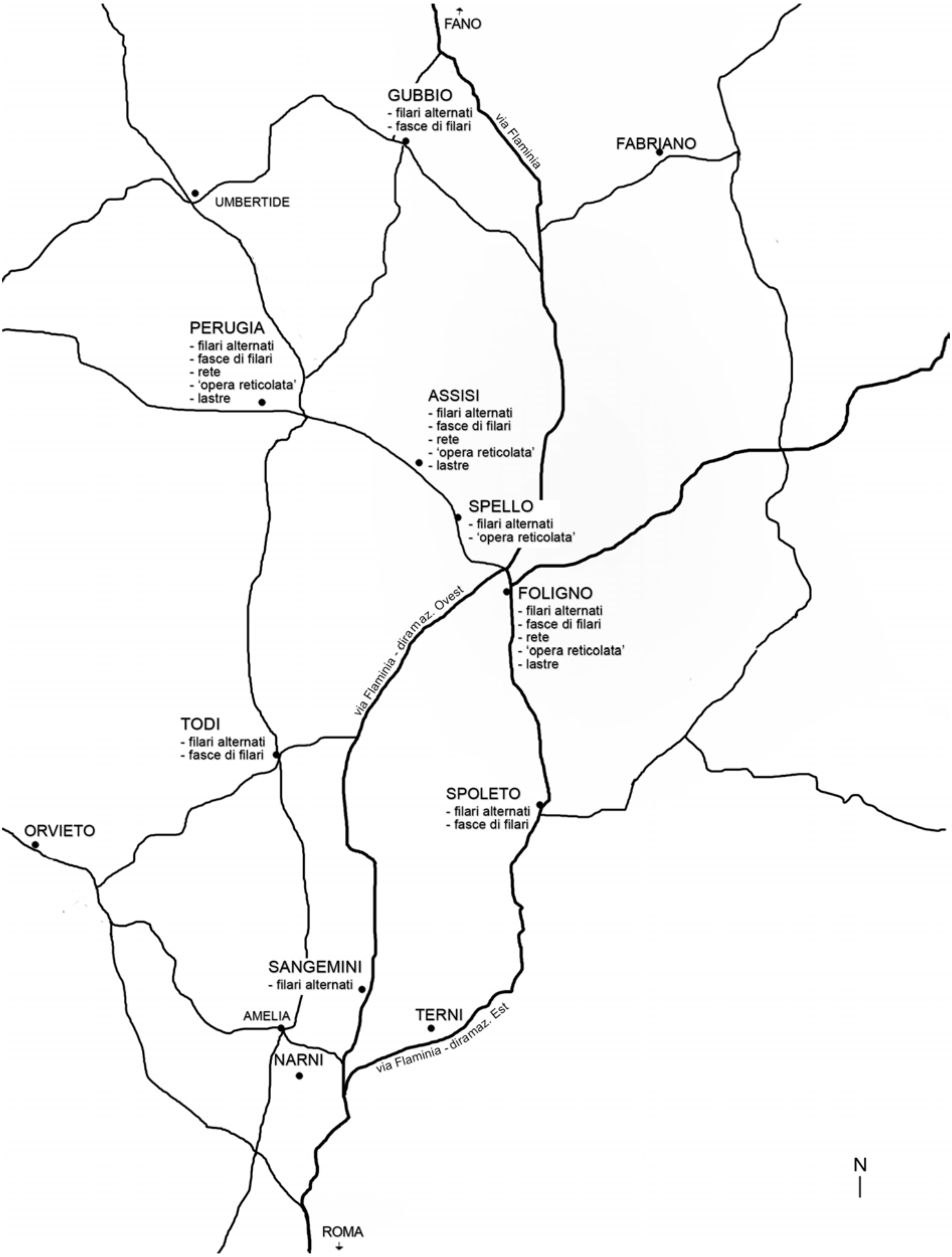

Fig. 93. The geographic distribution of the finishes made in bicromes in the middle ages in the Umbria-Marche region. Graphic processing E. Scopinaro.


Fig. 94. Palazzo Trinci. Frescos on the external walls of the Gothic Scale, nowadays inside the museum. Photography E. Scopinaro 2013.

4 THE CRITERIA FOR CATALOUGING MASONRY WITH LIMESTONE WALL FACING

Present study was based on the examination of structures of proven medieval realization in the area concerned, taking into account conditions determined by social, political, administrative and geographic reasons, geological composition, ease of supply of raw building materials and the presence of local specialized workers.

The criteria for detective discontinuity among different masonry units were established as changes of technical/technological characters, due to materials, building methods and changes of natural environment, taking into account of the local history, with its own productive cycles and its own empiric know-how.

Photographic samples (1m x 1m) have been taken to create a database not only useful for the identification of the different types of masonry and manufacturing, but also to perform statistical comparisons concerning the use of construction materials both of first extraction, and reuse (fig. 95). The samples taken with the criterion of investigations targeted to document different building techniques on already studied structures, have been compared each other and with those of pertaining to studies done in other Italian and European sites.

It was also possible to deepen the study of artificial materials and their execution techniques with the slim and thin section analysis of samples from the medieval structures of S. Croce Abbey in Sassovivo at Foligno. Thanks to the participation in the excavation campaigns directed by Maria Romana Picuti and Raffaele Pugliese for the School of Specialization in Architectural Heritage and the Landscape of the Sapienza University of Rome, we were allowed to pick up small amounts of material, which was subsequently analysed in Materials Analysis laboratory of the Department of History, Design and Restoration of the Sapienza University of Rome, under the supervision of architect Elisabetta Giorgi. Part of this work was also carried out by the Department of Physics and Geology at the University of Perugia under the supervision of Professor Angela Baldanza.

Data Sheets prefer reading the masonry facing in order to recognize and distinguish the various building techniques. The categorization is based on building methods and on installation of mural fixture by selection principles that consider the differences due to different materials and their zones of origin.

Data Sheets were also useful to study the restoring actions, which often pertained to the structures, due to the heavily seismic zone.

4.2 The method

Whole research is based on the analysis and study of masonry with facing in calcareous blocks of late ancient age or middle ages, still present in Umbria-Marques zone.

Owing the analysis and the comparison of samples, it was possible to arrange a catalogue of different building techniques and of related modifications. It was also possible to hypothesize a date for some structures even when we lack indisputable sources on the building phases of masonry.

The study of masonry facing is structured in four consequential macro-phases:

1. Recognition of operas to be studied with direct analysis

   The recognition of monuments of major interest for documenting was done by consulting the current literature on the architectonic assets of Umbria and Marques. I took into account all the manufacts with verified phases of middle ages and late ancient fulfilment in: Assisi; Bevagna; Capodacqua; Colfiorito; Costacciaro; Fabriano; Foligno; Fonte Avellana; Gualdo Tadino; Gubbio; Massa Martana; Montecastrilli; Montefalco; Narni; Perugia; San Giovanni Profiamma; Sangemini; Scheggia; Sigillo; Spello; Spoleto e Todi.

   The nature itself of this phase of my study cannot be considered as concluded with the present thesis. Actually the whole study even when temporarily concluded, probably will be newly enriched with new documents, which will improve and sharpen the analysis and consequently the conclusions.

2. Study of recognized buildings

   Once recognized the structures, I analysed the masonry facing to go on with sampling of masonry with less possible modifications from building time to now. During inspections I took 478 photographic samples of masonry facing with frames of 1m x 1m and 25 samples of mortar.[167]

3. Choice of most significant samples and selection of catalogued cases

   After having analysed and studied the photographic samples, I selected the most significant photographic samples, considering their site, the building to which the photograph belonged, its structural and formal type and its conservation. We selected 251 photographic documents, representing the constructive techniques used in medieval times and the restoration work made on them. In particular, 245 Data Sheets have the as object wall facings, the construction of which is documented between the VIII and the 15th century, 5 Data Sheets are representative of wall restorations made in the 20th and 21th centuries and one sheet is related to a structure of Roman origin (4th century) embedded within the church of S. Maria di Plestia. The latter is an interesting example of technical continuity between the ancient and medieval apparatus.

   I made no selection on the samples of mortars, cataloguing all the collected samples.

[167] Essendo tutti i campioni relativi a un unico monumento non è stato possibile effettuare comparazioni a livello regionale, ma solo strettamente relativo alle diverse fasi costruttive dell'abbazia esaminata. I risultati devono quindi essere letti come esempio di tecnica locale tra i secoli XI e XIV.

4. Drawing sample cataloguing up

Finally it was possible to catalogue the mentioned samples, considering the guidelines that will be hearafter outlined.

In the case of St. Croce in Sassovivo Abbey near Foligno, it was possible to place side by side the morphological analysis of masonry facing, the analysis of mortar composition and of the structure of the core masonry.

Recording the local seismic history, had great importance throughout the entire study, because this recording allowed us to link some changes with their causes.

4.3 Results of cataloguing

Hereby we introduce a critical selection of the data collected by mapping the wall facings and by analysing the mortar samples.

4.3.1 The masonries

After having comparatively studied the selected wall facings, we realized that it was impossible to base the analysis of constructive techniques on *mensio*-chronological criteria. Except for very rare exceptions, the elements do not present recurring measures that can be recognized to identify the chronology

It was not possible to conduct the analysis of building techniques and their dating on the criteria of changes in the measurement units, owing to the large use of recovery materials; moreover the dimensions of blocks and slabs can more easily be related to the thickness of geologic layers than to established measure units. Many out of the used limestone show sedimentation slices 4 to 30 cm high: The use of slabs with the original thickness of the found stone made mining of course easier and quicker.[168]

It is possible to observe the trend of making uniform the height of the blocks only in the masonries made with compact limestone ashlars of the 13th century. This trend was probably due to the repeated use of the same quarry. The churches of S. Francesco (Data Sheet 108) and S. Benedetto (Data Sheet 099) in Gualdo Tadino show 15 and respectively 16 cm average height of blocks. This height anyway has no relationship with local measurement units.

Main exceptions have been identified on masonries showing bi-chromatic wall facing, evidently due to aesthetic reasons. In order to standardize the decorations, the eight of building elements and rows were made uniform; it was possible to correlate the height and width of pieces to the measures used during middle ages[11] only in the case of the masonry with network made in some structures in Perugia.[169]

In the case of the wall facings of S. Chiara church in Assisi, bi-chromatic rows of the façade and bi-chromatic bundle of rows of the left side of the church always measure 40 cm in height (Data Sheets 001-003) (fig. 96). This measure ensures a perfect colour matching between the two sides, but does not seem to take into account the requirements due to supplying the pieces, moreover it is not comparable with any local unit of measurement. The masonry of the left flank is made up of elements of different sizes, arranged in such a way as to form almost perfectly isometric colour bands.

Similar method of repetition of recurring measures in bi-chromatic masonry has been established in some of the important buildings of the city of Foligno. The first case in chronological terms is the façade and the longitudinal masonry of the S. Salvatore church (12th century). In this building the bands of white rows are always thick between 31.6 and 32

[168] Detailed study in chapter 2 of present thesis.

[169] I sistemi di misurazione usati in area umbro-marchigiana, anche se storicamente legati a quelli romani, prevedevano valori diversi in ogni comune e rispettivo territorio di pertinenza. Le unità di misura utilizzate per i confronti sono quelle riportate in SALVATORI 2006.

cm, while the pink rows measure 31, 2 cm or between 24 and 25 cm (Data Sheets 082-083-084-085). The 'minor' facade of the cathedral (1201) is another example. This masonry has white and pink rows proportional to 1:2 *ratio*, respectively the travertine ashlars measure about 28 cm, while red ammonite rows are 14.6 cm high (Data Sheet 068) (fig. 97). The third example found in the town of Foligno is the façade of the church of S. Giacomo (1402) with white rows averaging 24 cm (23.6 to 24.5 cm) and pink rows of approximately 44 cm. Even in the discussed cases, it was not possible to find correspondences with the measurement units documented in the Middle Ages.[170]

On the other hand, the proportions of the bi-chromatic wall facing of the Perugia churches are perfectly comparable with the local units of measure. In this case the thickness of both vertical and horizontal white bands is 17-17.5 cm and the side of red slabs is 35.5-36 cm, comparable to that of the "foot from timber and factories = 36,35 cm " used in Perugia in late medieval times (fig. 98).

Considering the examined sample of masonry sufficiently representative for the purposes of present research, I hereby show a statistical comparison of the data emerging from masonry filing.

The Diffusion of the construction materials shows that their use was deeply bound to the territory to which these materials belonged (fig. 99-100). The most widely used lithotype on the whole territory is that of the white *scaglia*, present in all the analysed sites. The white *scaglia* was the unique building material in the villages of Costacciaro and Gualdo Tadino.

The second most widespread material with high percentages of use is the red *Scaglia*, with its various discoloration, especially present in the buildings of Assisi, Perugia and Foligno. After the two types of *scaglia*, we can catalogue a considerable percentage of all other types of limestone, including travertine, whose diffusion is limited to the buildings of Bevagna, San Giovanni Profiamma, Montecastrilli, Colfiorito, Perugia, Montefalco, Narni and Spoleto. We also observed the reuse of clay bricks and seldom of sandstone elements.

We were finally able to outline the diffusion periods of the aforementioned techniques (fig. 101) by comparing the various construction techniques with the catalogued masonry. The masonry with a facade made of materials of different origin, nature, shape and size (T1) has been found since the 4th century in the Roman plant structures. These kinds of structures were for example then embedded in the church of S. Maria di Plestia in Colfiorito (Data Sheet 060). This technique has been long used and has lasted throughout the late and medieval times. The later example among the cataloged methods dates back to the 14th century for the construction of the walls of the city of Montefalco (Data Sheet 148)

On contrary, the masonry samples of reuse ashlars (T2) showed the narrowest time spread among all, covering only the centuries from 10th to 12th. The first examples of this technique are the masonry of the basement of the church of SS. Giovanni Battista and Gemine in Sangemini (Data Sheets 200-201) and the sides of the church of S. Lorenzo in Ninflis in Montecastrilli (Data Sheets 144-145); the later example is that of the church of S. Giovanni a Sangemini. The masonry with wall facing in limestone blocks arranged as rows with thick

[170] Piede di Foligno = 73,73 cm; Mezzenga = ½ piede = 36,86 cm. Cfr. SALVATORI 2006, p. 40.

mortar joints (T3) were detected from the 9th century until the beginning of the 16th century, starting from the crypt of S. Maria Maggiore church in Assisi until to an outer part of the right side of the S. Feliciano church in Foligno (Data Sheet 070). The wall facing masonry with compact limestone ashlars arranged as parallel rows (T4) seems to have covered the same time span of the technique mentioned above with which it shares the date and place of first appearance, according to the filing proposed in present study. Masonry with mixed wall facing in blocks and slabs of compact limestone (T5), unlike all other techniques has a very narrow geographical and chronological location. This type of masonry was found in Bevagna and Sangemini between the end of the 12th and the beginning of the 13th century, in Gubbio and Todi between the end of the 12th and the first half of the 14th century and finally in Perugia during the second half of the 15th century.

In conclusion, based on the results collected, it can be stated that the T3 and T4 techniques have had the most widespread chronological and geographical diffusion and represent an identity with regard to the medieval villages of Umbria-Marques.

4.3.2 The mortars

During the archaeological excavations carried out at the Abbey of S. Croce di Sassovivo in Foligno, two different sampling campaigns were carried out. The first (2014) covered all the emerged structures; the second (2016) was focused on the study of the constructive phases of the north east wall of the church's avant-corps (fig. 102-103).

The abbey of S. Croce in Sassovivo, founded by Benedictine monks around the year 1080, is about 6 km from Foligno, at the foot of Monte Serrone. This complex is extremly interesting to the study of building techniques because it stands on a possible pre-existing fortification and presents a multitude of constructive phenomena that have changed its appearance and typology many times over the centuries.

The oldest structure, among those found so far, corresponds to the façade of the Romanesque church and is located along the southeastern boundary of the current excavation area. It is a rubler masonry, of which today is visible most of the core and some portions of the ahslar wall facing, for a thickness of about 115 cm, probably equal to three quarters of the total section.[171] The different parts of the structure are mutually solid in shape thanks to the truncopiramid shape of the wall facing elements that are smoothed on the surface and coarse-worked to favor grip with the core. Although the individual pieces are not homogeneous in size and color, this is a work that denotes accuracy and regularity because the cones are laid in perfectly parallel lines, even if of different heights. To the structure described above is added an avant-corps.[172] This avant-corps is hypothetically identified with the *paradisus* mentioned

[171] Hypothesis from a comparative examination carried out on the church's masonry walls.
[172] On the ashlars surface of the Romanesque facade, where the avant-corps masonry is today interrupted, it is still evident the presence of a thin layer, probably a trace of mortar left by the structure.

in the Archives of the Sassovivo Archives since 1227,[173] which presents the perimeter walls northwest and northeast inside the excavation area and the southwest side into the building which currently delimits on this side the churchyard. Even the masonries of the avant-corps is very thick (150 to 160 cm), characterized by three-part sections formed by inner core and two wall facings. In this case, however, there is a greater focus on the processing of individual pieces and refinement in the laying process, which, together with the stratigraphic and structural data, confirm the posteriority of the structure that could have been realized between the 13th and the first half of the 14th centuries.[174]

Since all the samples pertaining to a single site were not comparable at regional level, but only closely related to the different phases of the examined abbey. The results should therefore be read as an example of local technique between the 11th and 14th centuries.

The mortar used in medieval installations of the Sassovivo church consists of lime, inert and organic additives. The lime is present in all the samples, the inert are almost exclusively local limestone fragments and in 7 samples out of 10 it we found carbonaceous traces, as probable traces of a vegetal additive. The lime is of good quality, on average tenacious and only in 2 cases has recessive chariots.

The aggregates are mostly calcareous fragments of red and white *scaglia*, gray and white chert, majolica and sand. One sample showed a brick fragment inside the mixture, but it may be an accidental presence. The most widely used mixture consists of *scaglia* and chert, mixed with sand and frustoles.

As with the choice of the other used materials, the construction technique seems to depend on local availability, which is a widespread phenomenon in many other regions, especially in Middle Ages.

The results of analyses are attached in the appendix. Below we report a critical synthesis.

The L09 sample, which is the oldest masonry mortar, is reddish-brown and was not solid when picking; observed in optical microscopy it appears to be made of lime, red rock stone of two dominant types compared to white limestone, white and grey chert. It was possible to observe caries, probably due to poor state of conservation and to rare presence of sand. On contrary, all the samples taken from the structure of the avant-corps, although in many cases each other different, have overall colour characteristics in the fields of white and beige.

The L08 and L16 samples, coming from the north-western wall of the avant-corps, were taken with beige colour and are composed of lime, white and pink *scaglia* - from light pink to dark pink (rare) - fragments of white limestone, chert (red, gray and white) and rare sands. In this case the study of masonry showed a single constructive moment and the sample analysis seems to confirm it, because the only variation in the mixture is given by sieving, coarser in the core and finer in the curtain, which also suggests a great organization of the construction site. The wall texture of the north-western front of the north-east avant-corps wall, appears

[173] "a partire dal 1227 nelle date topiche comincia a comparire con una relativa frequenza - sei volte in quattro anni - un luogo definito paradisus, anch'esso aperto agli esterni" (BARELLI 2004, p. 18).
[174] LORETI 2004, p. 60-68.

this side however more complex, it required higher number of drawings and related analyses (fig. 101). This wall facing shows three different types of mortar, referring to same number of masonry, different from the other mortars already analysed for the facade (L09) and for the other part of the avant-corps (L08 and L16). Sample L33 has an aggregate-to-binder ratio typical of the mortars used in the foundations - with a greater percentage of the binder - in accordance with the morphology of the parcel, consisting of only rough edges. Samples L15, L32, L34 and L35, on the other hand, are mortars belonging to two different construction moments. Laboratory tests have actually shown significant analogies between the aggregates of the samples L15 and L32 and the samples L34 and L35.

All the analyses carried out on church structures highlight the use of good constructive techniques that fit with parameters found in other valuable, religious and civic buildings in oriental Umbria. The wall facings have regular equipment with thin joints and prove the growing accuracy that characterized the medieval structures of this region especially between the 13th and 14th centuries.

My study has therefore confirmed and validated the most recent hypotheses made on the architectural transformations experienced by the complex and on their dating. The data from archival sources and direct analyses allowed us to assign the façade of the Romanesque church and the advance respectively to 12th century and to the second half of the 13th century, highlighting how these different constructive moments show two macro-consequential Romanesque phases.

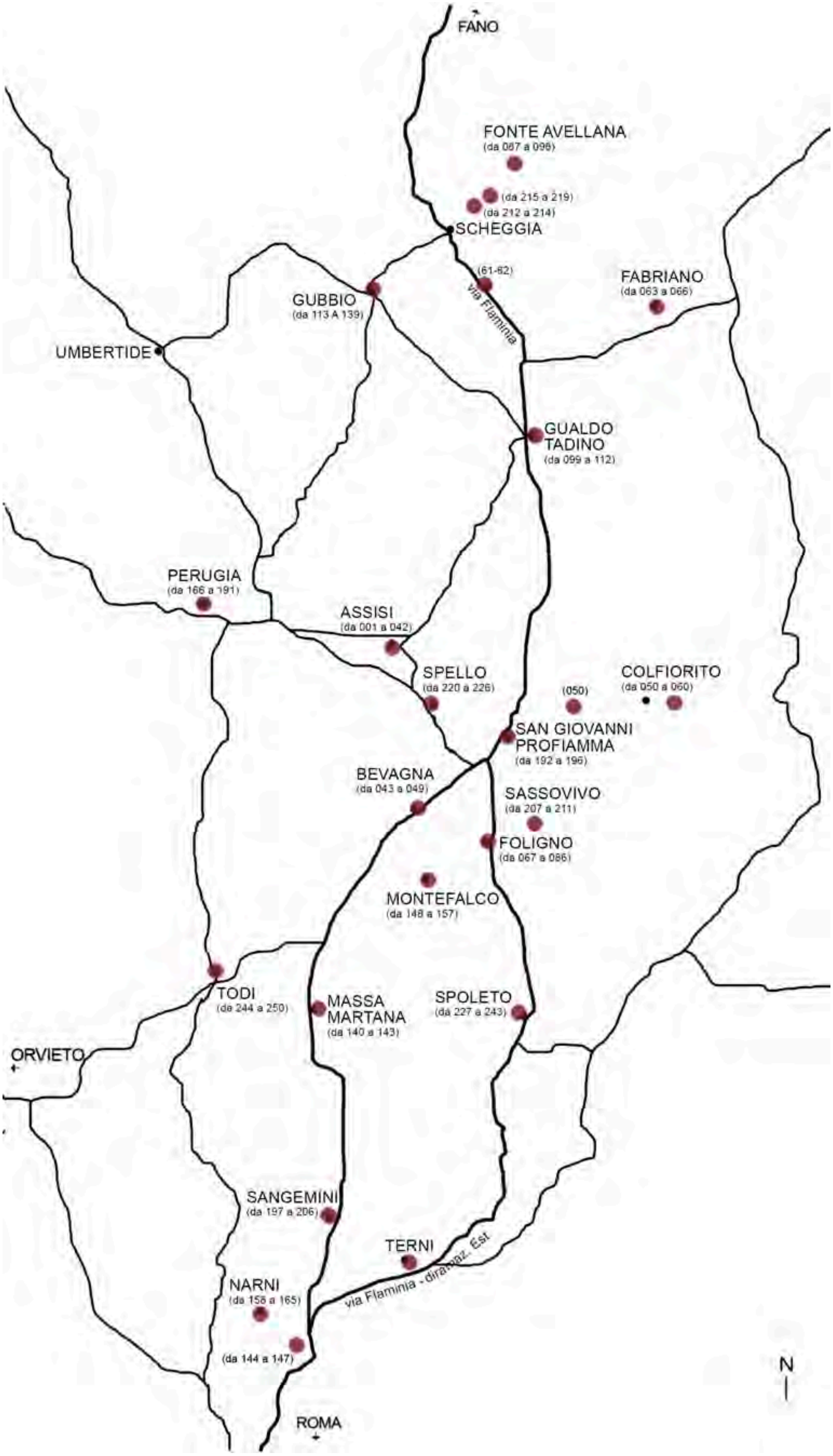

Fig. 95. The localization of masonry photographic samples collected in the Umbria-Marche region. Graphic processing E. Scopinaro.

Fig. 96. a. The Church of S. Chiara of Assisi. b. Detail of the connection between the masonry of the side and that of the façade. Photography E. Scopinaro 2017.

Fig. 97. The 'secondary' facade of the cathedral of S. Feliciano in Foligno. Photography E. Scopinaro 2017.

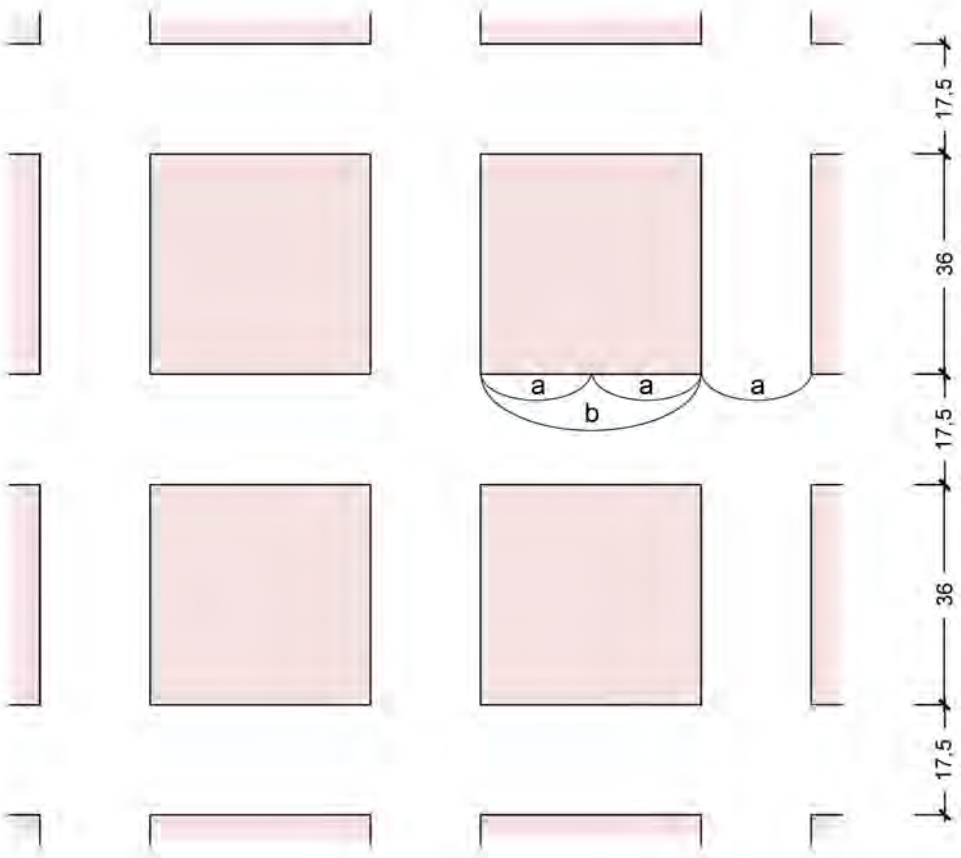

Fig. 98. The decoration of the main facade of the church of S. Agostino in Perugia. Graphic processing E. Scopinaro 2017.

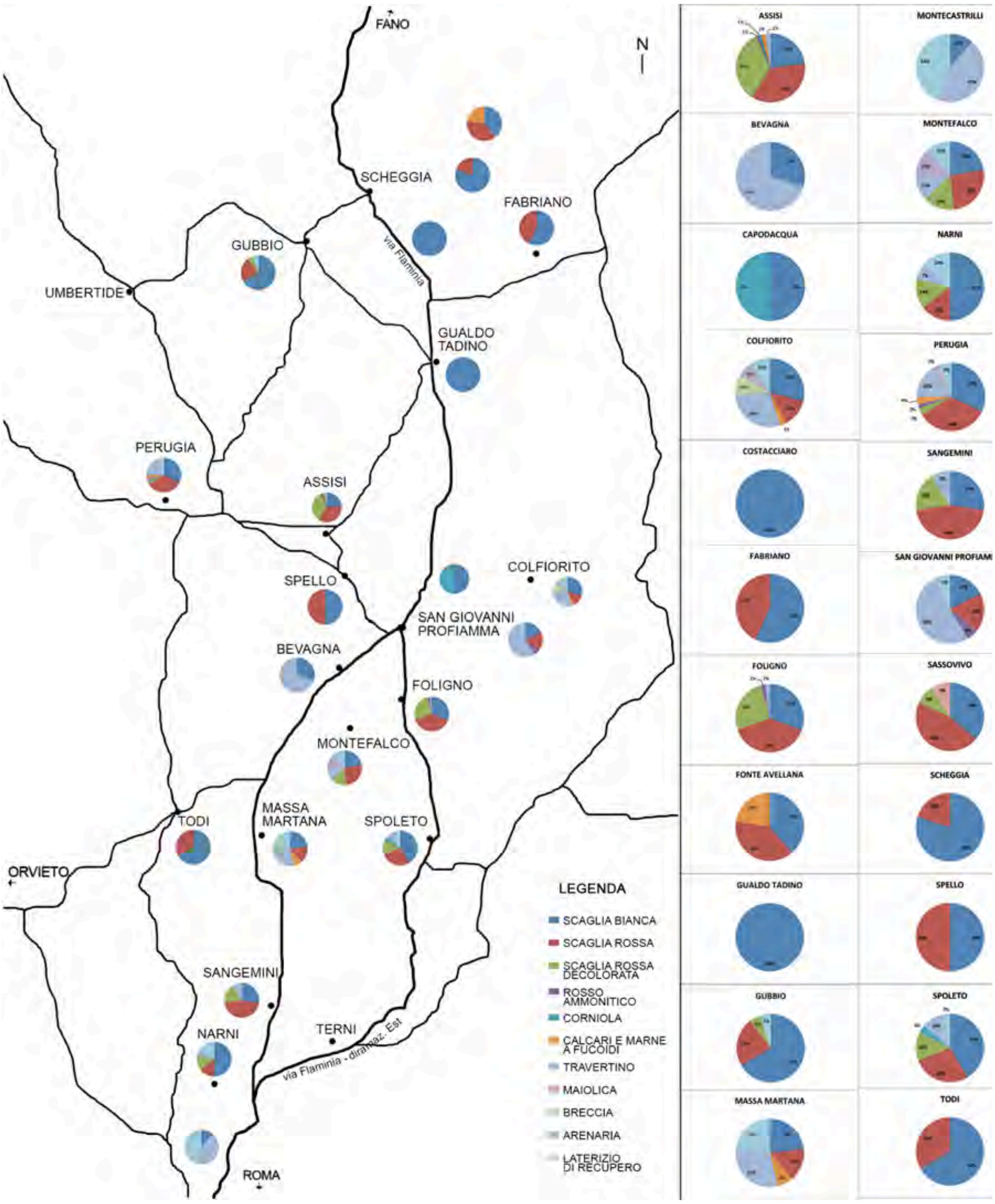

Fig. 99. The distribution of different construction materials. Graphic processing E. Scopinaro.

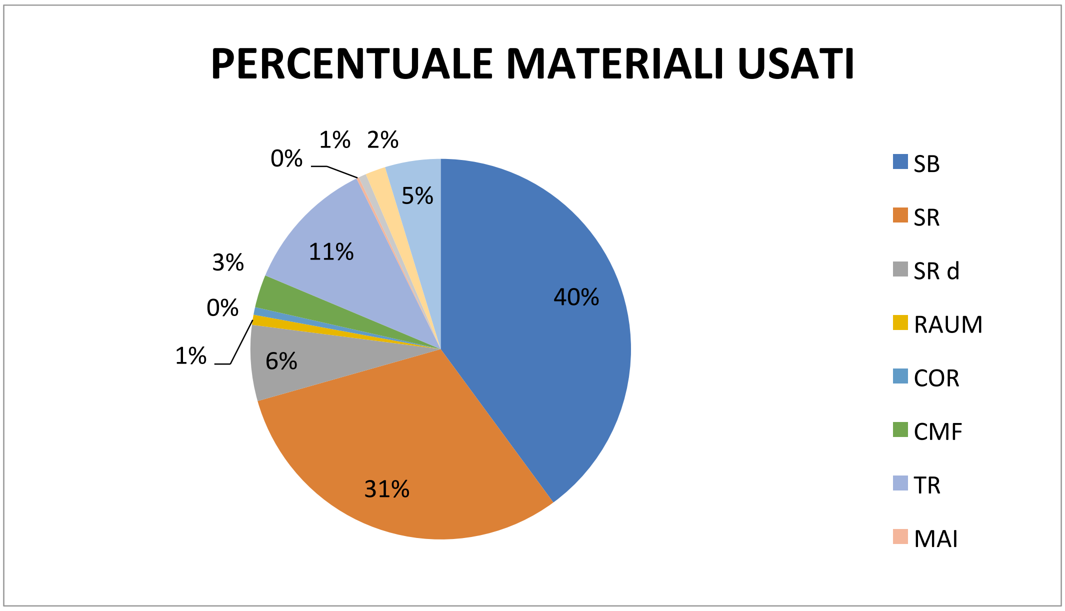

Fig. 100. The percentage of use of the different building materials. Graphic processing E. Scopinaro.

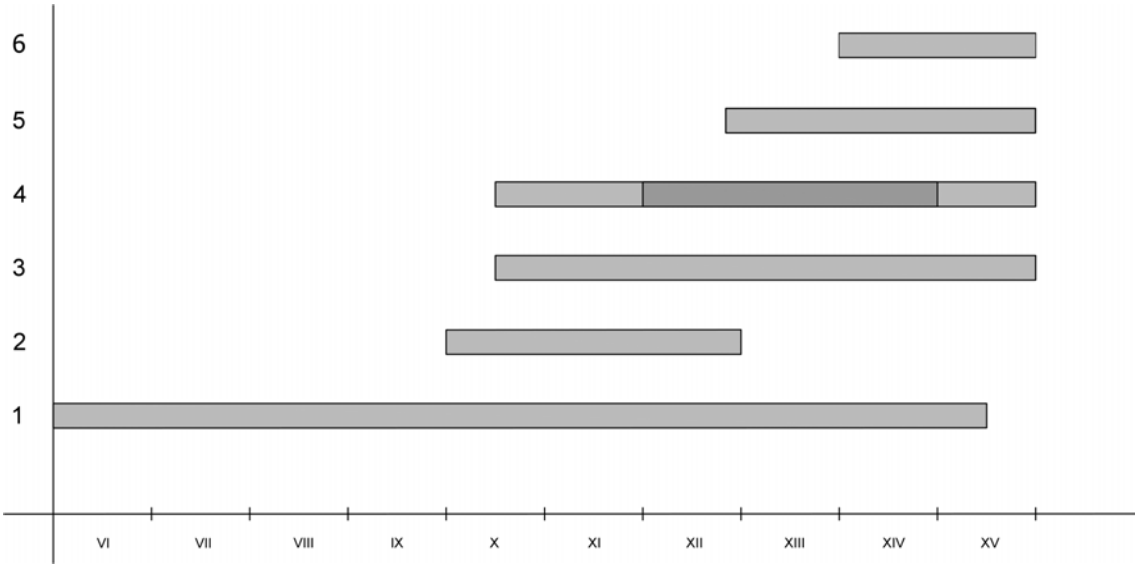

Fig. 101. The chronological distribution of building techniques with limestone wall facing. Graphic processing E. Scopinaro.

Fig. 102. The location of the samples of mortar collected during the archaelogical excavations in the church of S. Croce in Sassovivo abbey (PG). Graphic Processing E. Scopinaro 2017.

Fig. 103. Detail (img A) Location of samples L32-L33-L34-L35. Graphic Processing E. Scopinaro 2017.

5 CONSIDERATIONS ABOUT SURFACES CONSERVATION

Present research is mainly aimed at the restoration and conservation of masonry surfaces.

It is important to preserve the reading of the masonries because this is the main philological support to the study of architecture, especially when the work is not documented by indirect sources. In this case the material itself of the artefact is the only evidence of itself. Too often, however, it happens that, after trying to analyze the surfaces of the historical built heritage, we must desist because of too invasive over time made restoration actions. In most cases it is a matter of renewal of the surfaces or of small and large reconstructions, sometimes intentionally masked, which confuse all the parts of the masonry, thus confusing their entire appearance.

Present chapter summarizes the considerations gained during the study of the Umbrian-Marques area walls, concerning the degradation and the relative need for intervention, detected in different instances. The most significant and widespread problems on the wall facings were highlighted and examined, by performing the analysis of the most frequent pathologies and the respective 'responses' in terms of restoration, conservation and maintenance, It was possible to outline some concepts that can serve as guidelines, being based on the history of modern restoration and on the contemporary debate on restoration, by comparing the results obtained from the previous interventions with the expectations in terms of protection and enhancement from both a functional, aesthetic and documental point of view.

5.1 The degradation pathologies of the stone surfaces

The degradation pathologies of the stone surfaces analyzed during present research depend on intrinsic factors of the artefact, including its form and size and the characteristics of the materials, as well as extrinsic, such as natural events (earthquakes) and/or antropic interventions. Be the latter acts of vandalism or restoration works incompatible with the nature of the structures and their constituent materials.

Main problems are:

1. erosion of mortar;
2. degradation or alteration of the stone material;[175]
3. detachment or fall of the wallfacing;

The surface deterioration is mainly due to the erosion of mortar mostly due to the combined action of rain and wind, increased by the formation of ice on more superficial layers in winter. The phenomenon affects almost all of the masonry analyzed. It is amplified in this region by the nature of the used materials. It was thus not possible to find many examples of original mortar joints nor to study their respective finishes, due to these forms of degradation and subsequent restoration activity. Actually mortars were almost always of non-hydraulic type and were very easily disgregated and drained, especially when mortars are located in the outer wall facings or when the mortars were exposed to atmospheric agents and/or high humidity. The erosion of mortar occurs in a more clear (and more dangerous) manner in masonry made with blocks and/or with non-squared elements, while wall facings done by ashlars show less relevant mortar erosion, due to the reduced thickness and the often retracted finishing of the joints. The degradation of constituent elements occurs with deterioration and loss of material, deposition and formation of secondary products and chromatic alteration in the wall surfaces analysed.

In the first case, the most commonly observed pathologies are the scaling and the pitting (Figs. 104-105). The former occurs in compact limestones (e.g. *Scaglia* and *Maiolica*) with total or partial detachment of scales according to the already present holes in the original material. The second - observed on both porous and compact limestones - involves the formation of numerous holes with tendency to hemispheric shape with a maximum diameter of few millimeters: it is often due to the colonization of biodeteriogenic organisms.

The worse kind of decay due to the deposition of external materials are related to the pollution or to previous conservation interventions. Atmospheric pollution causes the formation of encrustations[3] and black encrustations. The former arecharacterized by layered and compact deposits, very adherent to the substrate, made up of poorly soluble substances (predominantly carbonated deposits from hard water). The second - most serious - causes modification of the surface layer of the stone material, independently from its thickness.

[175] For the analysis of the pathological degradation of stone surfaces, the study was based on the coding of the macroscopic alterations of the stone materials of the *Commissione NorMaL* 1/88 (I.C.R. 2006) and on the illustrated glossary of the stone's deterioration forms drawn up by the International Scientific Committee on Stone ICOMOS (ICOMOS-ISCS 2008).

Degraded stone is well distinguishable by morphological and chromatic characteristics from the original substrate. This degraded stone can also give rise to detachments. The anthropic action, on the other hand, belongs to the problems arising from the application of transparent or opaque surface films to extraneous to original stone, though self- coherent.[176]

In the pink stones and particularly the red *Scaglia,* it was possible to detect the phenomenon of color alteration. This involves the modification of the stone material, which does not necessarily imply worsening of the characteristics of the stone, but the irreversible variation of the parameters that define the color (tint, saturation and brightness) that can turn from pink to white or ocher. Owing to the influence of this type of change on the wall surfaces, especially in the case of bi-chromic masonry, please refer to section 5.1.

Detachment with possible loss of the wall facing, mainly affects walls shorter than 40 cm on the side, especially when the various parts have suboptimal overlap. Lack of adhesion may depend on the structure of the core and wall facing as well as on the composition of the mortar. This degradation phenomenon more frequently occurs more in ruins, where lack of coverage and any surface finishing allows the atmospheric agents to easily reach the inner section of the structures.

5.1.1 The chromatic alteration

To investigate the chromatic alteration phenomenon on construction materials, this research have been based on interdisciplinary contributions especially in the field of geology and geotechnics.

It can be actually observed that pink limestone can discolour, turning to white or to ocher, in a non-reversible way, sometimes confusing the formal interpretation of the original pattern used in wall facing. In these cases is not clear whether these patterns formed the part of the architectural design or the colour differences are related to later colour alteration caused by external factors.

We can easily figure out how the colour alteration could change the design of the facades through some examples from Assisi because this is the city with the largest amount of bi-chromatic stone structures characterized by the discolouration.

The lower part of the Cathedral’s façade was realized during the second half of the 12th century as designed by Giovanni da Gubbio who was one of the most important Umbrian medieval architects (fig. 106). Watching the building from afar the material looks homogeneously white, but if you move close to the surface you can see that there are two different types of limestone ashlars: travertine and scaglia, and the second one is discoloured (fig. 107). Given that the structure was mainly important and real white limestone ashlars were used during the construction I don’t think that the presence of pink limestone should be accidental.

We can suppose that if the choices about building materials were made when the rock was already discoloured - or becoming discoloured - it is possible that the surface should have

[176] An example are calcium oxalates that develop due to alteration of modern and ancient anti-aging treatments.

an external finishing, a thin layer of plaster or *stucco*. Otherwise, in the case of an accidental decolouration posterior to the arrangement of ashlars, we can imagine white rows and columns with red squares, as an early net bi-chromatic decoration.

On the contrary on the façade of S. Chiara the decoloured limestone was consciously used in first arrangement rows. The materials are almost pink and discoloured pink limestones chosen to create a rather perfect bi-chromatic alternation (fig. 108). We cannot know if the partial decolouration of the pink blocks in the pink rows had already occurred at the moment of wall facing fulfilment, we can however state that the pink rocks partially decoloured present inside the white rows were already imperfect during the placing, because the decolouration is not reversible.

As hypothesised for the S. Rufino façade it is possible that the white colour of the white row was improved by means of a subtle layer of finishing touch, a ‘ scialbatura‘ for example, that’s made of lime milk, which now has disappeared, also in this case there could have been a finishing layer.

Le nuove acquisizioni ottenute dall’analisi dei fenomeni di alterazione e degrado del calcare rosa in uso nell’edilizia medievale in area umbro-marchigiana hanno evidenti risvolti metodologici nel campo della lettura delle superfici murarie e del relativo restauro. Vista la carenza di studi specialistici sulle ragioni della decolorazione della pietra e sulla durata del processo[177]è stata eseguita una sperimentazione che ha permesso di esaminare le diverse reazioni della pietra, sottoposta a un processo di degrado accelerato, soprattutto in relazione al cambio di colorazione che questa può subire. Il progetto è stato svolto presso i laboratori dell’Università Politecnica di Budapest (Budapest University of Technology and Economics) in collaborazione con il professor Ákos Török, direttore del Dipartimento di Ingegneria applicata alla Geologia e Geotecnica (Department of Engineering Geology and Geotechnics) e con il professor Ákos Antal del Dipartimento di Ingegneria Meccatronica, Ottica e Tecnologia Strumentale (Department of Mechatronics, Optics and Instrumentation Technology).[178]

In order to study the colour changes of the pink rocks we took samples from medieval quarries - nowadays dismissed - close to Assisi and we cut these in small specimens to perform laboratory experiments (fig. 109-110-111).

Before, during and after stress cycles the colour changes were detected by using a spectrophotometer (fig. 113). As a consequence of modelled environmental stresses the colour difference calculated in perceptually uniform colour spaces was greater than 1.0 in all cases. The calculations were performed by considering of CIE standard illuminant D65 and the calculated colour difference values showed that the change of colours are perceptually perfectly acceptable. The direction of all changes within this system is consistent. The

[177] VANNUCCI 1986; CAI*et al.* 2012.

[178] Il progetto è stato realizzato seguendo l’esempio degli studi già svolti in materia da Joan Lluis Zamora-Mestre dell’Università Politecnica di Catalogna (Universitat Politècnica de Catalunya) e dallo stesso Dipartimento del professor Török.

lightness always increased compared to the reference specimens and the colour saturation represented chroma changed to red and yellow.[179]

Before starting the present study, we carried out a preliminary test on four samples (SP1, SP2, SP3, SP4). To verify if and to what extent the simulation of climate changes could have produced changes on the material, the four test samples were exposed to four different types of stress for the duration of 2 weeks. The stress types chosen for the preliminary experimentation are:

1. Wetting and drying cycles at 105 ° C;
2. freezing and thawing cycles;
3. Soaking cycles with water and magnesium sulphate. Drying at 105 ° C;
4. Extended exposure with Mercury lamp.

The plots related to the first series of stress cycles show how all the processes have brought about consistent changes in colour: all the samples show the discoloration turning from red to yellow (Fig. 114).

The core experiment was based on the cited preliminary results. Since all the simulations have provided significant results we proceeded by increasing the types of stress and, when possible, refining the characteristics.

The stress types to which we submitted the samples for the definitive experiment are:

A. freezing and thawing cycles;
B. Wetting and drying cycles at 105 ° C;
C. Extended exposure to ultraviolet rays;
D. Heating cycles at 105 ° C;
E. Wetting and drying cycles at 20-30° (room temperature);
F. Soaking cycles with water and salt (10% NaCl solution) and drying at 105 °.

The second experiment gave significant results, providing - as desired - a broader and more detailed panorama than the first. The summary table (fig. 115) shows that the greatest response in terms of chromatic alteration (DE) was obtained by the soaking cycles with water and salt and drying at 105 ° C (cycle F). The second most important process was the one obtained with the freezing and thawing cycles (cycle A), which however presents an average chromatic alteration (DE) equal to only half of the results of the cycle F. In terms of discoloration the answers of the other cycles were respectively aligned as follows: E, C, D and B. Furthermore the samples coming from the quarries n. 3 and 4 have shown, on average, significantly higher alterations than the others. This last result shows how the phenomenon of discoloration of the rocks depends substantially on the chemical-physical characteristics of each outcrop.[180]

[179] The XYZ space is an approximation of colour vision based on the trichromatic phenomenon to reach the neuronal vision. Cfr. ANTA L*et al.* 2016, p. 67.

[180] All the results of the sperimentation are soon published in the conference paper of the International Congress "Natural stone for Cultural Heritage: local resources with a global impact" tenutosi a Praga dal 19 al 22 settembre 2017.

The data obtained from the experiments here shown, are only the beginning of a broader study that we intend to continue on the present topic; however present results allow us to extrapolate some considerations.

The examined rock tends to discolour from red to white, as also happens to many other types of red and/or pink limestone,[181] according to a non-reversible process caused by the action of atmospheric agents. It can also be specified that all types of simulation have brought to detectable variations and that the presence of water is important, but not essential, as previous studies instead suggested.[182] In particular it seems that the presence of Sodium Chloride increases up to 6 times the alteration, compared to the samples treated only with water.

One of the most significant graphs among those developed during the study is reported as an example of what stated (fig. 116). The blue colour data show the color measurement before the alteration process (bi); the pink colour shows color measurements after stress cycles (ai).

The surface of the F334 sample, which was exposed to 60 saline imbibition cycles (10% NaCl) showed a strong and compact shift of the brightness values in all the detected points. It is also worth noting that the color has changed point by point in a differential way, with alignment on a range of values between the coordinates x = 0.334-0.339 and y = 0.340-0.341. Since also in the other samples coming from the same quarry a similar result has been recorded, both in terms of displacement and of 'alignment' towards a univocal value, one can think that this particular type of Scaglia Rossa stone does not decolour beyond the limit reached -also if it has not reached the white colour. It is also possible that the experiment has highlighted a particular 'moment of physical-chemical stabilization' of the material.

Considering the interest of this topic both for the study of the historical appearance of the structures and for the choice of the appropriate materials for the restoration of masonry, the study is proceeding with the aim of refining the already obtained results. We probably shall also start with new experiments.

[181] VANNUCCI 1986, pp.413-416.
[182] *Ivi,* pp. 414-415.

5.2 Previous restoration and conservation interventions

Any human intervention alters the original presentation of the masonry and its natural signs of degradation.

All the structures examined by present study show traces of restoration and maintenance from the second half of the 19th century to today.

Restoration interventions found on the surfaces of the studied masonries are due to degradation pathologies that we previously analyzed and can be divided into three categories:

- recovery of mortar joints;
- wall facing integration;
- cleaning actions.

La ripresa dei giunti è l'operazione spesso più evidente e sicuramente quella che presenta il numero maggiore di esempi. Per la realizzazione di questi interventi è stato rilevato l'utilizzo di malte generalmente molto compatte a base di calce o di cemento, realizzate con diverse granulometrie e finiture.

The recovery of mortar joints is often the most evident intervention and certainly the action with the greatest number of examples. In order to make the recovery, we found that the restorers generally used very compact lime mortars or cement mortars, done with different granulometry and finishes.

Compensation with lime mortar has very different colours and screenings that vary according to the characteristics of the inert materials forming the compound. Some examples of the great variety of restoration mortars found are visible in the wall facings of S. Chiara (Data Sheets from 001 to 006) and S. Francesco (Data Sheets from 007 to 015) churches in Assisi, where restorers used fine and medium-fine compounds according to the size of the commissure. Colours ranged from milky white to light brown and pale pink. Otherwise mortars made of cement are all gray in color and have a mean size of inert materials always very small (<1 mm). The use of cement is often linked to coarse executions as seen in the restoration of the masonry of the S. Maria dei Raccomandati church in GualdoTadino (Data Sheet 112) and of the façade of the S. Maria Maddalena church in Montefalco (Data Sheet 156-157).

The choice of finishing type seems to vary according to the type of construction and, above all, according to the shape and manufacturing of the arranged pieces.

The most commonly used treatments on block and non-squared stone are those *'a rasosasso'* or backwarded with respect to the surface of stone elements. As masonry, which probably would have a superficial coating (now lost), the '*rasosasso*' design could be a 'correct' technical option, but it is unadvisable to read the masonry technique. In most cases, mortar covers the edges of the elements, making it difficult to read and analyze the work and arrangement, as in the case of the outer edges of the S. Maria di Plestia church in Colfiorito (Data Sheets 051-052-053), the right side of S. Feliciano cathedral (Data Sheet 070) and the right side of the S. Salvatore church (Data Sheet 086) both in Foligno.

We also noticed the tendency to apply a thin layer of lime milk to the surface, especially when the arranged elements were of rough surface. This method could be aimed at highlighting the possible presence of the missing plaster as well as preserving the ancient masonry. An example is the restoration of the inner wall facings of the church of S. Maria di Colfiorito (Data Sheet 058).

In the case of wall facing with ashlars, the restoration mortar is more accurate, especially when the juxtaposition of the arranged elements makes very close each other one row and the other. The used mortar has fine screening in most cases has a back or threaded finish. The 'ribbon' finishes are an exception as are the finishes made on the inner linings of the S. Eufemia church in Spoleto (Data Sheets 232-233-234). In these cases the joints are realized in relief with respect to the wall plan, well smooth and cut laterally to right edges, but we have no document supporting the choice of this particular technical arrangement in that case.

Plastering of small portions of joints or of the damaged stone material has been rarely encountered. In these cases, a lime blend with small aggregates (fragments of lime always smaller than 1 mm) was used by restorers, as in the case of the inner masonry of the lower basilica of S. Francesco in Assisi (Data Sheet 007) or of the right side of the church of S. Benedetto in GualdoTadino (Data sheet 101).

Restoring of wall facing in the Umbrian-Marche region can be divided by material used, manufactoring and arrangement.

In the majority of the examined structures, the restorations were made in a mimetic manner, that is, with similar material, same manufacturing of the pieces and the same equipment. In these cases, it is not always possible to distinguish the integrations from the original parts, as happens in the external masonry of the Palazzo de' Priori in Perugia, where the traces of medieval and modern stratifications have been canceled, as well as those related to restorations at the end of the 19th century.[183]

When, however, restorers choose to differentiate the integrations, these were made evident by the manufacturing of the work pieces and, sometimes, by the use of different materials. An example of distinction is restoring of the right flank of the S. Benedetto church in Gualdo Tadino (Data Sheet 102), where the material used is the white *scaglia* stone (the only material used in the medieval local building) and the superficial finishing of ashlars, although it remembers ancient workmanship, is clearly industrial.

The restoration elements actually are well squared showing anathyrosis, in order to imitate other parts of the wall facing. In this case, the integration is made in such a way as to allow for the reading of the various stages of the work and the intervention may be valid even over time because the natural alteration of the rock does not involve significant morphological changes of the stone surface. Another example of replacing the wall facing is restoring made by Renzo Pardi on the left flank of the church of S. Croce di Sassovivo near Foligno.[184] In this case, thanks to a very articulated wall-cover, the restores chose to assemble materials

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[183] SILVESTRELLI 1997, pp. 19-49.

[184] This action had been done inside a greater restoring plan of the Sassovivo Abbey, made by Soprintendenza ai Monumenti e alle Gallerie dell'Umbria between 1966 and 1968, as described by ASCIUTTI 2004.

similar to those used in the original wall, but characterized by distinctive workmanship and equipment due to clearly educational purposes.

The insertion involves squared blocks of white and pink limestone, respectively characterized by: rough coarse grain processing for the first - white - limestones and dense *gradinatura* for the others, with succession of alternate-by-colour ashlars.

The chromatic and surface-finishing choices of individual elements do not seem to have a precise meaning, as if arbitrary motives had to create a 'new typology of bicrome representation' that would allow the author to differentiate his work from all the constructive phases of the church.

Many of the analysed surfaces underwent cleaning. Cleaning may be a reasonable and sometimes necessary action, but some surfaces probably suffered for invasive cleaning, creating conservation problems and /or loss of original materials.

The efforts to erase the effects of air pollution and the environment often lead to over-cleaning, which end up also removing precious surface finishing traces. This phenomenon also happened in the Umbrian-Marques area, where it is almost impossible to trace antique finishing layers, especially when it had to be thin and not decorated, though, as stated in the previous chapters, it would most likely be present. An example of over-cleaning is the 13th cloister of the S. Croce di Sassovivo abbey, where the restorations made following the seismic events of 1997 led to the definitive and irreversible loss of material. Despite the fact that in the technical report it is stated the desire to carry out the cleaning "without attacking the marble surfaces", it can be seen the total removal of the *patina* (figg. 117-118).

5.3 Surface restoration line-guides

The restoration must be based on an accurate study of the building that, together with a solid theoretical and methodological base, allows to operate in a conscious way in order to guarantee its protection through the preservation of material authenticity.[185]

To Aim at preserving authenticity without neglecting the aesthetic form is undeniably an action of selection on which the survival or loss of the historical, artistic and documental potential of the operas will depend. It is therefore of fundamental importance to base the selection, on a case-by-case basis, on objective data that come from the continuity between the phases of knowledge, project development and construction yard.[186]

To be sure that the plan takes into account all what the the matter needs, it is desirable that the selection be carried out by parts, on a case-by-case basis, in order to eliminate the degradation factors and to preserve the positive effect of the passing of time. Otherwise, any intervention that aimed to replace and renew, even when done on small portions of the surface, is equivalent to lose historical material and to change what had to be the final presentation of the work. A very useful analysis for the study and restoration of surfaces is certainly the stratigraphy. This analysis has gradually become part of the forms of knowledge on which it is believed that the restoration project should be founded together with the study and diagnosis of the phenomena of deterioration and instability.[187]

The stratigraphy also suggests some rules, or more simply some practical expedients, which increase the detection of the addition or integration in the context in which it is inserted, pushing it to a greater clarity, thus contributing to satisfy the requisite of the restoration that is to make distinguishable the added part, be it the integration of a gap, a structural or other intervention.[188] According to Francesco Doglioni the basic precautions are:

- do not alter nor completely cover the edges and the negative interfaces present at the contact point between new and old work;
- as much as possible reduce the formation of new edges. It is preferable the formation of false edges (juxtaposed edges that derive their shape from the pre-existing part).[189]

In present study the reintegration of joints were the most frequently found interventions in the masonry, which show de-cohesion and/or disintegration of the mortar.

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185 CARBONARA, BARELLI 2014, pp. 39-52; CARBONARA 2005, p. 58.

186 DOGLIONI 2008, pp. 157-160.

187 An accurate examination about the introduction of the stratigraphic analysis in the restoration was carried out by Roberta Loreti during her PhD in Resqualification and Recuperative Recovery achieved in 2012. For the results of this study see LORETI 2012, pp. 211-219.

188 See more about the importance of stratigraphy analises in restoration in *Ivi*, pp. 219-226.

189 «*Si apre perciò la strada all'utilizzo del metodo e della mentalità stratigrafica al fine di rendere più nitida la riconoscibilità futura degli interventi positivi e negativi che compongono l'opera di restauro, attraverso una deposizione-costruzione che tenga conto di quali sono i fattori e le condizioni in grado di permettere il riconoscimento stratigrafico di un processo avvenuto*». Cf. DOGLIONI 2002, p. 117.

As already underlined (highlighted) in the previous paragraph, this action should not be underestimated because the mortar is of primary importance in the final perception of medieval architecture, determining the aesthetic and stratigraphic values of the walls. The mortar actually is the layer aggregator, the material able to cement the elements (natural and artificial) that costitute the masonry, giving rise to the formation of a unitary whole. This means that the continuity of the mortar is also the demonstration of constructive continuity.

A problem at the base of the interventions on the joints is inherent in the fact that these works are often improperly considered as maintenance. This leads to arbitrarily act to the sole aim of protecting the wall from water infiltration or (worse) to standardize the appearance of the joints for arbitrary aesthetic purposes. On the contrary, the method with which the intervention is carried out is of fundamental importance. When this operation is carried out by jagging the joints and with the subsequent reintegration with new mortar, the above method causes the loss of information relevant to the original dimensions of the laying beds and to the possible other operations. Moreover, even when after the restoration we can still detect the extraneousness of the mortar with respect to the supports, and therefore we can argue the posteriority of the form and material of the joints, the initial stratigraphic unit will appear divided in as many units as there are stone elements that make the masonry, the latter will be built using the same material, cemented with a new binder. If then the reintegration included more units, the informative loss will also be extended to the stratigraphic relationships between the units involved and, possibly, also to the relationships with the adjacent ones, in the case in which the restoration changed the contact points, in other words the edges.

Such a restoration can therefore lead to interpretative errors, since it confers a character of homogeneity to the masonry apparatus. This homogeneity can lead someone to erroneously believe in the realization of its components in the same phase. The same restoration, when performed with conscious selection, exactly acting only where necessary, undoubtedly has very different and more limited consequences. Removing only the degraded mortar and paying attention to do the restoration of the joints with the new mortar without overlapping at the edges, the stratigraphic consequences are significantly reduced, allowing the observers to clearlry read the sequence of events, when the operation is completed.

In this working method it is essential to preserve the pre-existing mortar. This not only is necessary to respect the authenticity, but also because the ancient mortar with its persistence testifies the posteriority of the new materials used to compensate the missed joints. Moreover, through the persistence of the relationships with the stones of the masonry wall, the ancient mortar documents the belonging of a given masonry to same constructive actions and therefore to the same unit antecedent to that constituted by the restoration mortar. Finally, the ancient mortar ensures the continuity of the connections between mortar and stones made in the same phase; it is sufficient to lower the restoration to prove the contemporary construction.[190]

As for the additions to the wall-facing, the same principles already expressed for the reintegration of the mortar joints are valid, but in this case the actions are no longer focused only on a single aspect of the wall composition, but on the whole external *apparatus*. The

[190]DOGLIONI 1997, p. 262.

choices are therefore multiplied according to the number of parts to be reconstructed and to the relationship existing among the parts. This topic inevitably leads to the broader theme of the reintegration of the gaps and to the concept, generally now shared by the current literature, according to which the relationships between the added part and the pre-existence at the boundary must be done in such a way as to be recognizable. This end can be easily obtained by distinguishing the materials by nature, workmanship and/or installation and by interrupting the integration near the contact edges without creating overlaps or alterations.[191]

In this case also, the execution methods of the restoration work should therefore be deduced from the same rules of stratification, so as to make them clearly legible, but not enhanced, and less damaging to the authenticity of the construction. As already mentioned in the previous paragraph in the Umbria-Marques area there are, on the contrary, many examples of mimetic integrations, which makes difficult every successive study.[192]

Finally it would be necessary to discuss the topic of surface cleaning. Cleaning, as well as reintegration, when carried out excessively and without the basis of an accurate study can lead to loss of valuable information about the original appearance of the surface. The study should address the restorer to keep in mind a concept that can be expressed in terms of: "what is lost and in favour of what."

Two fundamental factors should be taken into account when designing the surface cleaning actions: 1) the original appearance, documented by the surface finishes and by the analysis of any traces of treatments, and 2) what turns out to be what is the new image of the building, given by the natural of the time. Also in this case the project is based on selection, which must be performed by protecting the non-degrading alterations of the material. The non-degrading alterations actually represent an integral part of its value and its protection.

Even after careful removal, however, visual problems may arise due to the state of the building once cleaned. The preserved patinas can actually appear to be inhomogeneous or incomplete, forming disordered 'figures', which no longer reflect the correct reading of the surface. In these cases the architect can choose between two different methods: continue with the removal or attenuation of the patinas, uniforming the final presentation of the work towards the absence of the same, or integrating them.

In all the cohorts of studied cases, it is finally worth to remember the importance of the executive aspect, considering that modest reintegration of the wall or wall covering and the cleaning actions sometimes entrusted to the discretion of the material executor. It is not actually possible to consider the design work as completed until the project intentionality has been transmitted to the construction site with specific, descriptive details.[193]

[191] D'OSSAT 1978.
[192] LORETI 2012, pp. 224-225.
[193] An example in this field is made by Francesco Doglioni and Fabiola Miriam Molinaro during the restoration of Palazzo Rota in S. Vito al Tagliamento (Pordenone), where a "abacus of the edges" was prepared with indications about executive methods. LORETI 2012, p. 225.

Fig. 104. Example of Scaling in the ashlars of the external wall facing of the Romanesque avant-corps of the church of S. Croce in Sassovivo. Photography E. Scopinaro 2016.

Fig. 105. Example of Pitting on the ashlars of the bell tower masonry of the duomo in Todi. Photography E. Scopinaro 2016.


Fig. 106. The facade of the cathedral of S. Rufino in Assisi. Photography E. Scopinaro 2016.


Fig. 107. The facade of the cathedral of S. Rufino in Assisi. Detail of ashlars made of scaglia rossa discolourated. Photography E. Scopinaro 2016.

Fig. 108. The church of S. Chiara in Assisi. Detail of the façade masonry. Photography E. Scopinaro 2016.

Fig. 109. Localization of samplings carried out in quarries probably used in medieval times. Graphic elaboration E. Scopinaro 2017.

Fig. 110. A quarry front probably exploited in medieval times near Assisi. Photography: E. Scopinaro 2016.

A	B	C	P	Q	R	W	X	Y	AB	AC	AD	AE
SAMPLE (n°)	WEIGHT (g)	WEIGHT (g)	UPT (µs)	UPT (µs)	UPV (km/s)	DENSITY AVERAGE	DENSITY STD	M (quality ch. n.)	CYCLES	NUMBER OF CYCLES		WEIGHT w WATER (g)
	before s.c.	after s.c.	before s.c.	after s.c.							TOTAL	
11	10,11		2,3		7,31	1a	1a	0,5854224				
12	11,59	11,62	2,3	1,5	6,91	2602,80030	253,73761	-0,5956794	WATER - DRY (E)	13 + 17	30	11,78
13	12,02	12,02	1,6	1,2	8,41			-0,9450030	HEAT - DRY (D)	26 + 4	30	
14	16,13	16,15	2,7	2,2	7,73			-1,0745682	WATER - DRY (E)	13 + 17	30	16,28
15	9,89		2,4		8,08			-1,5288462				
16	11,46	11,48	1,8		8,14			-0,3283338	HEAT - DRY (D)	26 + 4	30	
17	15,06	15,09	2,6	1,7	6,42			-1,1431635	HEAT - SALTED WATER (F)	11 + 19	30	
18	13,14	13,11	2,5		7,35			-0,7371585	FREEZE - THAW (A)	56	60	13,32
19	12,48	12,53	2,1	1,8	7,70			-0,3774317	HEAT - SALTED WATER (F)	11 + 19	30	
110	12,32	12,34	2,0	1,4	7,82			-0,6126046	UV LAMP (C)	20 + 6 (DAYS)	26 DAYS	
111	14,32	14,35	2,3	1,8	8,12			-0,8285601	UV LAMP (C)	20 + 6 (DAYS)	26 DAYS	
112	13,17	13,19	2,0	1,8	8,68			-0,2233926	HEAT- WATER (B)	26 + 4	30	
113	13,76	13,78	2,1	2,6	8,39			0,1046907	FREEZE - THAW (A)	56	60	13,89
114	14,07	14,09	2,0	1,6	9,18			-0,6804460	HEAT- WATER (B)	26 + 4	30	
115	11,88	11,89	1,4	1,4	9,94			0,1621193	HEAT- WATER (B)	26 + 4	30	
116	13,14	13,14	1,7	2,1	9,81			-0,6716434	FREEZE - THAW (A)	56	60	13,29
117	14,1		1,6		12,76			-0,2288069				
118	10,56	10,57	1,5	1,3	10,45			0,3586241	WATER - DRY (E)	13 + 17	30	10,7
119	11,7	11,71	1,6	1,3	10,01			0,2337457	UV LAMP (C)	20 + 6 (DAYS)	26 DAYS	
120	9,81	9,84	1,3	1,0	10,92			0,9384096	HEAT - SALTED WATER (F)	11 + 19	30	
121	12,69		1,6		8,58			1,6122149				
122	13,41	13,43	1,7	1,7	9,62			0,3561252	HEAT - DRY (D)	26 + 4	30	
123	14,71		1,7		9,36			2,9869697				
124	10,02		0,9		14,98			2,6373165				
225	13,96		2,0		8,71	2	2	-0,2089394				
226	11,33		1,9		8,27	2543,18043	36,15919239	-0,7508886				
227	13,84		1,5		10,24			0,4187311				
228	13,05		1,7		9,75			0,0476829				
329	10,9	10,91	1,4	1,3	11,15	3a	3a	1,3158750	HEAT - DRY (D)	26 + 4	30	
330	14,84	14,88	1,4	1,4	11,37	2552,21557	91,66524694	0,5905348	UV LAMP (C)	20 + 6 (DAYS)	26 DAYS	
331	14,55	14,58	2,1	1,9	9,59			-0,0189032	WATER - DRY (E)	13 + 17	30	14,75
332	9,52	9,54	1,3	1,2	11,75			1,0226923	HEAT- WATER (B)	26 + 4	30	
333	10,88	10,9	1,4	2,8	11,43			0,9402757	FREEZE - THAW (A)	56	60	11,02
334	9,86	9,88	1,2	1,5	13,21			2,4734627	HEAT - SALTED WATER (F)	11 + 19	30	
335	19,77	19,79	2,0	2,1	9,49	3b	3b	-0,3654828	HEAT - DRY (D)	26 + 4	30	
336	16,53	16,56	1,7	1,7	10,56	2506,08472	162,7420849	0,4254837	HEAT- WATER (B)	26 + 4	30	
337	9,67	9,68	1,2		12,82			1,9101089	FREEZE - THAW (A)	56	60	9,78
338	14,39	14,42	1,7	1,8	10,96			1,9970866	UV LAMP (C)	20 + 6 (DAYS)	26 DAYS	
339	9,81	9,83	1,0	0,8	14,89			3,5068458	WATER - DRY (E)	13 + 17	30	9,9
440	13,82		1,2		11,99	4	4	1,8343448				
441	14,03		1,3		12,53	2647,37820	36,93570093	1,9090610				

Fig 111. Tabella riassuntiva dei valori dei campioni prima e dopo l'applicazione dei processi di alterazione. Elaborazione grafica E. Scopinaro 2017.

Fig 112. The samples (1.5 cm x1.5 cm x 1.5 cm). Photography E. Scopinaro 2017.

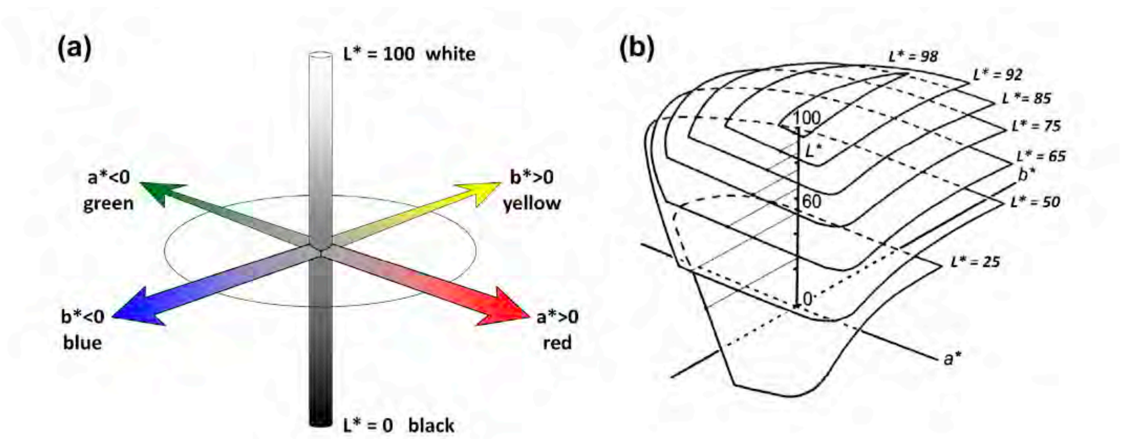


Fig 113. Graph of the spectral distribution of the reflected light according to the XYZ axes corresponding to the CMYB coordinates (Cyan, Magenta, Yellow, Black). A. ANTAL *et al.* 2016.

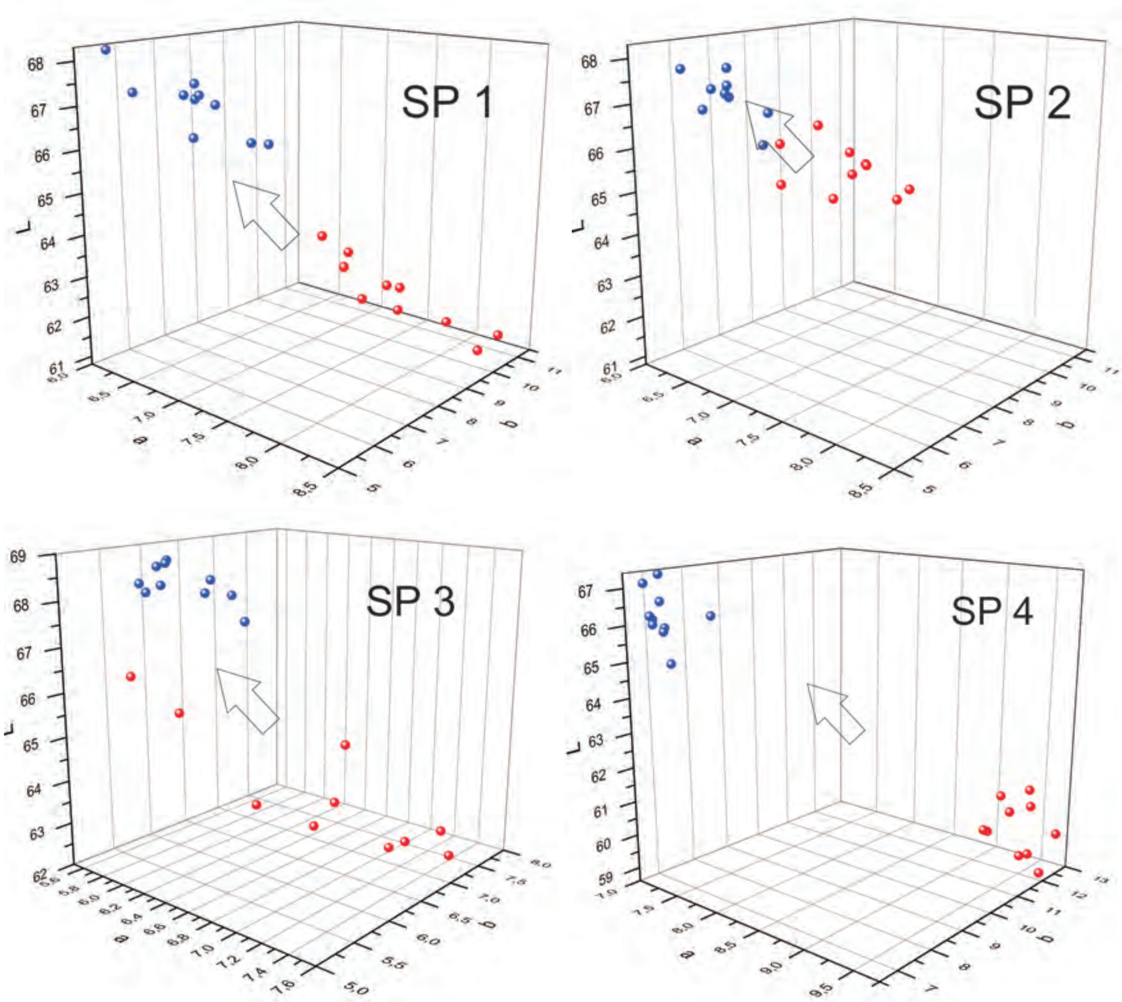


Fig. 114. Preliminary results. Grafic processing A. Antal 2017.

	before	after			before	after			before	after	
L	63,56346	63,52523	A113		65,44313	65,14431	B115		63,52024	63,62073	C119
a	8,2383	7,821247			7,38245	7,309322			7,869743	7,913442	
b	9,250765	8,510375			7,774496	7,810664			8,317258	8,625498	
DE		0,85063				0,309754				0,32714	
L	64,84152	64,45216	A18		64,8395	64,1713	B114		65,80453	64,9505	C111
a	8,095197	8,1784			7,384669	7,36989			6,727171	6,998679	
b	10,06709	9,93667			8,609023	8,815579			7,056956	7,679228	
DE		0,418968				0,699548				1,091011	
L	61,29143	62,7868	A116		64,80828	64,75277	B112		69,17179	69,31131	C110
a	8,862775	8,238441			7,226994	7,166978			6,772767	6,692316	
b	10,55947	9,10251			7,408127	7,520527			7,144947	7,12547	
DE		2,17914				0,138984				0,162228	
L	67,90964	66,20787	A333		68,53772	67,82242	B332		68,08645	68,51778	C330
a	7,4475	7,847649			6,962763	6,97333			7,252486	7,057884	
b	8,909322	9,627034			8,453624	8,508296			8,565855	7,965904	
DE		7,20771				0,717466				0,764106	
L	60,37204	59,89024	A337		60,43917	59,66059	B336		62,82235	62,22288	C338
a	10,83831	10,44863			10,66271	10,66274			9,724436	9,985728	
b	12,61871	12,26636			12,23062	12,00192			10,73425	11,35191	
DE		0,712841				0,811474				0,89952	

	before	after			before	after			before	after	
L	65,38362	65,19468	D122		64,36084	63,53428	E14		61,85652	64,55501	F120
a	7,084416	6,963677			7,294449	7,575706			8,209606	6,882007	
b	6,568436	6,540092			7,906125	8,58024			8,387028	6,577497	
DE		0,226005				1,10306				3,509807	
L	64,22198	64,2096	D13		64,17346	63,59622	E118		63,73793	64,32164	F17
a	7,429411	7,195992			7,909724	8,073921			7,594482	7,282999	
b	7,395561	6,790651			8,164688	8,51013			7,704046	7,552065	
DE		0,648502				0,69246				0,678856	
L	64,37748	63,47961	D16		65,02147	64,56253	E12		62,02006	66,03645	F19
a	7,698877	7,96725			7,34831	7,500087			8,284798	6,766661	
b	8,003813	8,831139			9,1745	9,474995			8,029319	7,542764	
DE		1,250063				0,56917				4,32121	
L	70,67064	70,38252	D329		69,41852	68,74598	E331		67,76837	75,42285	F334
a	6,668308	6,691415			6,491307	6,632637			7,397794	4,805768	
b	7,61733	7,755392			7,775793	8,215114			8,726211	7,188901	
DE		0,320329				0,815649				8,226366	
L	62,46051	62,977	D335		60,61758	60,43031	E339				
a	9,427936	9,060287			10,36177	10,60333					
b	10,07771	9,878545			11,30803	11,80964					
DE		0,664529				0,587393					

Fig. 115. Summary table of the results obtained from the experimentation on chromatic alteration. Graphic elaboration E. Scopinaro 2017.

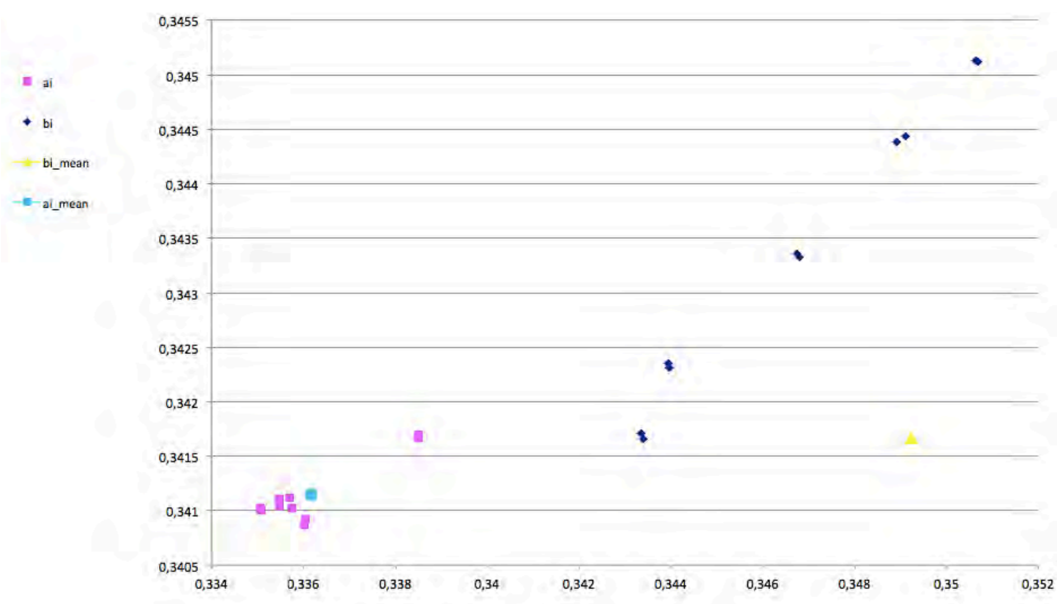


Fig. 116. Graph of F334 sample. Graphic elaboration E. Scopinaro 2017.


Fig. 117. Chiostro dell'abbazia di S. Croce in Sassovivo. Dettaglio del tassello di pulitura lasciato sulla terza arcatella da destra del fronte sud. Fotografia E. Scopinaro 2014.


Fig. 118. Chiostro dell'abbazia di S. Croce in Sassovivo. Dettaglio del tassello di pulitura lasciato sulla prima arcatella da destra del fronte ovest. Fotografia E. Scopinaro 2014.

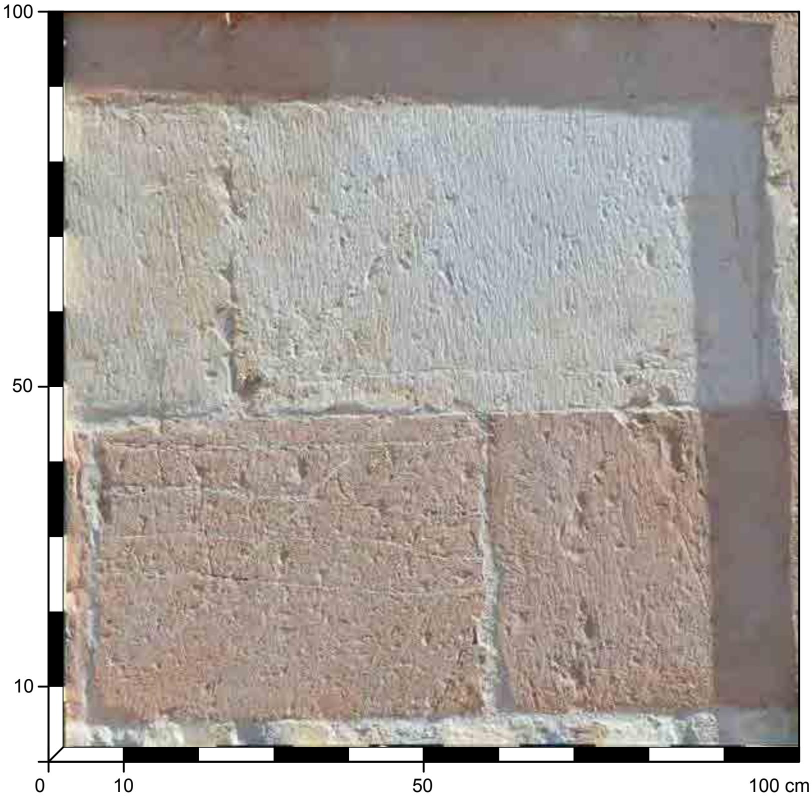
MASONRY DATA SHEETS

CHURCH OF S. CHIARA - ASSISI (PG)

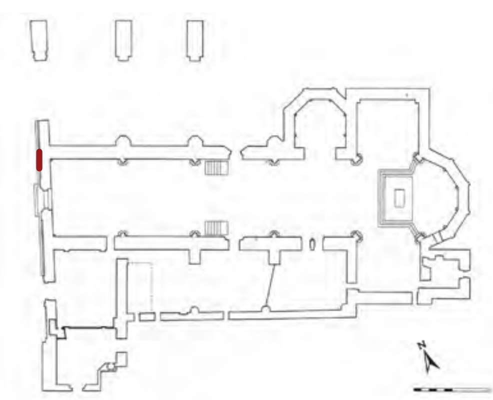
MAIN FACADE
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- BIGARONI, MEIER, LUNGHI 1994, pp. 11-81.



001	RUBBLE MASONRY WITH WALL FACING IN BICHROMATIC LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 150 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: from 1257 - to 1265 or 1280	
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA	
LAYING: REGULAR IN ISOMETRIC PARALLEL BICHROMATIC ROWS	



TOMEI 2002, p. 30.

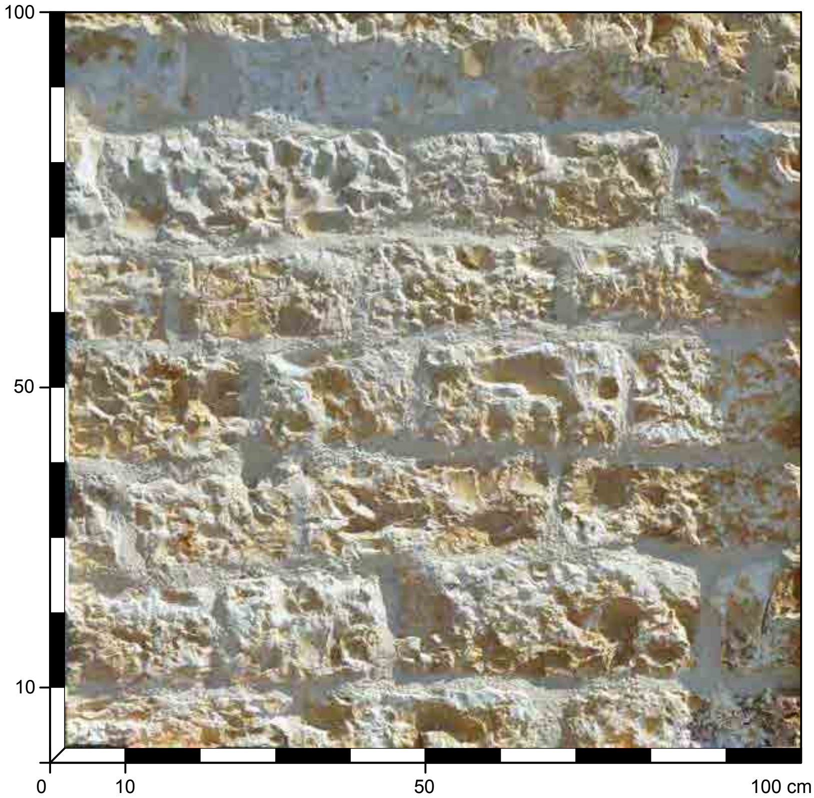
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** MEDIUM HARD
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** 0.1 < 1 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** SAND
DIMENSIONS: HEIGHT 40 cm; WIDTH from 52,5 to 65 cm	DIMENSION: 0.5 mm
MANUFACTURE: SMOOTH SURFACE PROCESSING WITH A FINE-TOOTH (1,5 mm) BUSH HAMMER	COLOR: BROWN
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT 40 cm; WIDTH from 55,5 to 69,5 cm	
MANUFACTURE: SMOOTH SURFACE PROCESSING WITH A FINE-TOOTH (1,5 mm) BUSH HAMMER	

CHURCH OF S. CHIARA - ASSISI (PG)

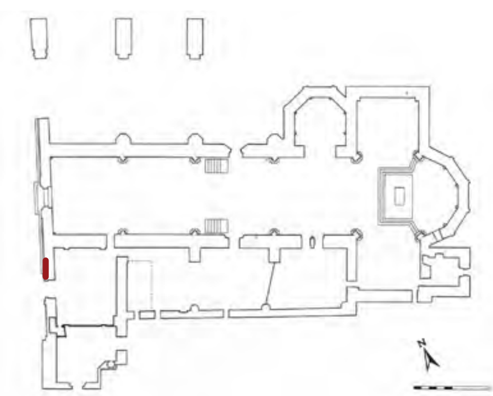
MAIN FACADE OF THE SACRISTY
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- BIGARONI, MEIER, LUNGHI 1994, pp. 11-81.



002	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: GOOD	
MASONRY THICKNESS: 150 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: post XIII century	
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA	
LAYING: REGULAR IN ISOMETRIC PARALLEL BICHROMATIC ROWS	



TOMEI 2002, p. 30.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** MEDIUM HARD
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: OCHER	**MORTAR (BEDDING) THICKNESS:** 0.1 < 1 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: BLOCKS	**AGGREGATE:** SAND
DIMENSIONS: HEIGHT from 10 to 14,5 cm; WIDTH from 19 to 41 cm	DIMENSION: 0.5 mm
MANUFACTURE: ROUGH SURFACE PROCESSING WITH A POINT CHISEL	COLOR: BROWN

CHURCH OF S. CHIARA - ASSISI (PG)

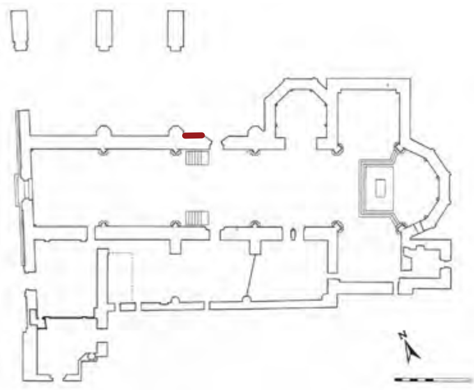
LEFT FRONT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- BIGARONI, MEIER, LUNGHI 1994, pp. 11-81.

003	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: --
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1280 (BIGARONI)
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS



TOMEI 2002, p. 30.

STONE ELEMENTS	MORTAR
LITHOTYPE: DICOLOURED SCAGLIA ROSSA	**CONSISTENCY:** MEDIUM HARD
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM
COLOR: WHITE AND PINK	**MORTAR (BEDDING) THICKNESS:** from 1 to 4 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 14 to 19,5 cm; WIDTH from 23 to 39 cm	DIMENSION: 2 mm
MANUFACTURE: SMOOTH SURFACE PROCESSING WITH PIONT CHISEL AND BUSH HAMMERS	COLOR: BROWN **AGGREGATE:** SAND
LITHOTYPE: SCAGLIA BIANCA	DIMENSION: 0.2 mm
NATURE: CARBONATIC LIMESTONE ROCK	COLOR: BROWN
COLOR: WHITE	
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 13 to 15,5 cm; WIDTH from 26,5 to 32,6 cm	
MANUFACTURE: SMOOTH SURFACE PROCESSING WITH PIONT CHISEL AND BUSH HAMMERS	
LITHOTYPE: SCAGLIA ROSSA	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: PINK	
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 13 to 15,5 cm; WIDTH from 17 to 22 cm	
MANUFACTURE: SMOOTH SURFACE PROCESSING WITH PIONT CHISEL AND BUSH HAMMERS	

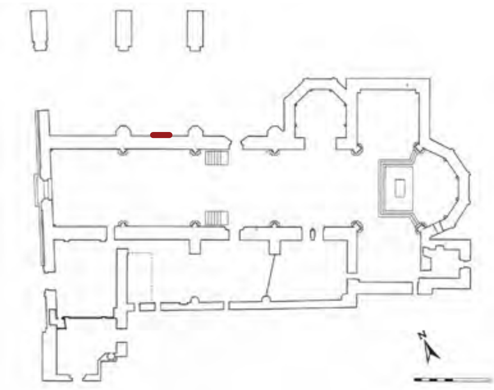
CHURCH OF S. CHIARA - ASSISI (PG)

LEFT FRONT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- BIGARONI, MEIER, LUNGHI 1994, pp. 11-81.

004	RUBBLE MASONRY WITH WALL FACING IN BICHROMATIC LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 180 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1257 - 1265	
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA	
LAYING: REGULAR IN ISOMETRIC PARALLEL BICHROMATIC BOUNDLE OF ROWS	
BOUNDLE OF ROWS HIGH : from 40,5 to 43 cm	



TOMEI 2002, p. 30.

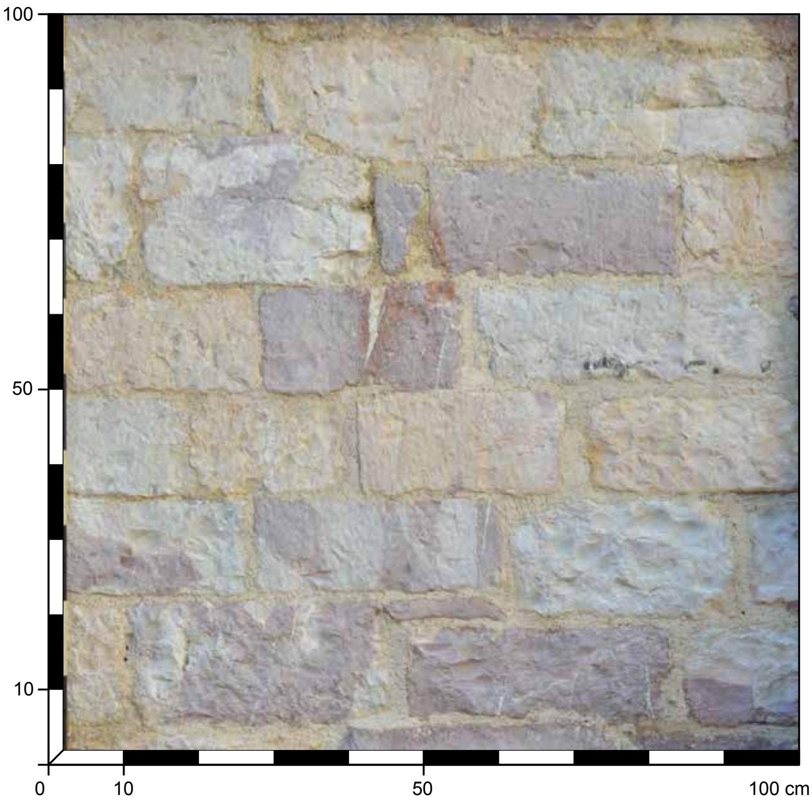
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** MEDIUM HARD
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM
COLOR: LIGHT PINK	**MORTAR (BEDDING) THICKNESS:** from 1 to 3 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 12.2 to 16 cm; WIDTH from 32 to 38 cm	DIMENSION: 1 mm
MANUFACTURE: SMOOTH SURFACE PROCESSING WITH POINT CHISEL AND LARGE-TOOTH (3 mm) BUSH HAMMER	COLOR: BROWN **AGGREGATE:** SAND
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	DIMENSION: 0.2 mm
NATURE: CARBONATIC LIMESTONE ROCK	COLOR: LIGHT BROWN
COLOR: WHITE	
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 11.8 to 15.8 cm; WIDTH from 28.5 to 41.2 cm	
MANUFACTURE: SMOOTH SURFACE PROCESSING WITH POINT CHISEL AND LARGE-TOOTH (3 mm) BUSH HAMMER	

CHURCH OF S. CHIARA - ASSISI (PG)

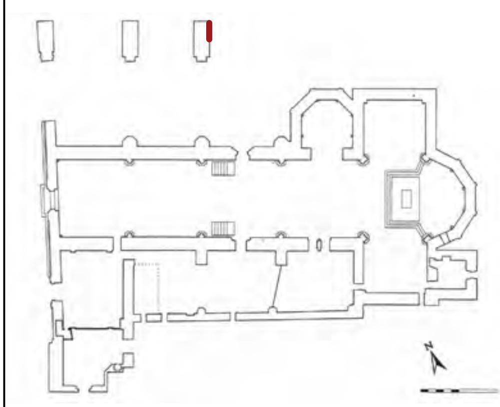
LEFT SIDE
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- BIGARONI, MEIER, LUNGHI 1994, pp. 11-81.



005	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 150 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1351	
MATERIALS: DISCOLOURED SCAGLIA ROSSA , SCAGLIA BIANCA, SCAGLIA ROSSA	
LAYING: REGULAR PARALLEL ROWS	



TOMEI 2002, p. 30.

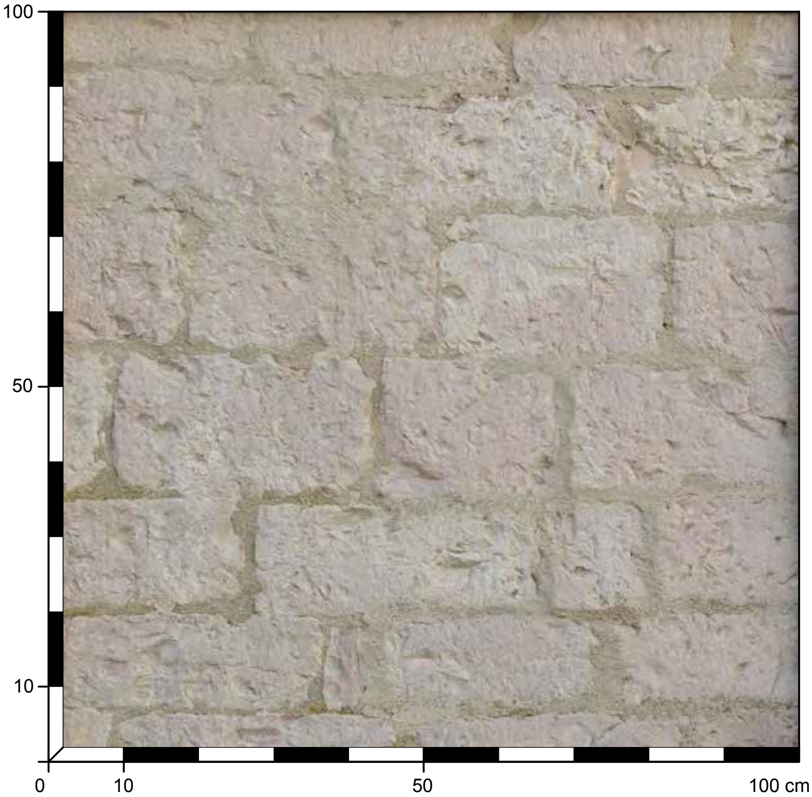
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** COMPACT
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 0.5 a 2.2 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT 12 cm; WIDTH 15.5 cm	DIMENSION: 1 mm
MANUFACTURE: SMOOTH SURFACE PROCESSING WITH A POINT CHISEL BUSH HAMMER	COLOR: BROWN **AGGREGATE:** SAND
LITHOTYPE: SCAGLIA BIANCA	DIMENSION: 0.2 mm
NATURE: CARBONATIC LIMESTONE ROCK	COLOR: LIGHT BROWN
COLOR: WHITE	
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT 13 cm; WIDTH 15.5 cm	
MANUFACTURE: SMOOTH SURFACE PROCESSING WITH A POINT CHISEL BUSH HAMMER	
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT 12 cm; WIDTH 17 cm	
MANUFACTURE: SMOOTH SURFACE PROCESSING WITH A POINT CHISEL BUSH HAMMER	

CHURCH OF S. CHIARA - ASSISI (PG)

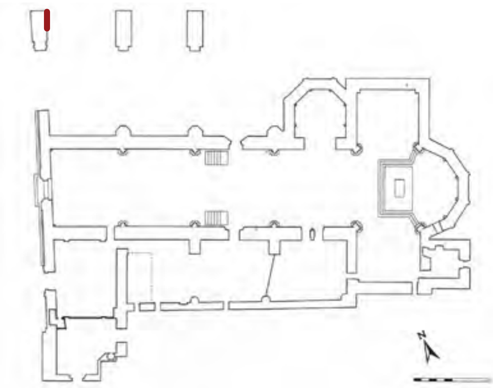
LEFT SIDE
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- BIGARONI, MEIER, LUNGHI 1994, pp. 11-81.



006	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: --	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1351	
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA	
LAYING: REGULAR PARALLEL ROWS	



TOMEI 2002, p. 30.

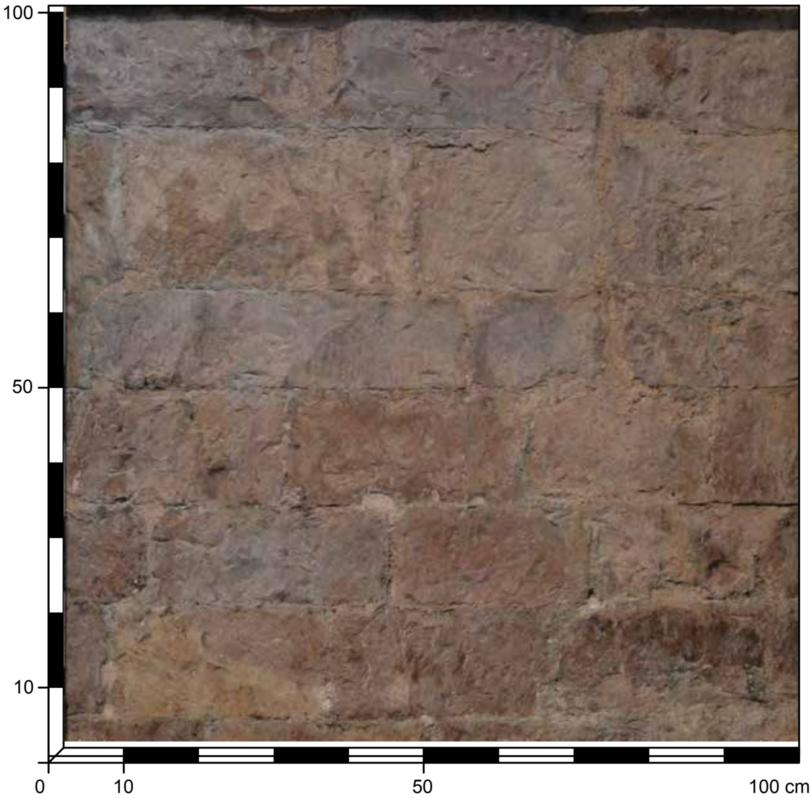
STONE ELEMENTS	MORTAR
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**CONSISTENCY:** MEDIUM
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.2 to 2 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** SAND
DIMENSIONS: HEIGHT from 11 to 20 cm; WIDTH from 12 to 37 cm	DIMENSION: 0.2 mm
MANUFACTURE: SMOOTH SURFACE PROCESSING WITH POINT CHISEL AND FINE-TOOTH (1,5 mm) BUSH HAMMER	COLOR: LIGHT BROWN

BASILICA OF S. FRANCESCO - ASSISI (PG)

LOWER CHURCH
DATE OF SURVEY 08 AGO 2016

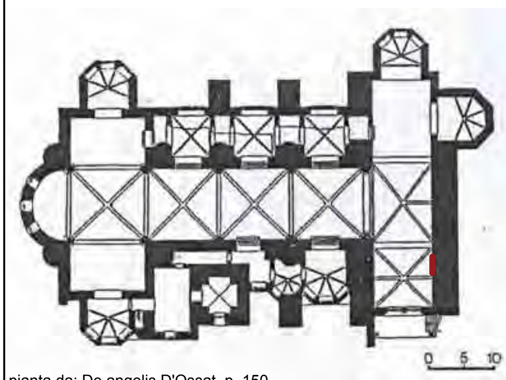
BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 69;
- PARDI 1975, p. 222;
- PARDI 1972, p. 50.



007	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: FAIRLY GOOD
MASONRY THICKNESS: 140 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: 1230 - 1232
MATERIALS: DISCOLOURED SCAGLIA ROSSA, SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS



pianta da: De angelis D'Ossat, p. 150.
DE ANGELIS D'OSSAT 1982, p. 150.

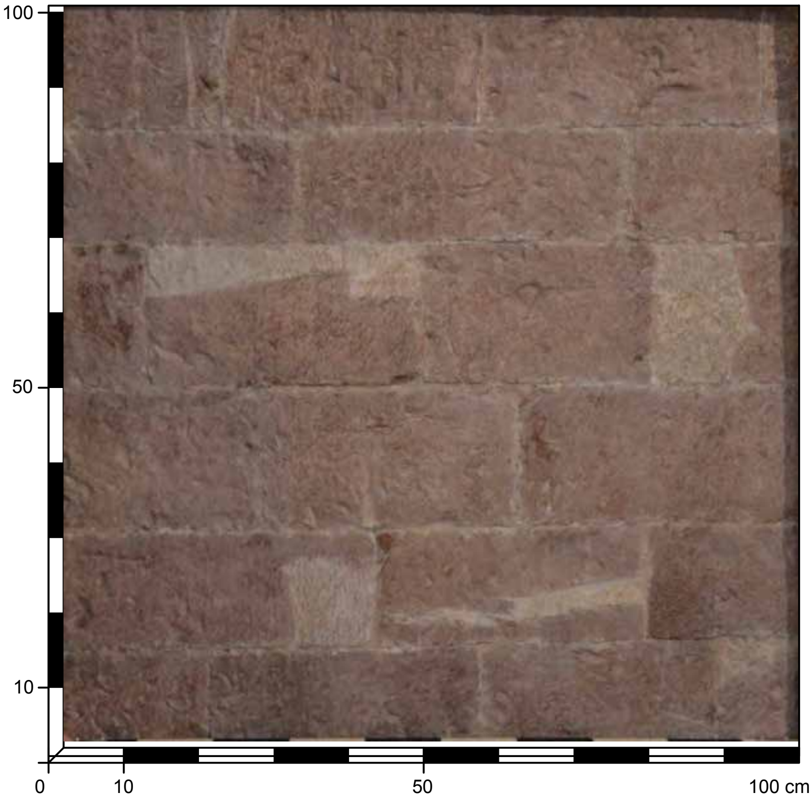
STONE ELEMENTS	MORTAR (1)
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.4 to 0.8 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** SAND
DIMENSIONS: HEIGHT from 12 to 20 cm; WIDTH from 23 to 50 cm	DIMENSION: <1 mm
MANUFACTURE: ROUGHLY SMOOTHED SURFACE PROCESSING WITH A POINT CHISEL	COLOR: BROWN
LITHOTYPE: SCAGLIA ROSSA	**MORTAR (2)**
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: PINK	**CONSISTENCY:** SOLID
QUARRY: SUBASIO MOUNT	**SIFT:** MEDIUM
SHAPE: ASHLARS	**MORTAR (BEDDING) THICKNESS:** from 1 to 2 cm
DIMENSIONS: HEIGHT from 12 to 13.5 cm; WIDTH from 26 to 31 cm	**BINDER:** LIME
MANUFACTURE: ROUGHLY SMOOTHED SURFACE PROCESSING WITH A POINT CHISEL	**AGGREGATE:** LIMESTONE FRAGMENTS
	DIMENSION: 1-2 mm
	COLOR: DARK RED
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: BROWN

BASILICA OF S. FRANCESCO - ASSISI (PG)

LEFT NAVE OF THE LOWER CHURCH
DATE OF SURVEY 08 AGO 2016

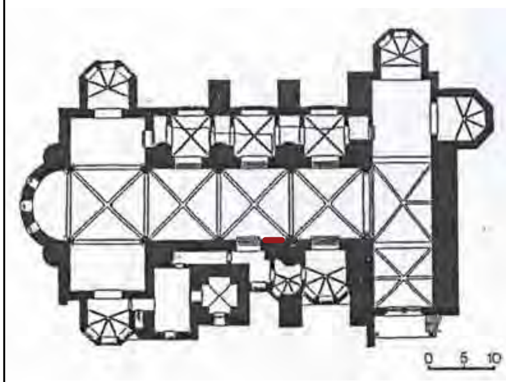
BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 69;
- PARDI 1975, p. 222;
- PARDI 1972, p. 50.



008	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: VERY GOOD
MASONRY THICKNESS:
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: 1230 - 1232
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS



DE ANGELIS D'OSSAT 1982, p. 150.

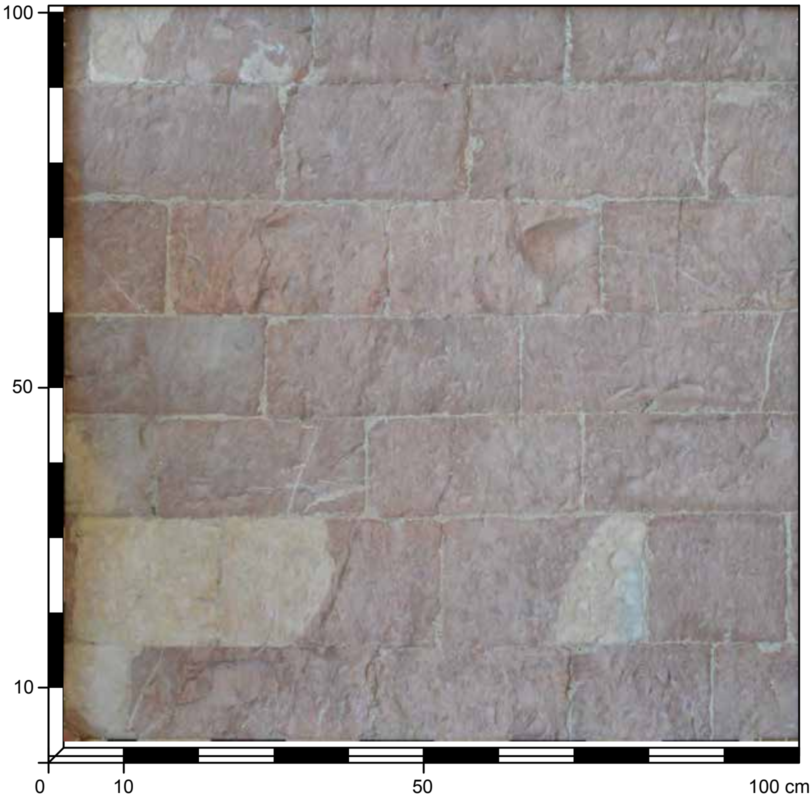
STONE ELEMENTS	**MORTAR**
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: DARK PINK	**MORTAR (BEDDING) THICKNESS:** 2 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** SAND
DIMENSIONS: HEIGHT from 15 to 18-18.5 cm; WIDTH from 19 to 41 cm	DIMENSION: <1 mm
MANUFACTURE: ROUGH SURFACE PROCESSING WITH A POINT CHISEL AND FINE-TOOTH (1.5 mm) BUSH HAMMER	COLOR: OCHER
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: PINK	
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 15 to 18-18.5 cm; WIDTH from 18 to 42 cm	
MANUFACTURE: ROUGH SURFACE PROCESSING WITH A POINT CHISEL AND FINE-TOOTH (1.5 mm) BUSH HAMMER	

BASILICA OF S. FRANCESCO - ASSISI (PG)

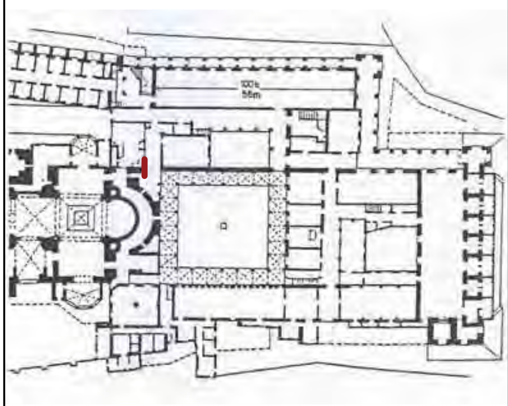
INTERNAL COURTYARD
DATE OF SURVEY 08 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 69;
- PARDI 1975, p. 222;
- PARDI 1972, p. 50.



009	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: VERY GOOD	
MASONRY THICKNESS:	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1230 - 1253	
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** 2 mm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 12,9 to 17.8 cm	DIMENSION: 1-2 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND FINE-TOOTH BUSH HAMMER	COLOR: BROWN **AGGREGATE:** SAND
LITHOTYPE: SCAGLIA BIANCA	DIMENSION: <1 mm
NATURE: CARBONATIC LIMESTONE ROCK	COLOR: LIGHT BROWN
COLOR: WHITE	
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 12.9 to 17.8 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND FINE-TOOTH BUSH HAMMER	

BASILICA OF S. FRANCESCO - ASSISI (PG)

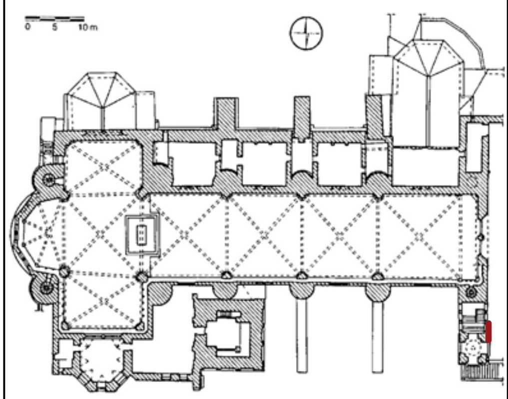
UPPER PART OF THE BELLTOWER OF THE LOWER CHURCH
DATE OF SURVEY 08 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 69;
- PARDI 1975, p. 222;
- PARDI 1972, p. 50.

010	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS:
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1230 - 1253
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA DECOLORATA
LAYING: REGULAR IN PARALLEL ROWS



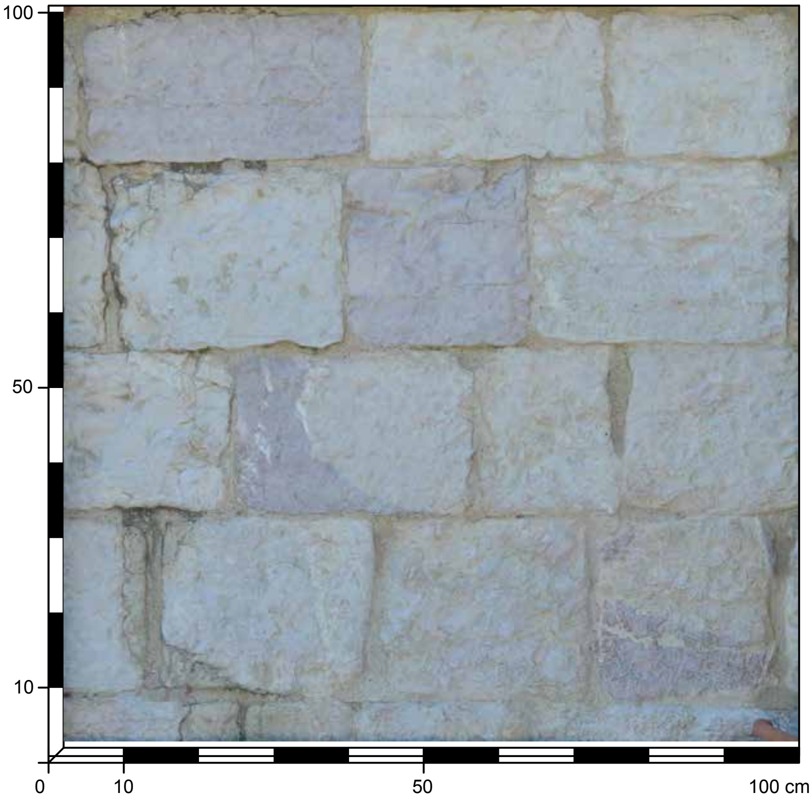
STONE ELEMENTS	MORTAR
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: PINK AND WHITE	**MORTAR (BEDDING) THICKNESS:** 2 mm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 20 to 24 cm; WIDTH from 28.5 to 32 cm	DIMENSION: 1-2 mm
MANUFACTURE: ROUGH SURFACE PROCESSING WITH A POINT CHISEL	COLOR: BROWN
LITHOTYPE: SCAGLIA BIANCA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: WHITE	COLOR: GREY
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 19 to 25 cm	
MANUFACTURE: ROUGH SURFACE PROCESSING WITH A POINT CHISEL	

BASILICA OF S. FRANCESCO - ASSISI (PG)

FACADE OF THE UPPER CHURCH
DATE OF SURVEY 08 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 69;
- PARDI 1975, p. 222;
- PARDI 1972, p. 50.



011	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD

MASONRY THICKNESS: 200 cm

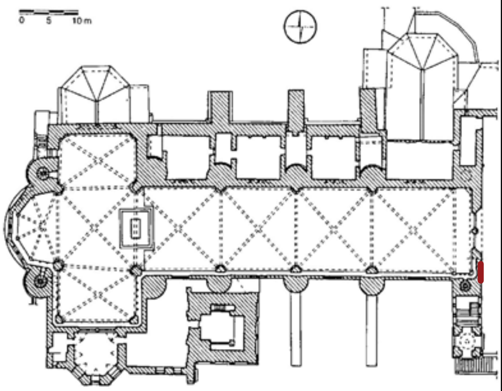
TYPE OF STRUCTURE: BEARING WALL

FACADE: EXTERIOR

DATING: 1230 - 1253

MATERIALS: SCAGLIA ROSSA DECOLORATA, SCAGLIA BIANCA

LAYING: REGULAR IN PARALLEL ROWS



STONE ELEMENTS	MORTAR
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** 2 mm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 2.50 to 24.8 cm; WIDTH from 23.7 to 30.6 cm	DIMENSION: 1-2 mm
MANUFACTURE: ROUGH SURFACE PROCESSING WITH A POINT CHISEL	COLOR: BROWN
LITHOTYPE: SCAGLIA BIANCA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: WHITE	COLOR: GREY
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 2.50 to 24.8 cm; WIDTH from 22.5 to 30 cm	
MANUFACTURE: ROUGH SURFACE PROCESSING WITH A POINT CHISEL	

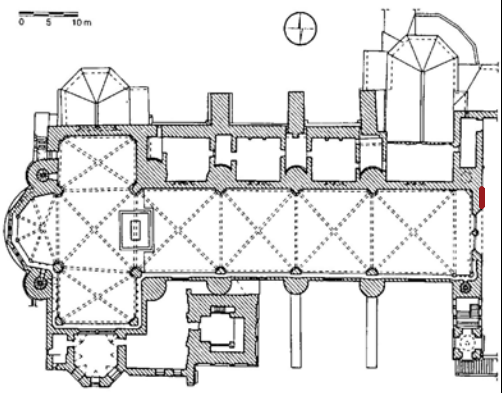
BASILICA OF S. FRANCESCO - ASSISI (PG)

FACADE OF THE UPPER CHURCH
DATE OF SURVEY 08 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 69;
- PARDI 1975, p. 222;
- PARDI 1972, p. 50.

012	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS:	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1228 - 1236	
MATERIALS: SCAGLIA ROSSA DECOLORATA, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



STONE ELEMENTS	MORTAR
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** 2 mm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 12.8 to 17.5 cm; WIDTH from 21 to 34.4 cm	DIMENSION: 1-2 mm
MANUFACTURE: SURFACE PROCESSING WITH A POINT CHISEL AND A FINE-TOOTH BUSH HAMMER (dist. 0.25 mm)	COLOR: BROWN **AGGREGATE:** SAND
LITHOTYPE: SCAGLIA BIANCA	DIMENSION: <1 mm
NATURE: CARBONATIC LIMESTONE ROCK	COLOR: GREY
COLOR: WHITE	
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 12.8 to 17.5 cm; WIDTH from 36 to 43 cm	
MANUFACTURE: SURFACE PROCESSING WITH A POINT CHISEL AND A FINE-TOOTH BUSH HAMMER (dist. 0.25 mm)	

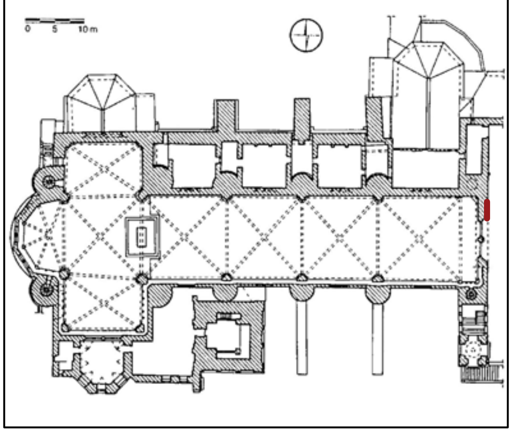
BASILICA OF S. FRANCESCO - ASSISI (PG)

FACADE OF THE UPPER CHURCH
DATE OF SURVEY 08 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 69;
- PARDI 1975, p. 222;
- PARDI 1972, p. 50.

013	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: VERY GOOD	
MASONRY THICKNESS:	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1228 - 1236	
MATERIALS: SCAGLIA ROSSA DECOLORATA, SCAGLIA ROSSA, TRAVERTINO	
LAYING: REGULAR IN PARALLEL ROWS	



STONE ELEMENTS	MORTAR
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 2 mm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 16 to 21.1 cm; WIDTH from 25.7 to 41.5 cm	DIMENSION: 1-2 mm
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH BUSH HAMMER	COLOR: BROWN
LITHOTYPE: SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: LIGHT PINK	COLOR: GREY
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 16 to 21.1 cm; WIDTH from 22.5 to 33.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH BUSH HAMMER	
LITHOTYPE: TRAVERTINE	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT 46.2 cm; WIDTH from 30 to 38.8 cm	
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH BUSH HAMMER	

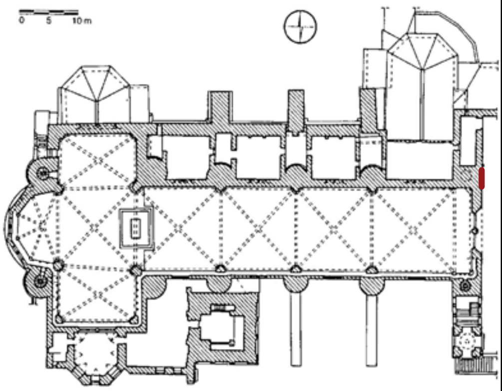
BASILICA OF S. FRANCESCO - ASSISI (PG)

FACADE OF THE UPPER CHURCH
DATE OF SURVEY 08 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 69;
- PARDI 1975, p. 222;
- PARDI 1972, p. 50.

014	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: VERY GOOD	
MASONRY THICKNESS:	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1228 - 1236	
MATERIALS: SCAGLIA ROSSA, SCAGLIA ROSSA DECOLORATA	
LAYING: REGULAR IN PARALLEL ROWS	



STONE ELEMENTS	MORTAR
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** 2 mm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 15 to 16 cm; WIDTH from 22.2 to 40 cm	DIMENSION: 1-2 mm
MANUFACTURE: SURFACE PROCESSING WITH A POINT CHISEL AND A FINE-TOOTH BUSH HAMMER (dist. 0.2-0.3 mm)	COLOR: BROWN **AGGREGATE:** SAND
LITHOTYPE: SCAGLIA ROSSA	DIMENSION: <1 mm
NATURE: CARBONATIC LIMESTONE ROCK	COLOR: GREY
COLOR: WHITE	
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 16 to 21.1 cm; WIDTH from 22.5 to 33.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH A POINT CHISEL AND A FINE-TOOTH BUSH HAMMER (dist. 0.2-0.3 mm)	

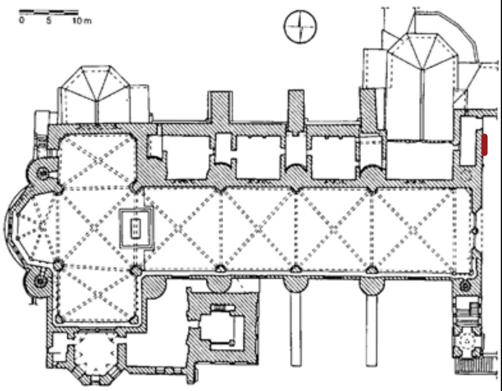
BASILICA OF S. FRANCESCO - ASSISI (PG)

FACADE OF THE UPPER CHURCH
DATE OF SURVEY 08 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 69;
- PARDI 1975, p. 222;
- PARDI 1972, p. 50.

015	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS:	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1228 - 1236	
MATERIALS: SCAGLIA ROSSA DECOLORATA, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



STONE ELEMENTS	**MORTAR**
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** 2 mm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 15 to 20.5 cm; WIDTH from 22 to 33.5 cm	DIMENSION: 1-2 mm
MANUFACTURE: SURFACE PROCESSING WITH A POINT CHISEL AND A FINE-TOOTH BUSH HAMMER (dist. 0.2-0.3 mm)	COLOR: BROWN **AGGREGATE:** SAND
LITHOTYPE: SCAGLIA BIANCA	DIMENSION: <1 mm
NATURE: CARBONATIC LIMESTONE ROCK	COLOR: GREY
COLOR: WHITE	
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 15 to 20.5 cm; WIDTH from 19 to 33.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH A POINT CHISEL AND A FINE-TOOTH BUSH HAMMER (dist. 0.2-0.3 mm)	

CHURCH OF S. MARIA MAGGIORE - ASSISI (PG)

MAIN FACADE
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 105-140.

016	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD

MASONRY THICKNESS: 120 cm

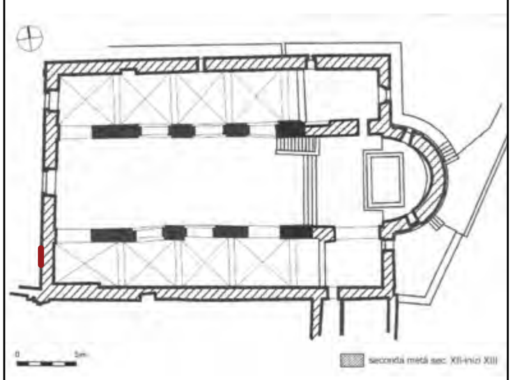
TYPE OF STRUCTURE: BEARING WALL

FACADE: EXTERIOR

DATING: ante 1162 (rose window)

MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA, SCAGLIA BIANCA

LAYING: REGULAR IN PARALLEL ROWS

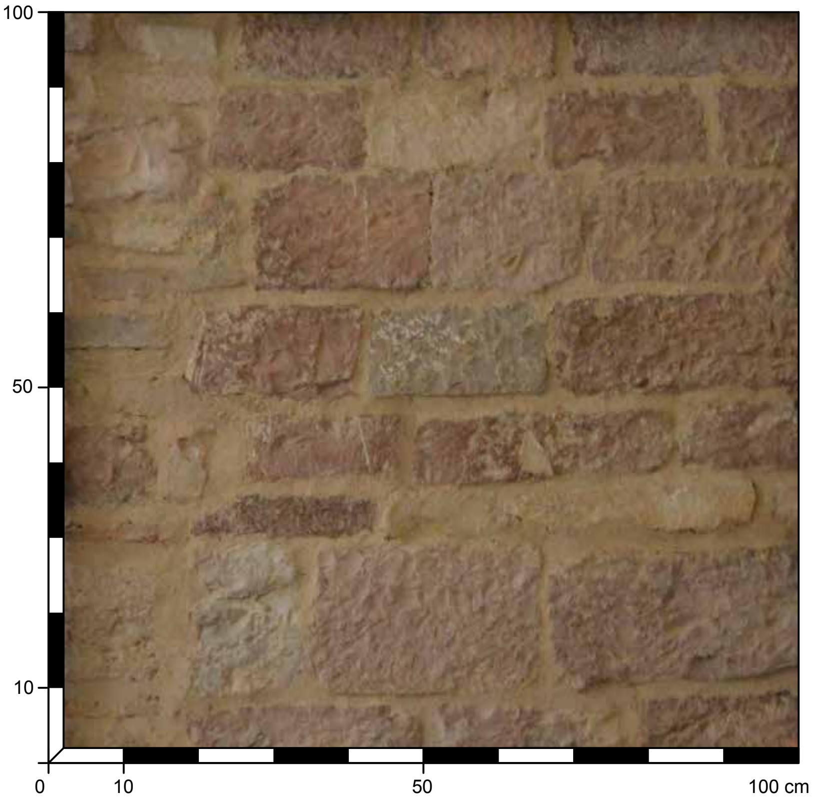


GIGLIOZZI 2013, p. 140.

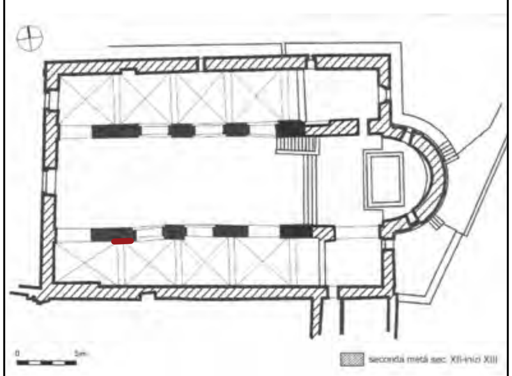
STONE ELEMENTS	**MORTAR**
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK AND WHITE	**MORTAR (BEDDING) THICKNESS:** from 2 to 5 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 9 to 18 cm; WIDTH from 16 to 48 cm	DIMENSION: <1 mm
MANUFACTURE: SURFACE PROCESSING WITH A POINT CHISEL AND A BUSH HAMMER	COLOR: WHITE
LITHOTYPE: SCAGLIA BIANCA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: WHITE	COLOR: LIGHT BROWN
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 15 to 18 cm; WIDTH from 17 to 32 cm	
MANUFACTURE: SURFACE PROCESSING WITH A POINT CHISEL AND A BUSH HAMMER	
LITHOTYPE: SCAGLIA ROSSA	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: PINK	
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 9 to 18 cm; WIDTH from 30 to 35 cm	
MANUFACTURE: SURFACE PROCESSING WITH A POINT CHISEL AND A BUSH HAMMER	

CHURCH OF S. MARIA MAGGIORE - ASSISI (PG)

RIGHT CHAPEL
DATE OF SURVEY 09 AGO 2016



017	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: VERY GOOD	
MASONRY THICKNESS: 120 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: SECOND HALF XII CENTURY - XIII CENTURY	
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA, CALCARI E MARNE A FUCOIDI	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 140.

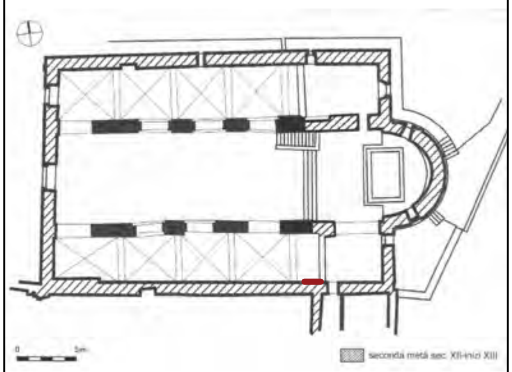
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 1 to 2 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: BLOCKS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 5.2 to 19.5 cm; WIDTH from 17.5 to 35 cm	DIMENSION: 1 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	COLOR: WHITE
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: PINK AND WHITE	COLOR: LIGHT BROWN
QUARRY: SUBASIO MOUNT	
SHAPE: BLOCKS	
DIMENSIONS: HEIGHT from 4.5 to 19.4 cm; WIDTH from 13 to 22.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	
LITHOTYPE: CALCARI E MARNE A FUCOIDI	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
QUARRY: SUBASIO MOUNT	
SHAPE: BLOCKS	
DIMENSIONS: HEIGHT from 4.5 to 19.4 cm; WIDTH from 13 to 22.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	

CHURCH OF S. MARIA MAGGIORE - ASSISI (PG)

RIGHT NAVE
DATE OF SURVEY 09 AGO 2016

018	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: VERY GOOD
MASONRY THICKNESS: 120 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: SECOND HALF XII CENTURY - XIII CENTURY
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 126.

STONE ELEMENTS	**MORTAR**
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 0.5 to 1 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from12.8 to 16 cm; WIDTH from 6 to 51 cm	DIMENSION: 1 mm
MANUFACTURE: SURFACE PROCESSING WITH A FINE-TOOTH (dist. 0.6 mm) GRADINA	COLOR: BROWN
LITHOTYPE: SCAGLIA BIANCA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: WHITE	COLOR: LIGHT BROWN
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 12.8 to 16 cm; WIDTH from 5 to 32.2 cm	
MANUFACTURE: SURFACE PROCESSING WITH A FINE-TOOTH (dist. 0.6 mm) GRADINA	

CHURCH OF S. MARIA MAGGIORE - ASSISI (PG)

CRYPT
DATE OF SURVEY 09 AGO 2016

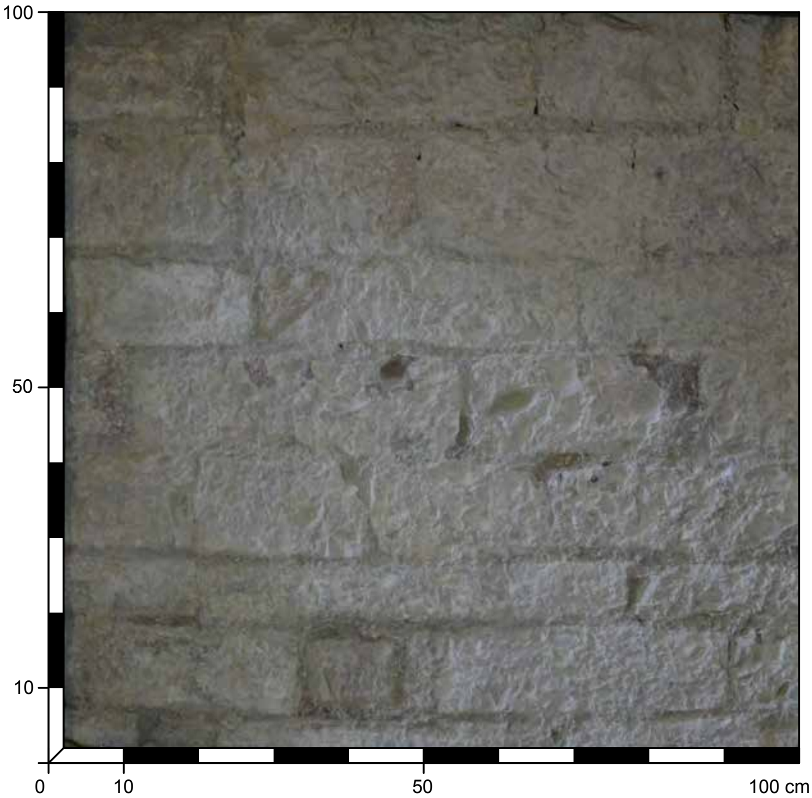
019	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS

CONSERVATION: VERY GOOD
MASONRY THICKNESS: 150 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: END OF IX CENTURY (PARDI e MARTELLI) HALF OF X CENTURY (GIGLIOZZI)
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS

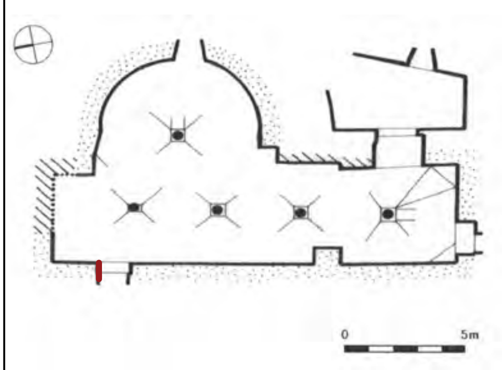
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 1 to 3 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: BLOCKS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 8 to 15.5 cm; WIDTH from 11.6 to 52 cm	DIMENSION: 1 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	COLOR: GREY
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: PINK AND WHITE	COLOR: LIGHT BROWN
QUARRY: SUBASIO MOUNT	
SHAPE: BLOCKS	
DIMENSIONS: HEIGHT from 12.5 to 16 cm; WIDTH from 32 to 40.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	

CHURCH OF S. MARIA MAGGIORE - ASSISI (PG)

CRYPT
DATE OF SURVEY 09 AGO 2016



020	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: FAIRLY GOOD	
MASONRY THICKNESS: 120 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: END OF IX CENTURY (PARDI e MARTELLI) HALF OF X CENTURY (GIGLIOZZI)	
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 126.

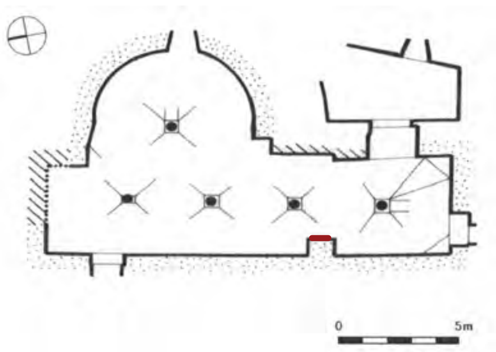
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 1 to 3 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 7 to 16 cm; WIDTH from 19 to 22.5 cm	DIMENSION: 1-5 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	COLOR: LIGHT GREY
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: PINK AND WHITE	COLOR: LIGHT BROWN
QUARRY: SUBASIO MOUNT	
SHAPE: BLOCKS	
DIMENSIONS: HEIGHT from 7 to 16 cm; WIDTH from 20 to 30 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	
LITHOTYPE: SCAGLIA BIANCA	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 7 to 16 cm; WIDTH from 12 to 38.2 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	

CHURCH OF S. MARIA MAGGIORE - ASSISI (PG)

CRYPT

DATE OF SURVEY 09 AGO 2016

021	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 150 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: SECOND HALF XII CENTURY - XIII CENTURY	
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	

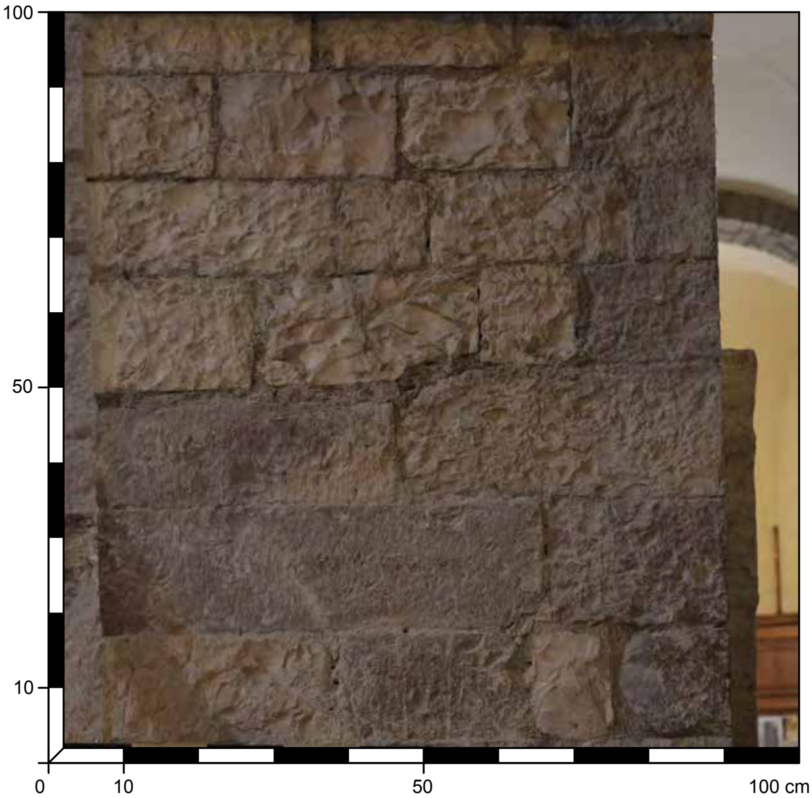


GIGLIOZZI 2013, p. 21.

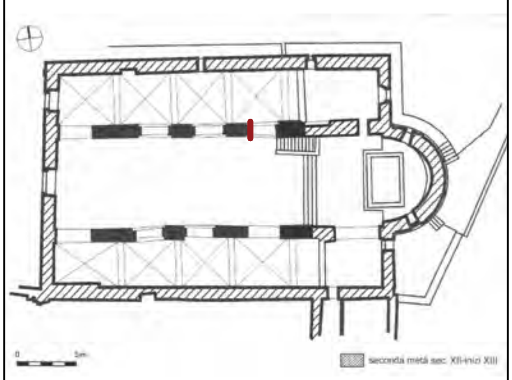
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 1 to 2 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 15.5 to 24 cm; WIDTH from 10 to 53 cm	DIMENSION: 1 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	COLOR: WHITE
LITHOTYPE: SCAGLIA BIANCA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: WHITE	COLOR: LIGHT BROWN
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 15.5 to 24 cm; WIDTH from 25 to 32 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	

CHURCH OF S. MARIA MAGGIORE - ASSISI (PG)

PILLAR
DATE OF SURVEY 09 AGO 2016



022	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: VERY GOOD	
MASONRY THICKNESS: 120 cm	
TYPE OF STRUCTURE: PILLAR	
FACADE: EXTERIOR	
DATING: SECOND HALF XII CENTURY - XIII CENTURY	
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 140.

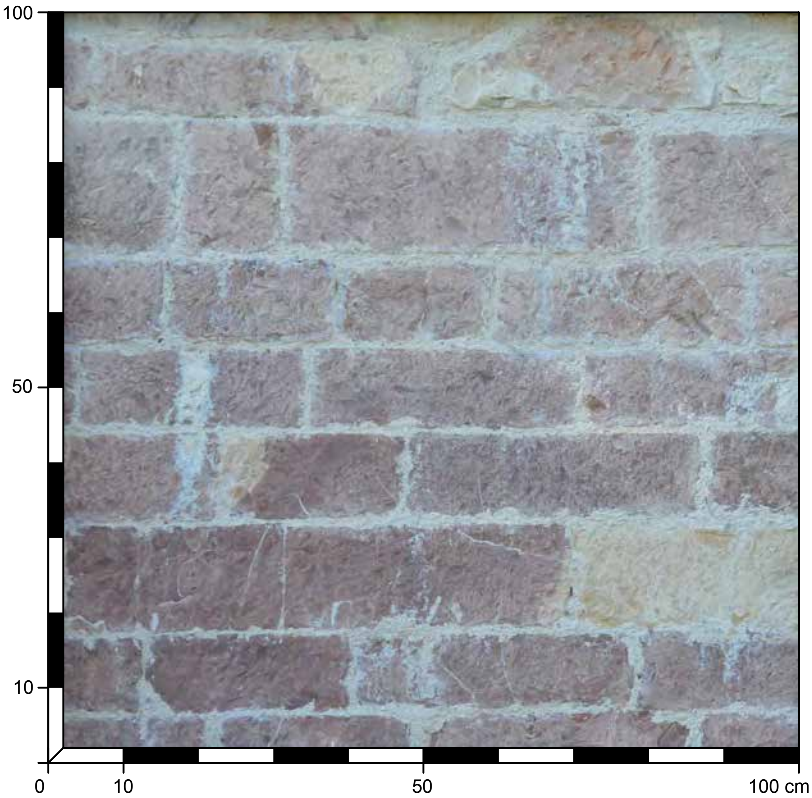
STONE ELEMENTS	MORTAR (1)
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: LIGHT PINK	**MORTAR (BEDDING) THICKNESS:** 0.5 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT 16 cm; WIDTH from 40 to 58.8 cm	DIMENSION: <1 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	COLOR: WHITE
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: LIGHT PINK AND WHITE	COLOR: LIGHT BROWN
QUARRY: SUBASIO MOUNT	**MORTAR (2)**
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT 13 cm; WIDTH 40 cm	**CONSISTENCY:** FRIABLE
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	**SIFT:** ROUGH
	MORTAR (BEDDING) THICKNESS: from 0.8 to 1.5 cm
	BINDER: CEMENT
	AGGREGATE: LIMESTONE FRAGMENTS
	DIMENSION: 1-4 mm
	COLOR: WHITE

CHURCH OF S. MASSEO - ASSISI (PG)

EXTERIOR FRONT OF THE CRYPT
DATE OF SURVEY 08 AGO 2016

FONTI BIBLIOGRAFICHE DI RIFERIMENTO

- GIGLIOZZI 2013, p. 72;
- PARDI 1972, p. 50;
- DE ANGELIS D'OSSAT 1939, p. 8;
- MARTELLI 1996, p. 333.



023	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS:
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: SECOND HALF OF XII CENTURY
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 1 to 3 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: BLOCKS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 9 to 13.2 cm; WIDTH from 12 to 40 cm	DIMENSION: 1 mm
MANUFACTURE: ROUGH SURFACE PROCESSING WITH A POINT CHISEL AND A FINE-TOOTH (0.3 mm) BUSH HAMMER	COLOR: GREY **AGGREGATE:** SAND
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	DIMENSION: <1 mm
NATURE: CARBONATIC LIMESTONE ROCK	COLOR: LIGHT BROWN
COLOR: PINK AND WHITE	
QUARRY: SUBASIO MOUNT	
SHAPE: BLOCKS	
DIMENSIONS: HEIGHT from 9 to 13.2 cm; WIDTH from 5 to 37.1 cm	
MANUFACTURE: ROUGH SURFACE PROCESSING WITH A POINT CHISEL AND A FINE-TOOTH (0.3 mm) BUSH HAMMER	

CHURCH OF S. MASSEO - ASSISI (PG)

MAIN FACADE
DATA DEL RILIEVO 09/08/2016

FONTI BIBLIOGRAFICHE DI RIFERIMENTO

- GIGLIOZZI 2013, p. 72;
- PARDI 1972, p. 50;
- DE ANGELIS D'OSSAT 1939, p. 8;
- MARTELLI 1996, p. 333.

024	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: VERY GOOD
MASONRY THICKNESS:
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: SECOND HALF OF XII CENTURY
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA, CALCARI E MARNE A FUCOIDI, CORNIOLA
LAYING: REGULAR IN PARALLEL ROWS

STONE ELEMENTS
LITHOTYPE: SCAGLIA ROSSA
NATURE: CARBONATIC LIMESTONE ROCK
COLOR: PINK
QUARRY: SUBASIO MOUNT
SHAPE: BLOCKS AND LITTLE BLOCKS
DIMENSIONS: HEIGHT BLOCKS from 15 to 18.5 cm; HEIGHT LITTLE BLOCKS from 5.8 to 9.3 cm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA
NATURE: CARBONATIC LIMESTONE ROCK
COLOR: PINK AND WHITE
QUARRY: SUBASIO MOUNT
SHAPE: BLOCKS AND LITTLE BLOCKS
DIMENSIONS: HEIGHT BLOCKS from 15 to 18.5 cm; HEIGHT LITTLE BLOCKS from 5.8 to 9.3 cm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER
LITHOTYPE: CALCARI E MARNE A FUCOIDI
NATURE: CARBONATIC LIMESTONE ROCK
COLOR: GREY
QUARRY: SUBASIO MOUNT
SHAPE: LITTLE BLOCKS
DIMENSIONS: HEIGHT from 7 to 9.36 cm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER

MORTAR
CONSISTENCY: SOLID
SIFT: ROUGH
MORTAR (BEDDING) THICKNESS: from 0.6 to 1.5 cm
BINDER: LIME
AGGREGATE: LIMESTONE FRAGMENTS
DIMENSION: 1 mm
COLOR: WHITE, PINK, RED
AGGREGATE: SAND
DIMENSION: <1 mm
COLOR: LIGHT BROWN

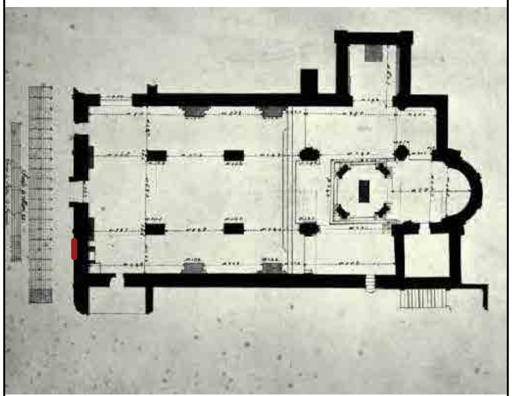
CHURCH OF S. PIETRO - ASSISI (PG)

MAIN FACADE
DATE OF SURVEY 09/08/2016

BIBLIOGRAPHICAL REFERENCES

- TOGNI 2014, p. 3;
- GIGLIOZZI 2013, p. 123;
- PARDI 1975.

025	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 100 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1200-1268	
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA	
LAYING: REGULAR IN PARALLEL ROWS	



Archivio Beni Culturali Regione Lombardia (http://www.lombardiabeniculturali.it/).

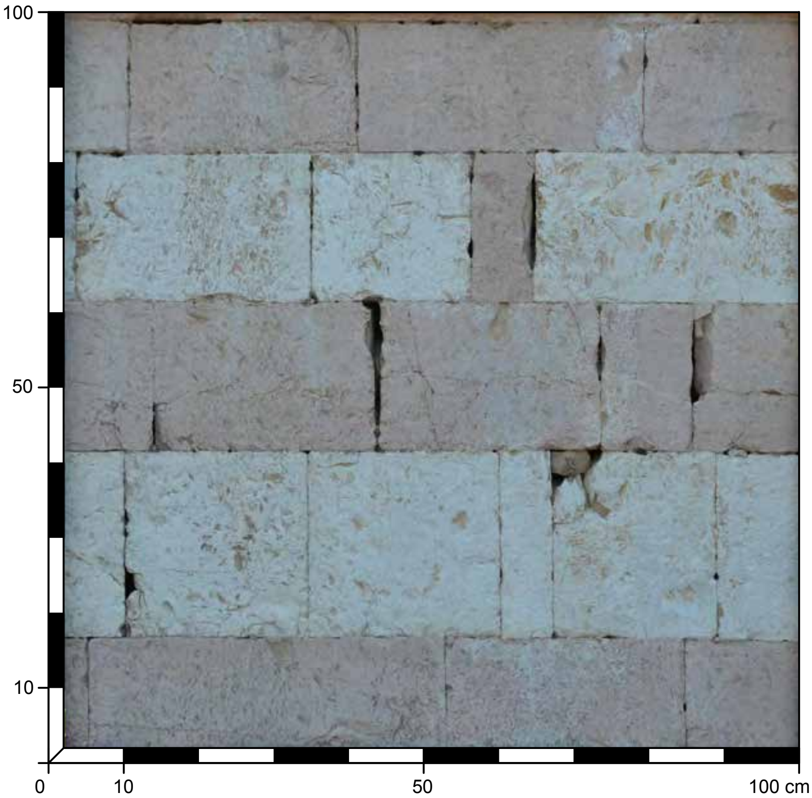
STONE ELEMENTS	MORTAR (1)
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 0.1 to 0.3 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 13 to 18.5 cm; WIDTH from 13.5 to 27 cm	DIMENSION: <1 mm
MANUFACTURE: SMOOTH SURFACE PROCESSING WITH POINT CHISEL AND PITCHING TOOLS	COLOR: RED **AGGREGATE:** SAND
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	DIMENSION: <1 mm
NATURE: CARBONATIC LIMESTONE ROCK	COLOR: LIGHT BROWN
COLOR: PINK AND WHITE	**MORTAR (2)**
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	**CONSISTENCY:** QUITE SOLID
DIMENSIONS: HEIGHT from 13 to 18.5 cm; WIDTH from 13.5 to 27 cm	**SIFT:** FINE
MANUFACTURE: SMOOTH SURFACE PROCESSING WITH POINT CHISEL AND PITCHING TOOLS	**MORTAR (BEDDING) THICKNESS:** from 0.8 to 1.5 cm **BINDER:** LIME
	AGGREGATE: LIMESTONE FRAGMENTS
	DIMENSION: 1 mm
	COLOR: RED

CHURCH OF S. PIETRO - ASSISI (PG)

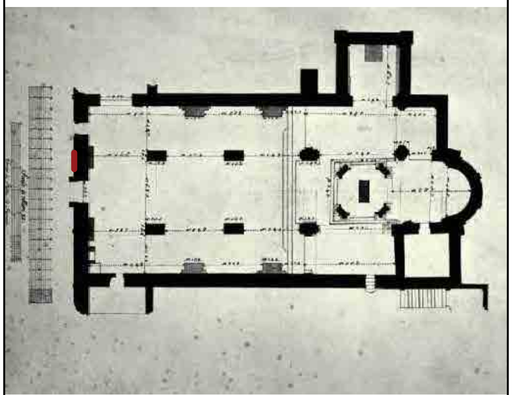
MAIN FACADE
DATE OF SURVEY 09/08/2016

BIBLIOGRAPHICAL REFERENCES

- TOGNI 2014, p. 3;
- GIGLIOZZI 2013, p. 123;
- PARDI 1975.



026	RUBBLE MASONRY WITH WALL FACING IN BICHROMATIC LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 100 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1200-1268	
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL BICHROMATIC ROWS	



Archivio Beni Culturali Regione Lombardia (http://www.lombardiabeniculturali.it/).

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 0.1 to 0.2 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 17.2 to 20 cm	DIMENSION: <1 mm
MANUFACTURE: SMOOTH SURFACE PROCESSING WITH POINT CHISEL AND PITCHING TOOLS	COLOR: RED **AGGREGATE:** SAND
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	DIMENSION: <1 mm
NATURE: CARBONATIC LIMESTONE ROCK	COLOR: LIGHT BROWN
COLOR: PINK AND WHITE	
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 12 to 24.2 cm; WIDTH from 20 to 25 cm	
MANUFACTURE: SMOOTH SURFACE PROCESSING WITH POINT CHISEL AND PITCHING TOOLS	

CHURCH OF S. PIETRO - ASSISI (PG)

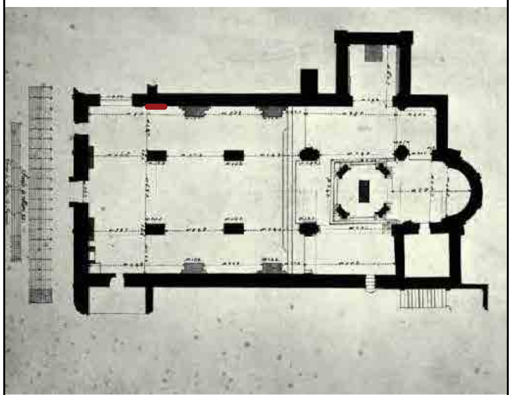
LEFT NAVE
DATE OF SURVEY 09/08/2016

BIBLIOGRAPHICAL REFERENCES

- TOGNI 2014, p. 3;
- GIGLIOZZI 2013, p. 123;
- PARDI 1975.

027	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: VERY GOOD
MASONRY THICKNESS: 75 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: 1200-1268
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS



Archivio Beni Culturali Regione Lombardia (http://www.lombardiabeniculturali.it/).

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 0.1 to 0.3 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 17.2 to 20 cm	DIMENSION: <1 mm
MANUFACTURE: SMOOTH SURFACE PROCESSING WITH POINT CHISEL AND A LARGE-TOOTH BUSH HAMMER (dist. 6mm)	COLOR: RED **AGGREGATE:** SAND
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	DIMENSION: <1 mm
NATURE: CARBONATIC LIMESTONE ROCK	COLOR: LIGHT BROWN
COLOR: PINK AND WHITE	
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from16.52 to 9.8 cm; WIDTH from 18.1 to 42 cm	
MANUFACTURE: SMOOTH SURFACE PROCESSING WITH POINT CHISEL AND A LARGE-TOOTH BUSH HAMMER (dist. 6mm)	

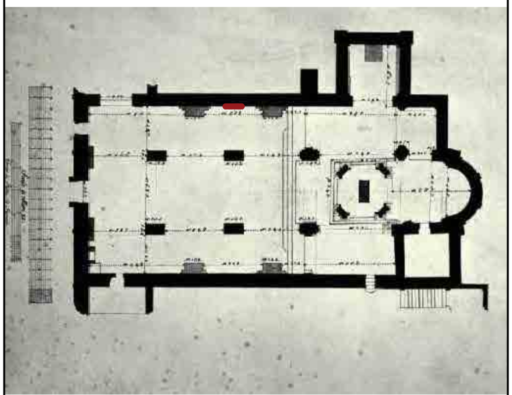
CHURCH OF S. PIETRO - ASSISI (PG)

LEFT NAVE
DATE OF SURVEY 09/08/2016

BIBLIOGRAPHICAL REFERENCES

- TOGNI 2014, p. 3;
- GIGLIOZZI 2013, p. 123;
- PARDI 1975.

028	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 75 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: 1200-1268	
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA	
LAYING: REGULAR IN PARALLEL ROWS	



Archivio Beni Culturali Regione Lombardia (http://www.lombardiabeniculturali.it/).

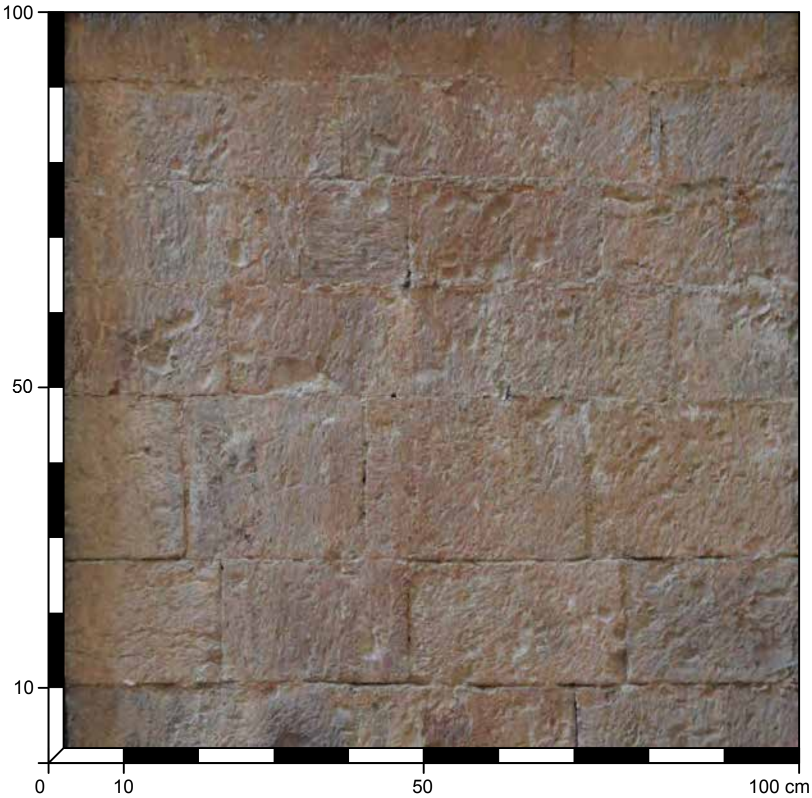
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 0.1 to 0.3 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 13.5 to 21 cm; WIDTH from 10 to 38.2 cm	DIMENSION: <1 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	COLOR: RED
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT BROWN

CHURCH OF S. PIETRO - ASSISI (PG)

CENTRAL NAVE PILLAR
DATE OF SURVEY 09/08/2016

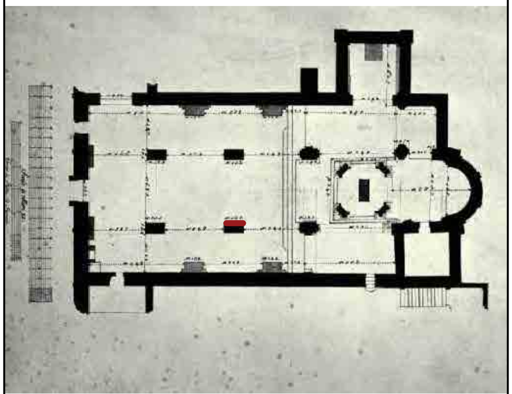
BIBLIOGRAPHICAL REFERENCES

- TOGNI 2014, p. 3;
- GIGLIOZZI 2013, p. 123;
- PARDI 1975.



029	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 70 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: 1200-1268
MATERIALS: SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS



Archivio Beni Culturali Regione Lombardia (http://www.lombardiabeniculturali.it/).

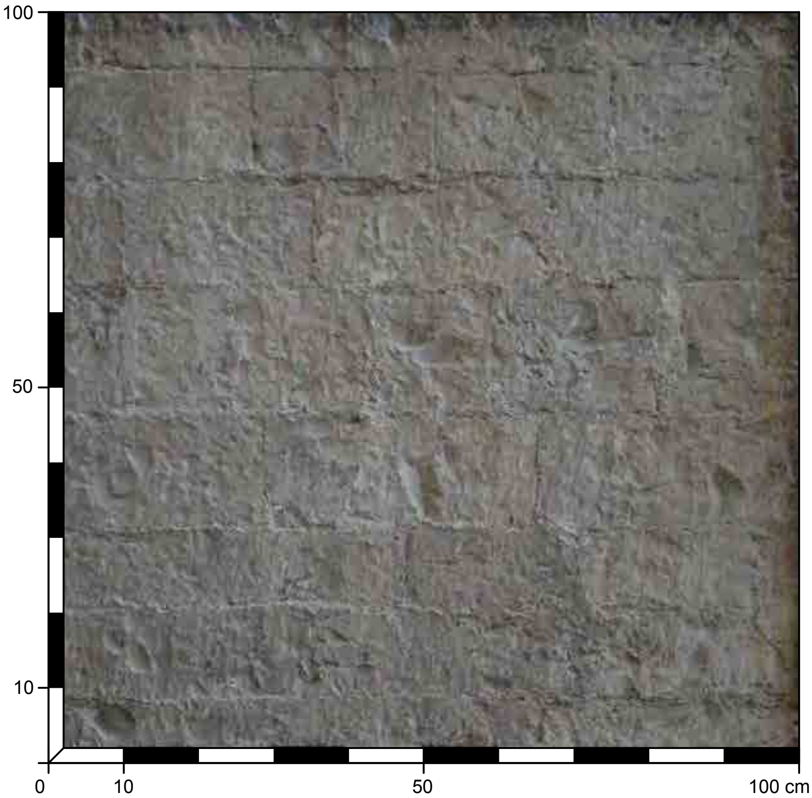
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 0.1 to 0.4 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 1325 to 21 cm; WIDTH from 21 to 35.8 cm	DIMENSION: <1 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	COLOR: RED
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT BROWN

CHURCH OF S. PIETRO - ASSISI (PG)

RIGHT NAVE
DATE OF SURVEY 09/08/2016

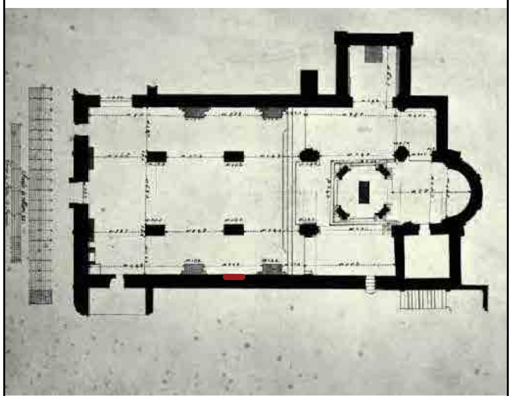
BIBLIOGRAPHICAL REFERENCES

- TOGNI 2014, p. 3;
- GIGLIOZZI 2013, p. 123;
- PARDI 1975.



030	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 75 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: 1200-1268
MATERIALS: SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS



Archivio Beni Culturali Regione Lombardia (http://www.lombardiabeniculturali.it/).

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 0.3 to 1.4 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from10.3 to 16.8 cm	DIMENSION: 1-4 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	COLOR: RED
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT BROWN

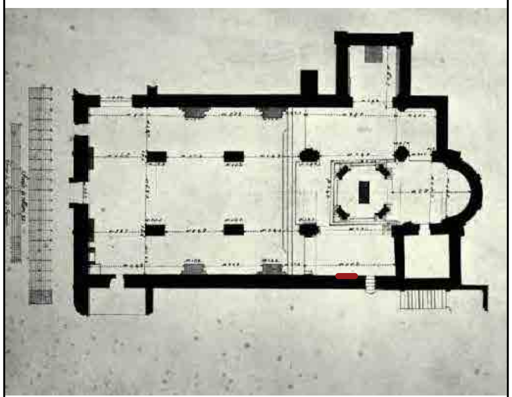
CHURCH OF S. PIETRO - ASSISI (PG)

RIGHT NAVE
DATE OF SURVEY 09/08/2016

BIBLIOGRAPHICAL REFERENCES

- TOGNI 2014, p. 3;
- GIGLIOZZI 2013, p. 123;
- PARDI 1975.

031	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 75 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: 1200-1268	
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA, DISCOLOURED SCAGLIA ROSSA	
LAYING: REGULAR IN PARALLEL ROWS	



Archivio Beni Culturali Regione Lombardia (http://www.lombardiabeniculturali.it/).

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 0.2 to 0.6 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 15 to 17.8 cm; WIDTH from 20 to 25.8 cm	DIMENSION: 1-3 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	COLOR: WHITE AND GREY
LITHOTYPE: SCAGLIA BIANCA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: WHITE	COLOR: LIGHT GREY
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 15 to 17.8 cm; WIDTH from 18 to 27 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: PINK AND WHITE	
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 15 to 17.8 cm; WIDTH from 20 to 42 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	

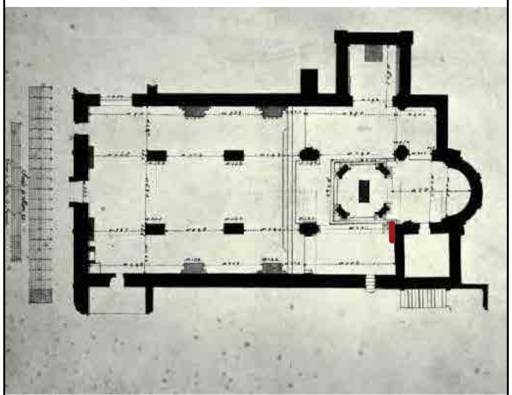
CHURCH OF S. PIETRO - ASSISI (PG)

TRANSEPT
DATE OF SURVEY 09/08/2016

BIBLIOGRAPHICAL REFERENCES

- TOGNI 2014, p. 3;
- GIGLIOZZI 2013, p. 123;
- PARDI 1975.

032	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: FAIRY GOOD	
MASONRY THICKNESS:	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1200-1268	
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL BICHROMATIC ROWS	



Archivio Beni Culturali Regione Lombardia (http://www.lombardiabeniculturali.it/).

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 0.4 to 0.7 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 15 to 17.8 cm; WIDTH from 20 to 28.5 cm	DIMENSION: 1-3 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	COLOR: WHITE
LITHOTYPE: SCAGLIA BIANCA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: WHITE	COLOR: LIGHT GREY
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 15 to 17.8 cm; WIDTH from 20 to 28.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	

CATHEDRAL OF S. RUFINO - ASSISI (PG)

MAIN FACADE
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 28-30 and pp. 123-124;
- MARTELLI 1966, p. 327.

033	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD

MASONRY THICKNESS: 100 cm

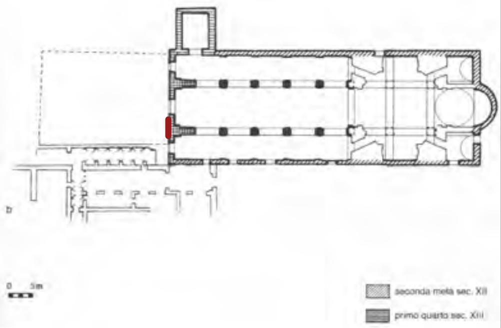
TYPE OF STRUCTURE: BEARING WALL

FACADE: EXTERIOR

DATING: 1175 - 1215

MATERIALS: DISCOLOURED SCAGLIA ROSSA, TRAVERTINE

LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 139.

STONE ELEMENTS	MORTAR
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** VERY FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.1 to 0.2 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** SAND
DIMENSIONS: HEIGHT from 31 to 22.3 cm; WIDTH from 31 to 44 cm	DIMENSION: <1 mm
MANUFACTURE: SMOOTH SURFACE PROCESSING WITH PITCHING TOOLS	COLOR: LIGHT BROWN
LITHOTYPE: TRAVERTINE	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 31 to 22.3 cm	
MANUFACTURE: SMOOTH SURFACE PROCESSING WITH PITCHING TOOLS	

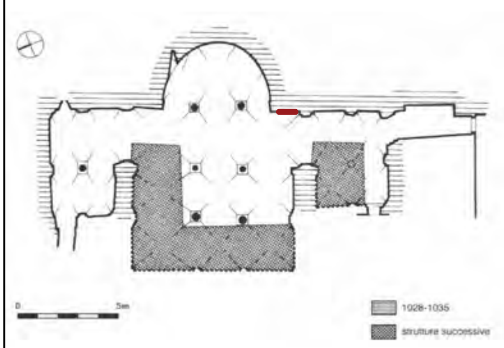
CATHEDRAL OF S. RUFINO - ASSISI (PG)

CRYPT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 28-30 and pp. 123-124;
- MARTELLI 1966, p. 327.

034	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS:	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: XI CENTURY	
MATERIALS: DISCOLOURED SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 46.

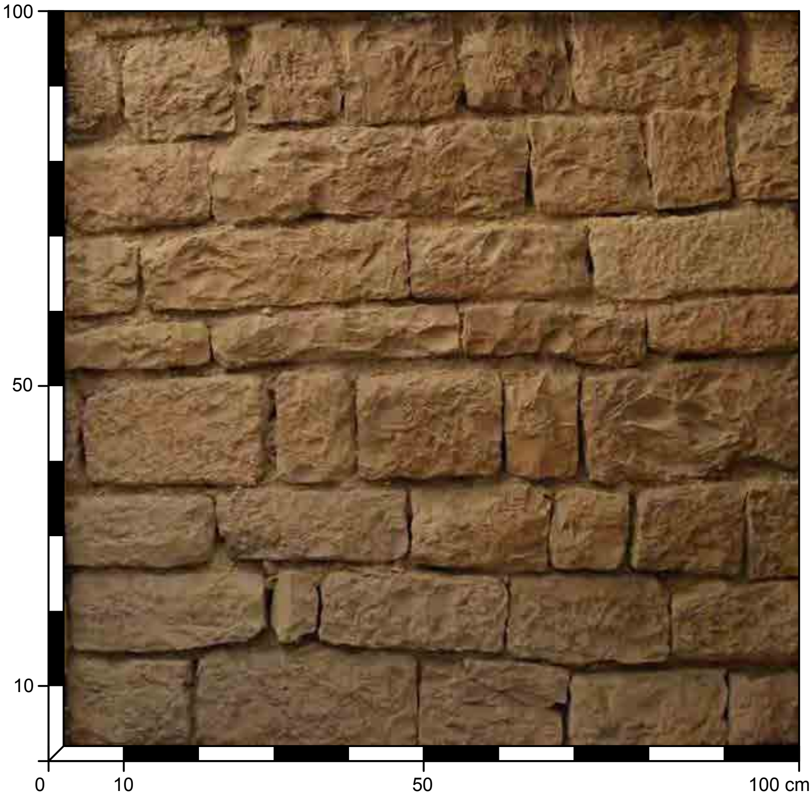
STONE ELEMENTS	**MORTAR (1)**
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE AND PINK	**MORTAR (BEDDING) THICKNESS:** from 0.4 to 2.2 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from14.5 to 18 cm; WIDTH from 25 to 34.5 cm	DIMENSION: 1-10 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	COLOR: GREY
LITHOTYPE: SCAGLIA BIANCA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: WHITE	COLOR: LIGHT BROWN
QUARRY: SUBASIO MOUNT	**MORTAR (1)**
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 14.5 to 18 cm; WIDTH from 23.3 to 52 cm	**CONSISTENCY:** SOLID
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	**SIFT:** ROUGH
	MORTAR (BEDDING) THICKNESS: from 0.4 to 2.2 cm
	BINDER: CEMENT
	AGGREGATE: LIMESTONE FRAGMENTS
	DIMENSION: 1-5 mm
	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT GREY

CATHEDRAL OF S. RUFINO - ASSISI (PG)

ANCIENT CHURCH
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 28-30 and pp. 123-124;
- MARTELLI 1966, p. 327.



035	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: GOOD	
MASONRY THICKNESS: 100 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: XI CENTURY	
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	

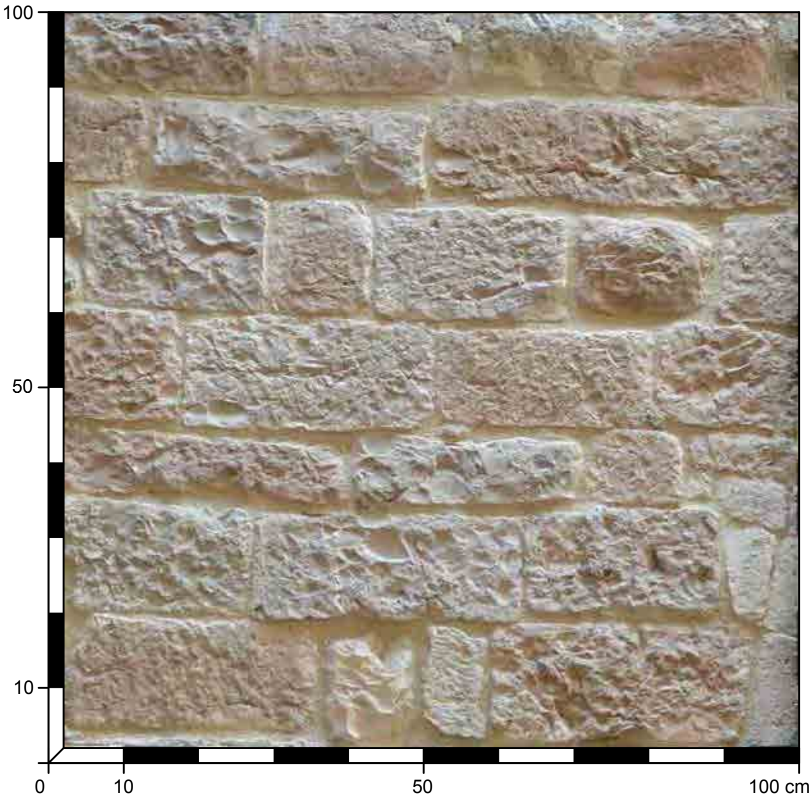
STONE ELEMENTS	**MORTAR (1)**
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** VERY FINE
COLOR: DARK PINK	**MORTAR (BEDDING) THICKNESS:** from 0.1 to 0.2 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: BLOCKS	**AGGREGATE:** SAND
DIMENSIONS: HEIGHT from 6.5 to 18 cm; WIDTH from 9.5 to 34.6 cm	DIMENSION: <1 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	COLOR: LIGHT BROWN
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE AND PINK	
QUARRY: SUBASIO MOUNT	
SHAPE: BLOCKS	
DIMENSIONS: HEIGHT from 10.5 to 18 cm; WIDTH from 18.2 to 27 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	

CATHEDRAL OF S. RUFINO - ASSISI (PG)

CLOISTER OF THE ANCIENT CHURCH
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 28-30 and pp. 123-124;
- MARTELLI 1966, p. 327.



036	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS AND BLOCKS
CONSERVATION: GOOD	
MASONRY THICKNESS:	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: XI CENTURY	
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: REGULAR IN SEMI-PARALLEL ROWS	

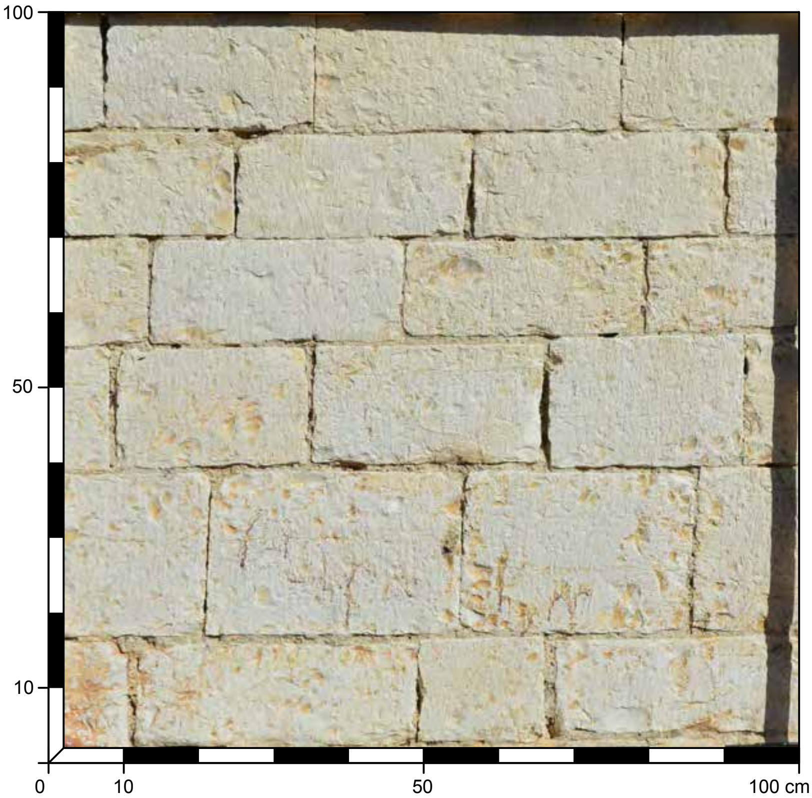
STONE ELEMENTS	**MORTAR (1)**
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: DARK PINK	**MORTAR (BEDDING) THICKNESS:** from 0.3 to 2.5 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: BLOCKS AND ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 8 to 16.3 cm; WIDTH from 7.3 to 44 cm	DIMENSION: 1-2 mm
MANUFACTURE: SMOOTH SURFACE PROCESSING WITH PITCHING TOOLS	COLOR: GREY
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: WHITE AND PINK	COLOR: LIGHT GREY
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 8 to 16.3 cm; WIDTH from 5 to 38.2 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	

CHURCH OF S. STEFANO - ASSISI (PG)

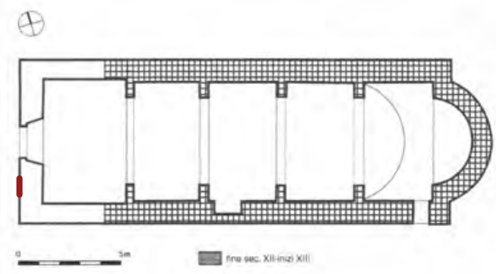
MAIN FACADE
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 72 and pp. 98-100;
- PARDI 1972, p. 108.



037	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 60 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: post 1270	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 103.

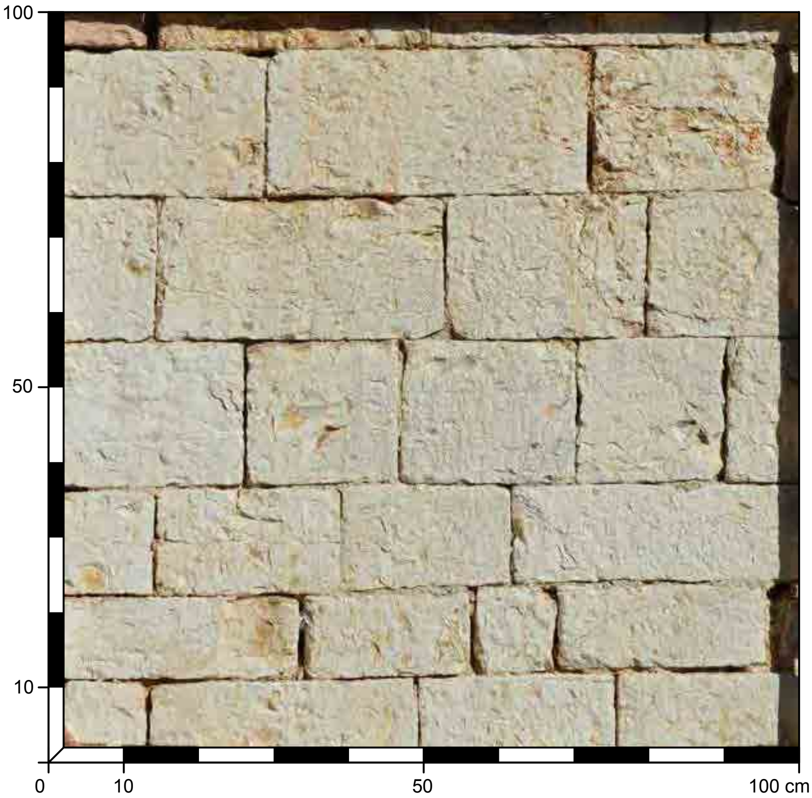
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.7 to 1.5 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from12.51 to 21.6 cm	DIMENSION: 1-10 mm
MANUFACTURE: SMOOTH SURFACE PROCESSING WITH FINE-TOOTH BUSH HAMMER (dist. 2mm)	COLOR: RED,WHITE, GREY
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT BROWN

CHURCH OF S. STEFANO - ASSISI (PG)

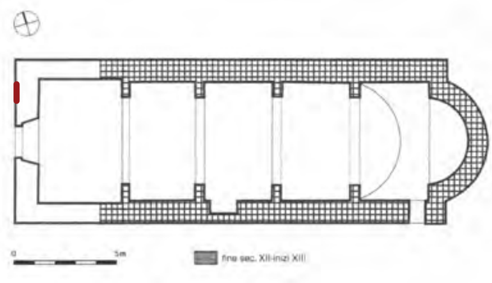
MAIN FACADE
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 72 and pp. 98-100;
- PARDI 1972, p. 108.



038	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 60 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: post 1270	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 103.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.5 to 1 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 11.3 to 18.4 cm	DIMENSION: 1-8 mm
MANUFACTURE: SMOOTH SURFACE PROCESSING WITH FINE-TOOTH BUSH HAMMER (dist. 2 mm)	COLOR: RED,WHITE, GREY
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT BROWN

CHURCH OF S. STEFANO - ASSISI (PG)

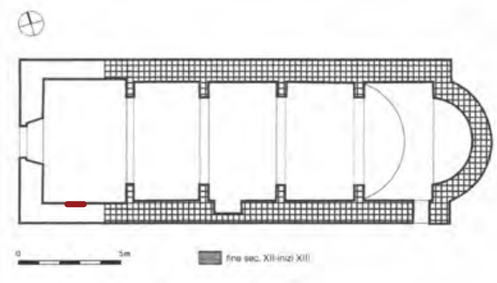
RIGHT FRONT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 72 and pp. 98-100;
- PARDI 1972, p. 108.

039	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 60 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: POST 1270
MATERIALS: DISCOLOURED SCAGLIA ROSSA, SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 103.

STONE ELEMENTS	MORTAR
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE AND PINK	**MORTAR (BEDDING) THICKNESS:** from 0.4 to 1.4 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 12.5 to 21.5 cm	DIMENSION: 1-8 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	COLOR: RED,WHITE, GREY
LITHOTYPE: SCAGLIA BIANCA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: WHITE	COLOR: LIGHT BROWN
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 12.5 to 21.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	

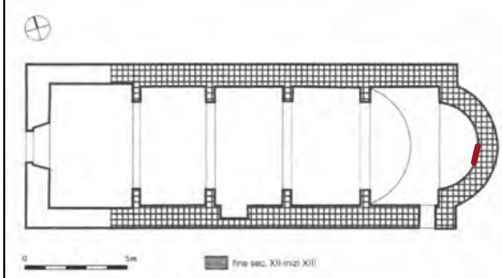
CHURCH OF S. STEFANO - ASSISI (PG)

ABSE
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 72 and pp. 98-100;
- PARDI 1972, p. 108.

040	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 80 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: 1166 - 1270	
MATERIALS: DISCOLOURED SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 103.

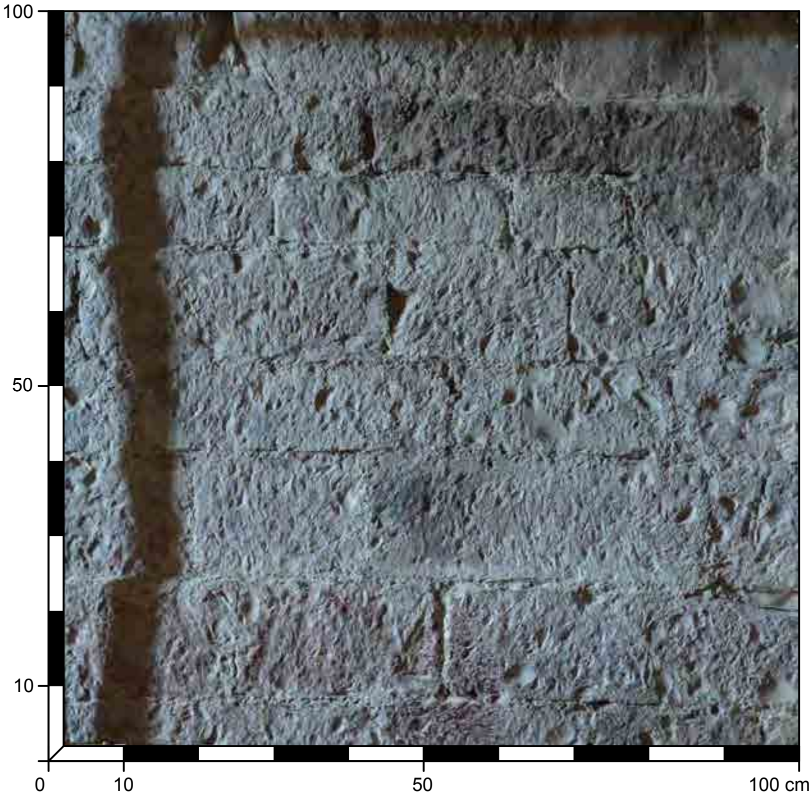
STONE ELEMENTS	MORTAR
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE AND PINK	**MORTAR (BEDDING) THICKNESS:** from 0.5 to 1 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 8 to 13.5 cm	DIMENSION: 1-8 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	COLOR: RED,WHITE, GREY
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT BROWN

CHURCH OF S. STEFANO - ASSISI (PG)

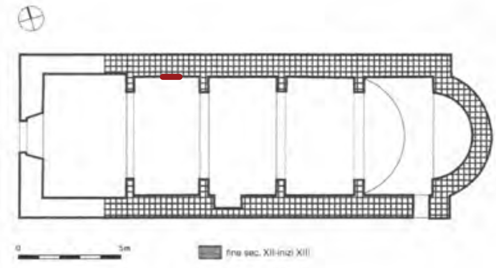
LEFT FRONT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 72 and pp. 98-100;
- PARDI 1972, p. 108.



041	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 80 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: 1166 - 1270	
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 103.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 0.5 to 1 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 8 to 13.5 cm	DIMENSION: 1-10 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	COLOR: RED,WHITE, GREY
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: WHITE AND PINK	COLOR: BROWN
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 8 to 13.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	

CHURCH OF S. STEFANO - ASSISI (PG)

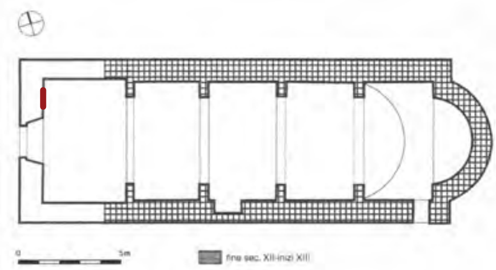
COUNTER-FACADE
DATA DEL RILIEVO 09/08/2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 72 and pp. 98-100;
- PARDI 1972, p. 108.

042	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 60 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: POST 1270
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 103

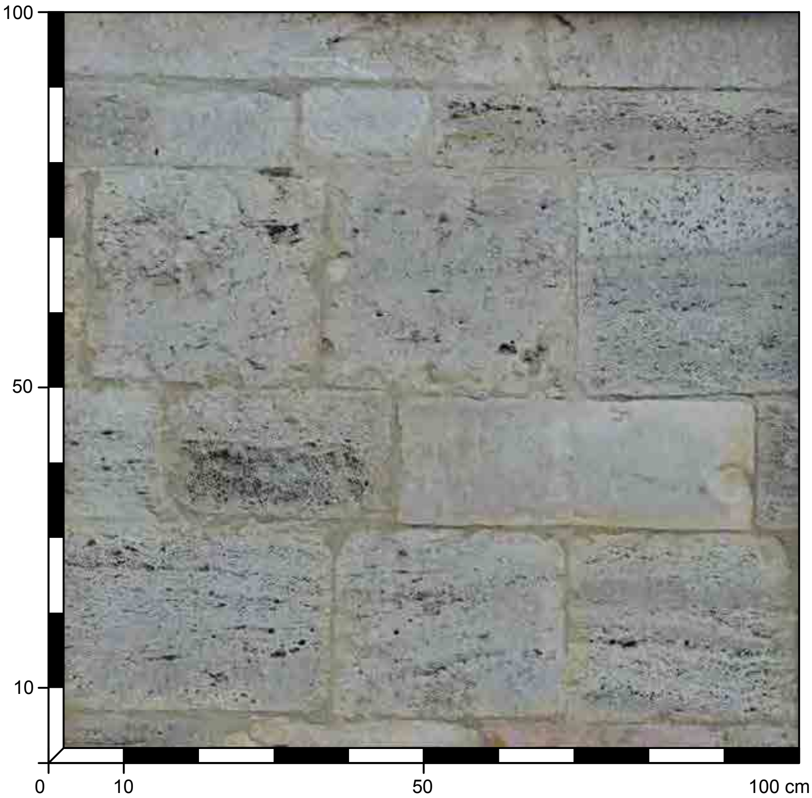
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 0.5 to 1 cm
QUARRY: SUBASIO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 12.2 to 21 cm	DIMENSION: 1-10 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	COLOR: RED,WHITE, GREY
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: WHITE AND PINK	COLOR: LIGHT BROWN
QUARRY: SUBASIO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 12.4 to 20 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	

CHURCH OF S. FRANCESCO - BEVAGNA (PG)

MAIN FACADE
DATE OF SURVEY 20 NOV 2015

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, p.160.



043	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS AND/OR SLABS

CONSERVATION: GOOD
MASONRY THICKNESS: 105 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: post 1275
MATERIALS: TRAVERTINE, SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS

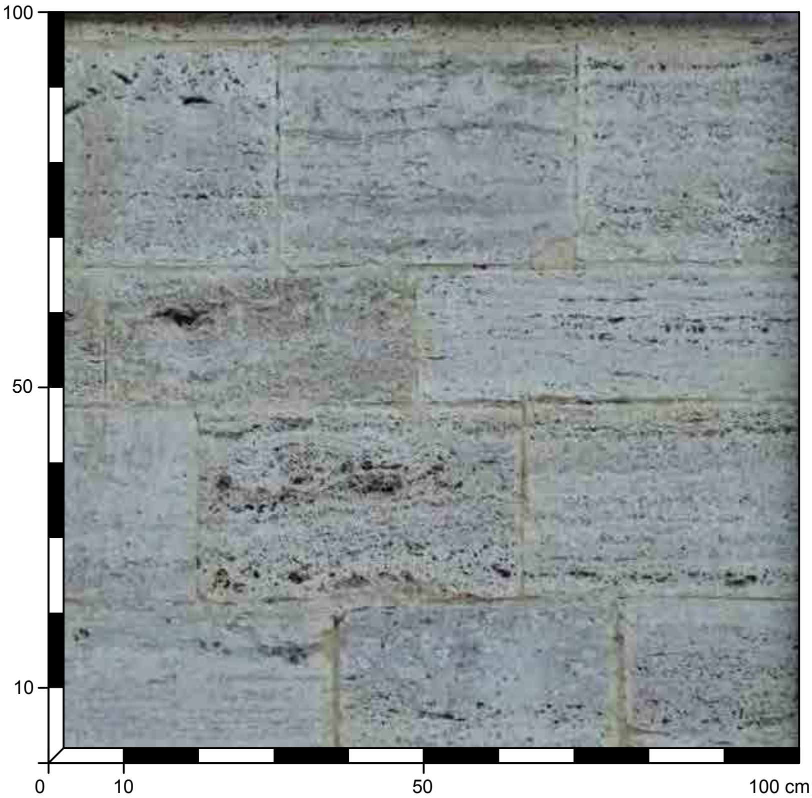
STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** da 0.5 a 1 cm
QUARRY: SUBASIO MOUNT (ASSISI)	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 10.5 to 29 cm; WIDTH from 30-31 cm	DIMENSION: 1-2 mm
MANUFACTURE: SURFACE PROCESSING WITH TOOTH CHISEL	COLOR: WHITE
LITHOTYPE: SCAGLIA BIANCA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: WHITE	COLOR: GREY
QUARRY: SUBASIO MOUNT	**MORTAR**
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 15 to 17 cm; WIDTH from 40 to 48 cm	**CONSISTENCY:** SOLID
MANUFACTURE: SURFACE PROCESSING WITH TOOTH CHISEL	**SIFT:** MEDIUM-FINE
	MORTAR (BEDDING) THICKNESS: 0.5 mm
	BINDER: CEMENT
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

CHURCH OF S. FRANCESCO - BEVAGNA (PG)

MAIN FACADE
DATE OF SURVEY 20 NOV 2015

BIBLIOGRAPHICAL REFERENCES

• QUINTERIO, CANALI 2010, p.160.



044	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS AND/OR SLABS
CONSERVATION: GOOD	
MASONRY THICKNESS: 105 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: post 1275	
MATERIALS: TRAVERTINE	
LAYING: REGULAR IN PARALLEL ROWS	

STONE ELEMENTS	MORTAR (2)
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE-GREY	**MORTAR (BEDDING) THICKNESS:** da 0.5 a 2 cm
QUARRY: SUBASIO MOUNT (ASSISI)	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 16.5 to 27.5 cm; WIDTH from 34 to 40 cm	DIMENSION: 1 mm
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	COLOR: WHITE
MORTAR (1)	**AGGREGATE:** SAND
	DIMENSION: <1 mm
CONSISTENCY: FRIABLE	COLOR: GREY
SIFT: FINE	**MORTAR (3)**
MORTAR (BEDDING) THICKNESS: da 0.5 a 1 cm	
BINDER: LIME	**CONSISTENCY:** SOLID
AGGREGATE: LIMESTONE FRAGMENTS	**SIFT:** MEDIUM-FINE
DIMENSION: 1-2 mm	**MORTAR (BEDDING) THICKNESS:** 0.5 mm
COLOR: WHITE	**BINDER:** CEMENT
AGGREGATE: SAND	**AGGREGATE:** SAND
DIMENSION: <1 mm	DIMENSION: <1 mm
COLOR: GREY	COLOR: GREY

CHURCH OF S. FRANCESCO - BEVAGNA (PG)

RIGHT FRONT
DATE OF SURVEY 20 NOV 2015

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, p.160.

045	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS

CONSERVATION: FAIRLY GOOD
MASONRY THICKNESS: 105 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: post 1275
MATERIALS: TRAVERTINE
LAYING: REGULAR IN PARALLEL ROWS

STONE ELEMENTS	MORTAR (2)
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE-GREY	**MORTAR (BEDDING) THICKNESS:** da 0.6 a 1.2 cm
QUARRY: SUBASIO MOUNT (ASSISI)	**BINDER:** LIME
SHAPE: BLOCKS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 29.5 to 17 cm; WIDTH from 37 to 50.8 cm	DIMENSION: 1 mm
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	COLOR: LIGHT BROWN
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

CHURCH OF SS. DOMENICO E GIACOMO - BEVAGNA (PG)

MAIN FACADE
DATE OF SURVEY 20 NOV 2015

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, p.160.
- PARDI 2000, p. 97.

046	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS AND SLABS
CONSERVATION: GOOD	
MASONRY THICKNESS: 100 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: post 1291	
MATERIALS: TRAVERTINE, SCAGLIA BIANCA	
LAYING: PSEUDO-REGULAR IN PARALLEL ROWS	

STONE ELEMENTS	MORTAR (1)
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.1 cm
QUARRY: CANTALUPO AREA	**BINDER:** LIME
SHAPE: SLABS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 10 to 28 cm; WIDTH from 8 to 52 cm	DIMENSION: 1-2 mm
MANUFACTURE: SURFACE PROCESSING WITH TOOTH CHISEL AND PITCHING TOOLS	COLOR: WHITE
	AGGREGATE: SAND
LITHOTYPE: SCAGLIA BIANCA	DIMENSION: <1 mm
NATURE: CARBONATIC LIMESTONE ROCK	COLOR: GREY
COLOR: WHITE	**MORTAR (2)**
QUARRY: CANTALUPO AREA	
SHAPE: SLABS	**CONSISTENCY:** SOLID
DIMENSIONS: HEIGHT from 20 to 25.2 cm; WIDTH from 35.1 to 42.5 cm	**SIFT:** FINE
MANUFACTURE: SURFACE PROCESSING WITH TOOTH CHISEL AND PITCHING TOOLS	**MORTAR (BEDDING) THICKNESS:** 0.5 mm
	BINDER: CEMENT
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

CHURCH OF SS. DOMENICO E GIACOMO - BEVAGNA (PG)

MAIN FACADE
DATE OF SURVEY 20 NOV 2015

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, p.160.
- PARDI 2000, p. 97.

047	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS AND SLABS

CONSERVATION: GOOD
MASONRY THICKNESS: 100 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: post 1291
MATERIALS: TRAVERTINE, SCAGLIA BIANCA
LAYING: PSEUDO-REGULAR IN PARALLEL ROWS

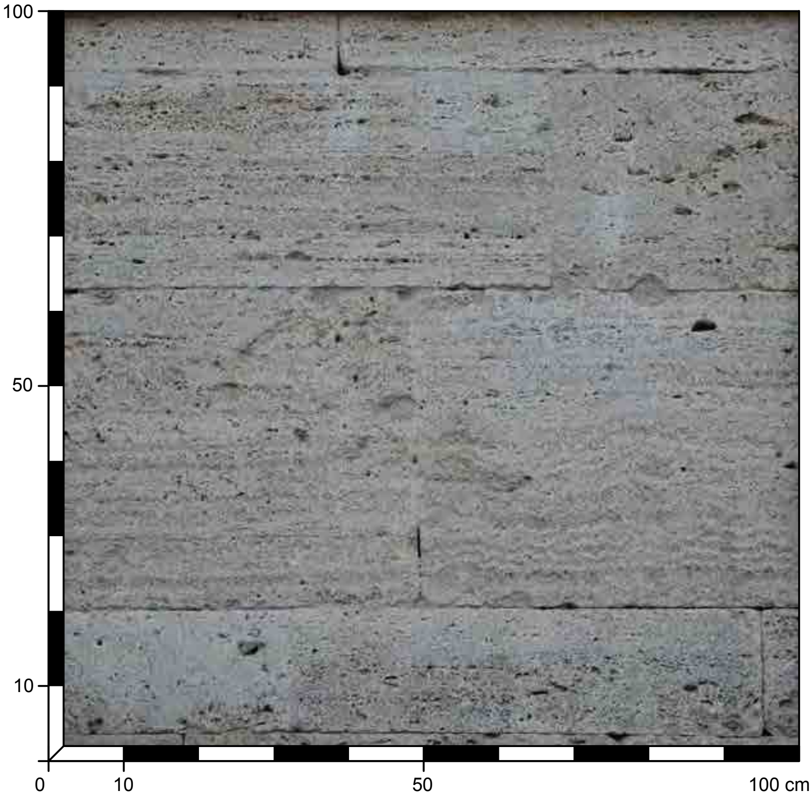
STONE ELEMENTS	MORTAR (1)
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.1 cm
QUARRY: CANTALUPO AREA	**BINDER:** LIME
SHAPE: SLABS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 10 to 28 cm; WIDTH from 8 to 52 cm	DIMENSION: 1-2 mm
MANUFACTURE: SURFACE PROCESSING WITH TOOTH CHISEL AND PITCHING TOOLS	COLOR: WHITE
	AGGREGATE: SAND
LITHOTYPE: SCAGLIA BIANCA	DIMENSION: <1 mm
NATURE: CARBONATIC LIMESTONE ROCK	COLOR: GREY
COLOR: WHITE	**MORTAR (2)**
QUARRY: CANTALUPO AREA	
SHAPE: SLABS	**CONSISTENCY:** SOLID
DIMENSIONS: HEIGHT from 20 to 25.2 cm; WIDTH from 35.1 to 42.5 cm	**SIFT:** FINE
MANUFACTURE: SURFACE PROCESSING WITH TOOTH CHISEL AND PITCHING TOOLS	**MORTAR (BEDDING) THICKNESS:** 0.5 mm
	BINDER: CEMENT
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

CHURCH OF S. SILVESTRO - BEVAGNA (PG)

MAIN FACADE
DATE OF SURVEY 20 NOV 2015

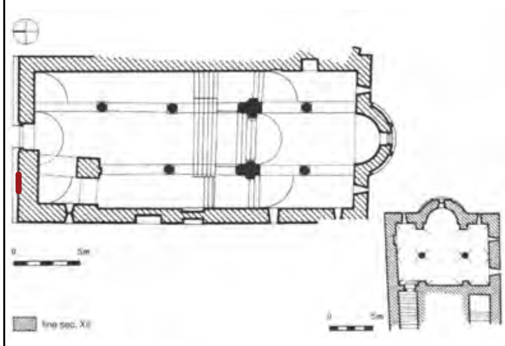
BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 74 e 115;
- QUINTERIO, CANALI 2010, pp.160-170.
- PARDI 1972, p. 218.



048	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS AND SLABS

CONSERVATION: GOOD
MASONRY THICKNESS: 130 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1195
MATERIALS: TRAVERTINE
LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 136.

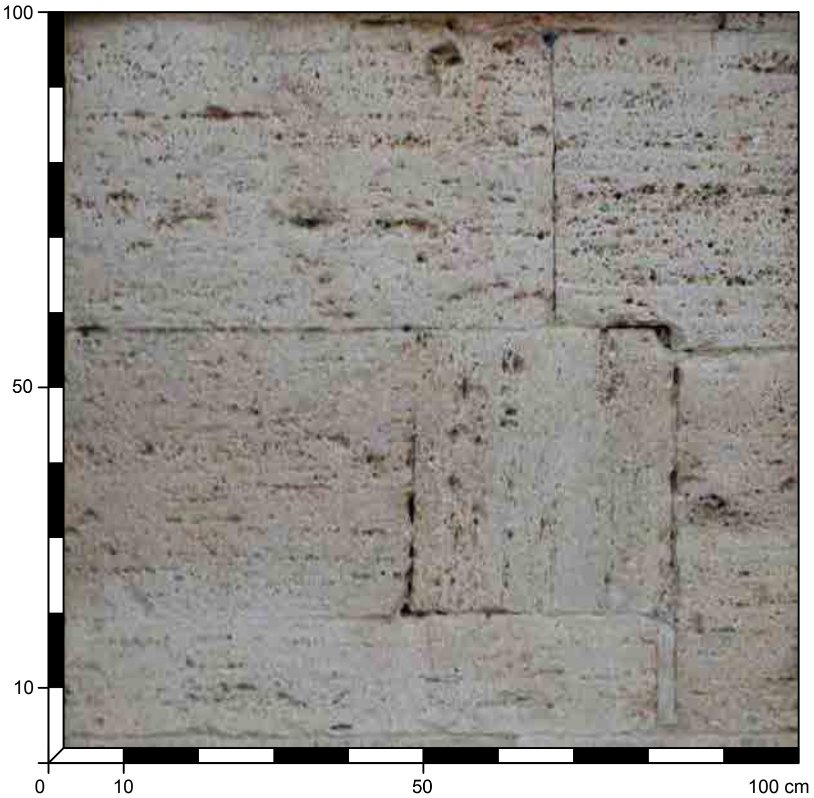
STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.1 cm
QUARRY: SPELLO AND ASSISI AREA	**BINDER:** CEMENT
SHAPE: SLABS	**AGGREGATE:** SAND
DIMENSIONS: HEIGHT from 28.5 to 42 cm; WIDTH from 51 to 78.5 cm	DIMENSION: <1 mm
MANUFACTURE: SURFACE PROCESSING WITH PITCHING TOOLS	COLOR: GREY

CHURCH OF S. SILVESTRO - BEVAGNA (PG)

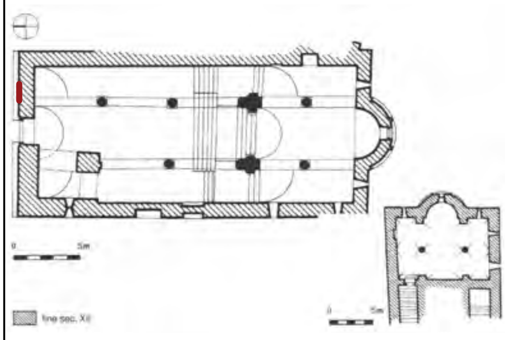
MAIN FACADE
DATE OF SURVEY 20 NOV 2015

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 74 e 115;
- QUINTERIO, CANALI 2010, pp.160-170.
- PARDI 1972, p. 218.



049	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS AND SLABS
CONSERVATION: GOOD	
MASONRY THICKNESS: 130 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1195	
MATERIALS: TRAVERTINE	
LAYING: REGULAR IN PARALLEL ROWS	

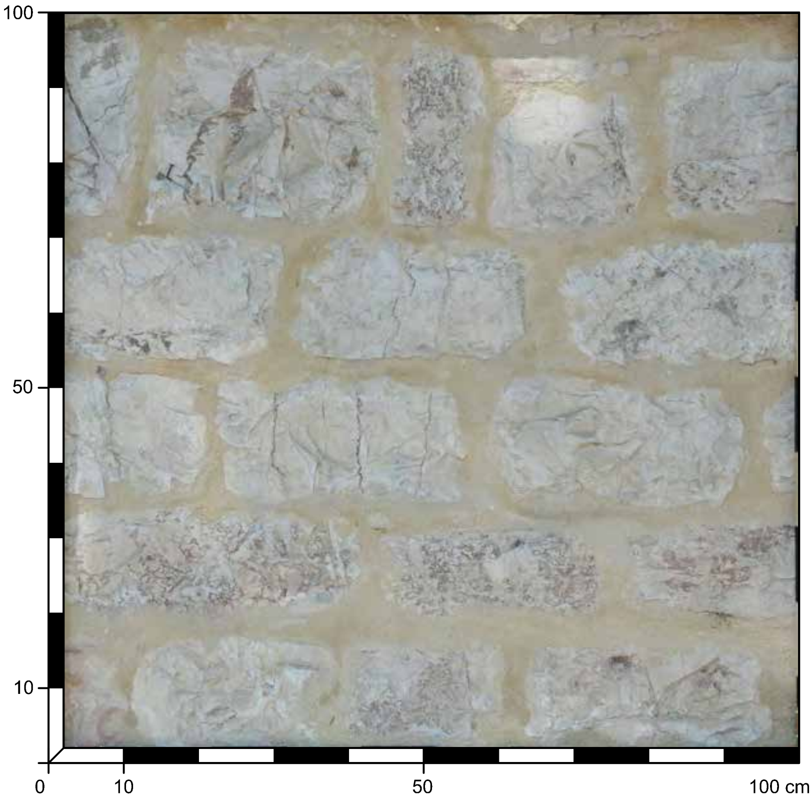


GIGLIOZZI 2013, p. 136.

STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.1 cm
QUARRY: SPELLO AND ASSISI AREA	**BINDER:** CEMENT
SHAPE: SLABS	**AGGREGATE:** SAND
DIMENSIONS: HEIGHT from 28.5 to 42 cm; WIDTH from 51 to 78.5 cm	DIMENSION: <1 mm
MANUFACTURE: SURFACE PROCESSING WITH PITCHING TOOLS	COLOR: GREY

CHURCH OF SS. MARIA E ANNA - CAPODACQUA (PG)

MAIN FACADE
DATE OF SURVEY 09 AGO 2016



050	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS

CONSERVATION: FAIRLY GOOD
MASONRY THICKNESS: 100 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING:
MATERIALS: SCAGLIA BIANCA, CORNIOLA
LAYING: REGULAR IN SEMI-PARALLEL ROWS

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** da 2 a 4.5 cm
QUARRY: LOCAL	**BINDER:** LIME
SHAPE: BLOCKS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT 12-13 cm; WIDTH from 28 to 42 cm	DIMENSION: 1 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	COLOR: LIGHT BROWN
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: WHITE	COLOR: GREY
QUARRY: LOCAL	
SHAPE: BLOCKS	
DIMENSIONS: HEIGHT from 30 to 40 cm; WIDTH from 38 to 70 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	

CHURCH OF S. MARIA DI PLESTIA - COLFIORITO (PG)

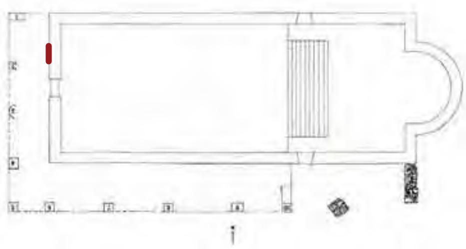
WALL FACING OF THE MAIN FACADE OF THE CHURCH
DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- RAININI 2014, pp. 251-351;
- MARTELLI 1996, pp. 350-351.

051	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ELEMENTS

CONSERVATION: GOOD
MASONRY THICKNESS: 75 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: BEGINNING OF XII CENTURY
MATERIALS: TRAVERTINE, SCAGLIA BIANCA, LATERIZIO
LAYING: IRREGULAR



RAININI 2014, p. 253

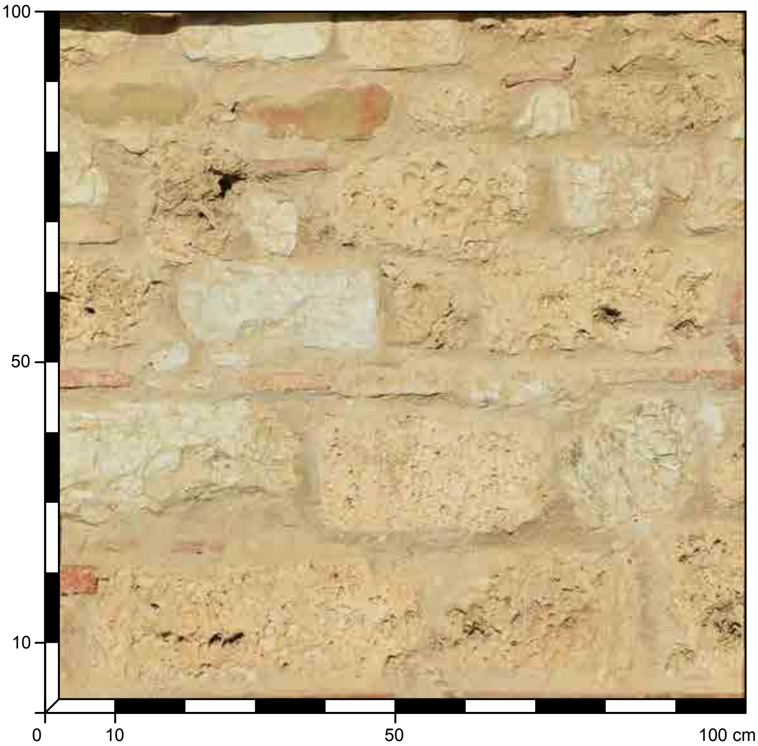
STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 2 to 6 cm
SHAPE: IRREGULAR BLOCKS	**BINDER:** CEMENT
DIMENSIONS: HEIGHT from 18 to 30 cm; WIDTH from 10 to 40 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: NO SURFACE PROCESSING	DIMENSION: 1-2 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: IRREGULAR BLOCKS	COLOR: GREY
DIMENSIONS: HEIGHT from 5 to 16 cm; WIDTH from 4 to 42.5 cm	
MANUFACTURE: NO SURFACE PROCESSING	
LITHOTYPE: BRICK	
NATURE: REUSED CERAMIC MATERIAL	
COLOR: DARK RED, OCHER	

CHURCH OF S. MARIA DI PLESTIA - COLFIORITO (PG)

WALL FACING OF THE MAIN FACADE OF THE CHURCH
DATE OF SURVEY 10 AGO 2016

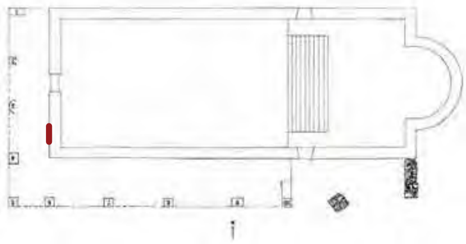
BIBLIOGRAPHICAL REFERENCES

- RAININI 2014, pp. 251-351;
- MARTELLI 1996, pp. 350-351.



052	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ELEMENTS

CONSERVATION: GOOD
MASONRY THICKNESS: 75 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: BEGINNING OF XII CENTURY
MATERIALS: TRAVERTINE, SCAGLIA BIANCA, SCAGLIA ROSSA, LATERIZIO
LAYING: SEMI-REGULAR IN ROWS



RAININI 2014, p. 253

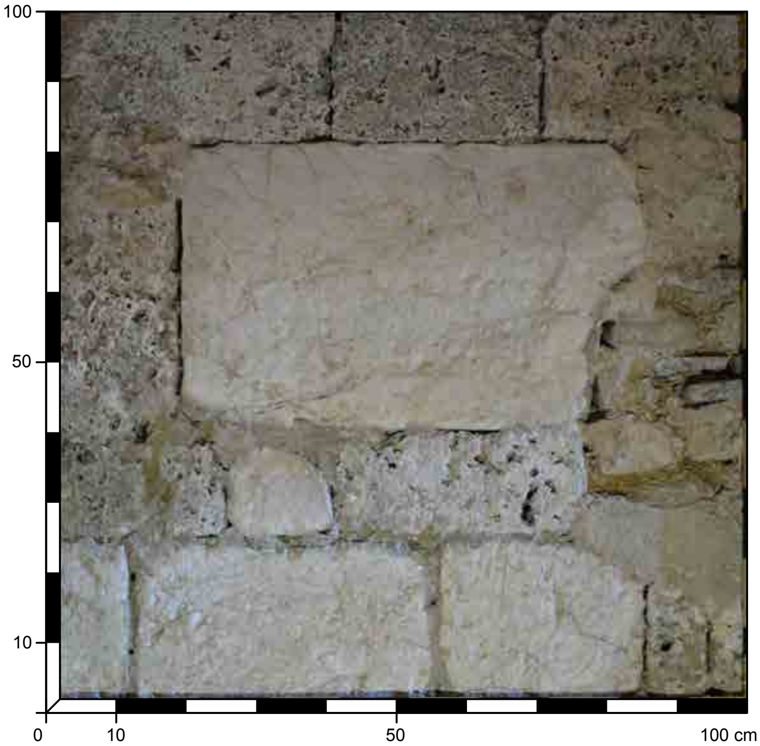
STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 2 to 6 cm
SHAPE: BLOCKS	**BINDER:** CEMENT
DIMENSIONS: HEIGHT from 10 to 17.6 cm; WIDTH from 11 to 46.2 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH AXE	DIMENSION: 1-2 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: BLOCKS	COLOR: GREY
DIMENSIONS: HEIGHT from 8 to 17.6 cm; WIDTH from 8 to 46.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH AXE	
LITHOTYPE: BRICK	
NATURE: REUSED CERAMIC MATERIAL	
COLOR: DARK RED, OCHER	

CHURCH OF S. MARIA DI PLESTIA - COLFIORITO (PG)

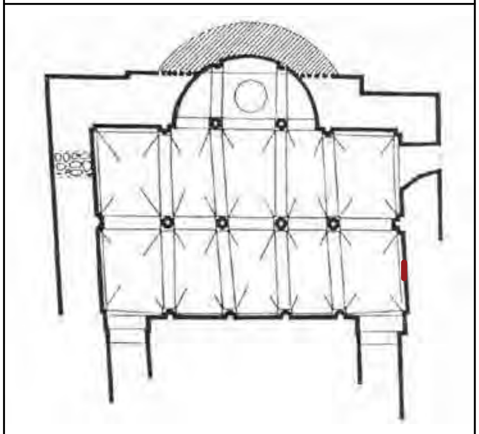
CRYPT MASONRY
DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- RAININI 2014, pp. 251-351;
- MARTELLI 1996, pp. 350-351.



053	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS AND REUSED BRICKS
CONSERVATION: GOOD	
MASONRY THICKNESS: 75 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: BEGINNING OF XII CENTURY	
MATERIALS: TRAVERTINE, SCAGLIA BIANCA	
LAYING: REGULAR IN ROWS	



MARTELLI 1996, p. 350.

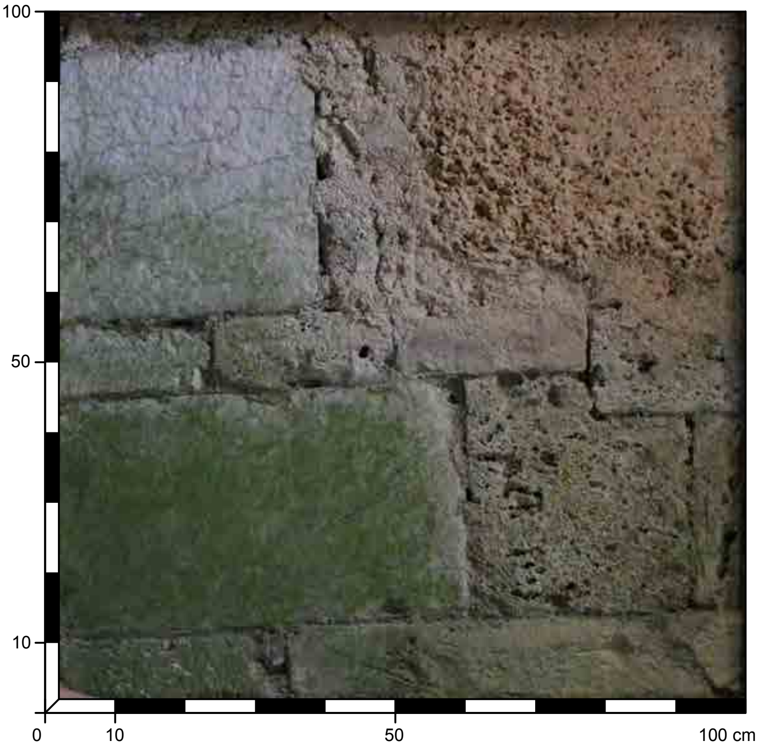
STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 2 to 6 cm
SHAPE: ASHLARS	**BINDER:** CEMENT
DIMENSIONS: HEIGHT from 12 to 25.5 cm; WIDTH from 8 to 46.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH AXE	DIMENSION: 1-2 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: GREY
DIMENSIONS: HEIGHT from 12 to 40 cm; WIDTH from 15 to 65.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH AXE	

CHURCH OF S. MARIA DI PLESTIA - COLFIORITO (PG)

CRYPT MASONRY
DATE OF SURVEY 10 AGO 2016

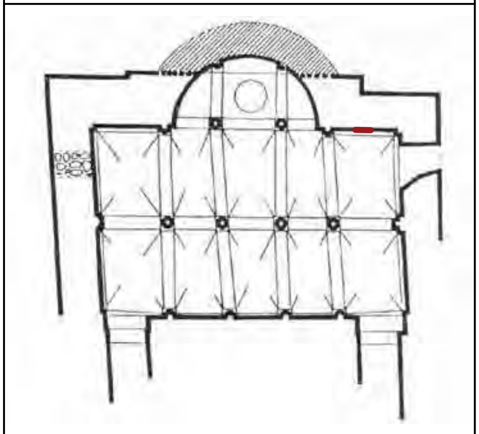
BIBLIOGRAPHICAL REFERENCES

- RAININI 2014, pp. 251-351;
- MARTELLI 1996, pp. 350-351.



054	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS AND REUSED BRICKS

CONSERVATION: GOOD
MASONRY THICKNESS: 75 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: END OF XI CENTURY - BEGINNING OF XII CENTURY
MATERIALS: TRAVERTINE, SCAGLIA BIANCA
LAYING: REGULAR IN ROWS



MARTELLI 1996, p. 350.

STONE ELEMENTS	**MORTAR**
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 1 to 15 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 34.2 to 14.7 cm; WIDTH from 38 to 40.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH AXE	DIMENSION: 1-2 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: RED, WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**MORTAR**
COLOR: WHITE	
SHAPE: ASHLARS	**CONSISTENCY:** SOLID
DIMENSIONS: HEIGHT from 10 to 34.5 cm; WIDTH from 30 to 72 cm	**SIFT:** FINE
MANUFACTURE: SURFACE PROCESSING WITH AXE	**MORTAR (BEDDING) THICKNESS:** from 1 to 15 cm
LITHOTYPE: SCAGLIA ROSSA	**BINDER:** CEMENT
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** LIMESTONE FRAGMENTS
COLOR: PINK	DIMENSION: 1-2 mm
SHAPE: ASHLARS	COLOR: WHITE
DIMENSIONS: HEIGHT from 8 to 12.2 cm; WIDTH from 15 to 28.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH AXE	

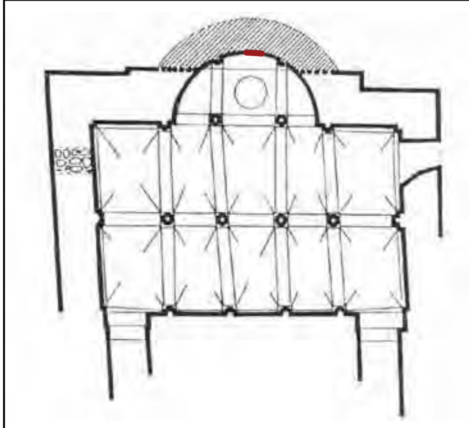
CHURCH OF S. MARIA DI PLESTIA - COLFIORITO (PG)

CRYPT MASONRY
DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- RAININI 2014, pp. 251-351;
- MARTELLI 1996, pp. 350-351.

055	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS AND REUSED BRICKS
CONSERVATION: GOOD	
MASONRY THICKNESS: 80 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: END OF XI CENTURY - BEGINNING OF XII CENTURY	
MATERIALS: TRAVERTINE, SCAGLIA BIANCA, BRICKS	
LAYING: REGULAR IN ROWS	



MARTELLI 1996, p. 350.

STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 1,5 to 2 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 16 to 21 cm; WIDTH from 15 to 28.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH AXE	DIMENSION: 1-8 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: RED, WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: BLOCKS	COLOR: GREY
DIMENSIONS: HEIGHT from 10 to 34.5 cm; WIDTH from 30 to 72 cm	
MANUFACTURE: SURFACE PROCESSING WITH AXE	
LITHOTYPE: BRICKS	
NATURE: REUSED CERAMIC MATERIAL	
COLOR: RED, OCHER	
SHAPE: RECTANGULAR	
DIMENSIONS: HEIGHT 4.3 cm; WIDTH 28 cm	

CHURCH OF S. MARIA DI PLESTIA - COLFIORITO (PG)

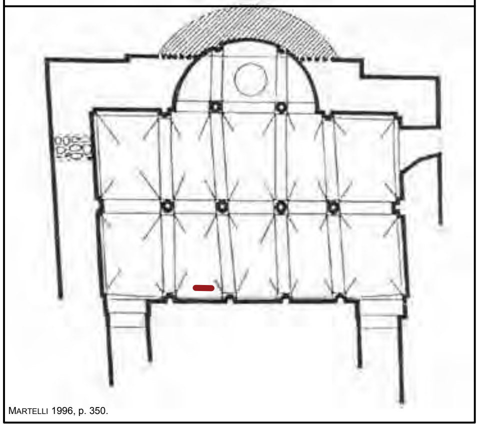
CRYPT MASONRY

DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- RAININI 2014, pp. 251-351;
- MARTELLI 1996, pp. 350-351.

056	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS AND ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 80 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERNAL	
DATING: END OF XI CENTURY - BEGINNING OF XII CENTURY	
MATERIALS: TRAVERTINE, SCAGLIA BIANCA, SCAGLIA ROSSA, CALCARI E MARNE A FUCOIDI	
LAYING: IN IRREGULAR ROWS	



MARTELLI 1996, p. 350.

STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.8 to 1.5 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 10 to 25.5 cm; WIDTH from 12 to 56.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH AXE	DIMENSION: 1-8 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: RED, WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: GREY
DIMENSIONS: HEIGHT from 7 to 20.5 cm; WIDTH from 10.5 to 28.8 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	
LITHOTYPE: SCAGLIA ROSSA	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: PINK	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 7 to 20.5 cm; WIDTH from 11 to 25 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	

CHURCH OF S. MARIA DI PLESTIA - COLFIORITO (PG)

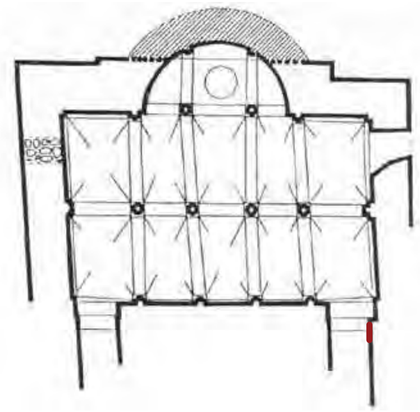
CRYPT MASONRY
DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- RAININI 2014, pp. 251-351;
- MARTELLI 1996, pp. 350-351.

057	RUBBLE MASONRY WITH WALL FACING IN REUSED LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 80 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: END OF XI CENTURY - BEGINNING OF XII CENTURY
MATERIALS: TRAVERTINE, SCAGLIA BIANCA, SCAGLIA ROSSA
LAYING: IN IRREGULAR ROWS



MARTELLI 1996, p. 350.

STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.8 to 1.5 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 12.5 to 48 cm; WIDTH from 25 to 56.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH AXE	DIMENSION: 1-8 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: RED, WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: BLOCKS	COLOR: GREY
DIMENSIONS: HEIGHT from 8 to 15.5 cm; WIDTH from 12 to 25.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH AXE	
LITHOTYPE: SCAGLIA ROSSA	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: PINK	
SHAPE: BLOCKS	
DIMENSIONS: HEIGHT from 7.5 to 15.5 cm; WIDTH from 10 to 24 cm	
MANUFACTURE: SURFACE PROCESSING WITH AXE	

CHIESA DI S. MARIA DI PLESTIA - COLFIORITO (PG)

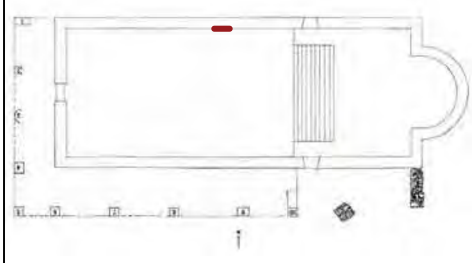
PARAMENTO INTERNO PARETE INTERNA NORD
DATA DEL RILIEVO 10/08/2016

BIBLIOGRAPHICAL REFERENCES

- RAININI 2014, pp. 251-351;
- MARTELLI 1996, pp. 350-351.

058	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS

CONSERVATION: GOOD
MASONRY THICKNESS: 75 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING:
MATERIALS: TRAVERTINE, SCAGLIA BIANCA
LAYING: IN IRREGULAR ROWS



RAININI 2014, p. 253

STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 1 to 2 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 10.5 to 15 cm; WIDTH from 18 to 22.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH AXE	DIMENSION: 1-4 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: BLOCKS	COLOR: WHITE
DIMENSIONS: HEIGHT from 12 to 21 cm; WIDTH from 10.2 to 32.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH AXE	

CHIESA DI S. MARIA DI PLESTIA - COLFIORITO (PG)

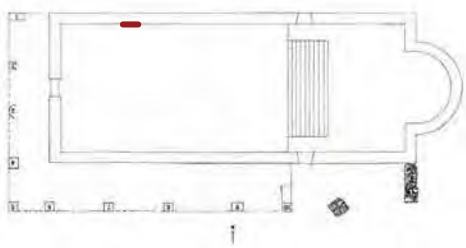
PARAMENTO INTERNO TAMPONATURA APERTURA PARETE INTERNA NORD
DATA DEL RILIEVO 10/08/2016

BIBLIOGRAPHICAL REFERENCES

- RAININI 2014, pp. 251-351;
- MARTELLI 1996, pp. 350-351.

059	RUBBLE MASONRY WITH WALL FACING IN REUSED LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 75 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: 1910
MATERIALS: TRAVERTINE
LAYING: IRREGULAR



RAININI 2014, p. 253

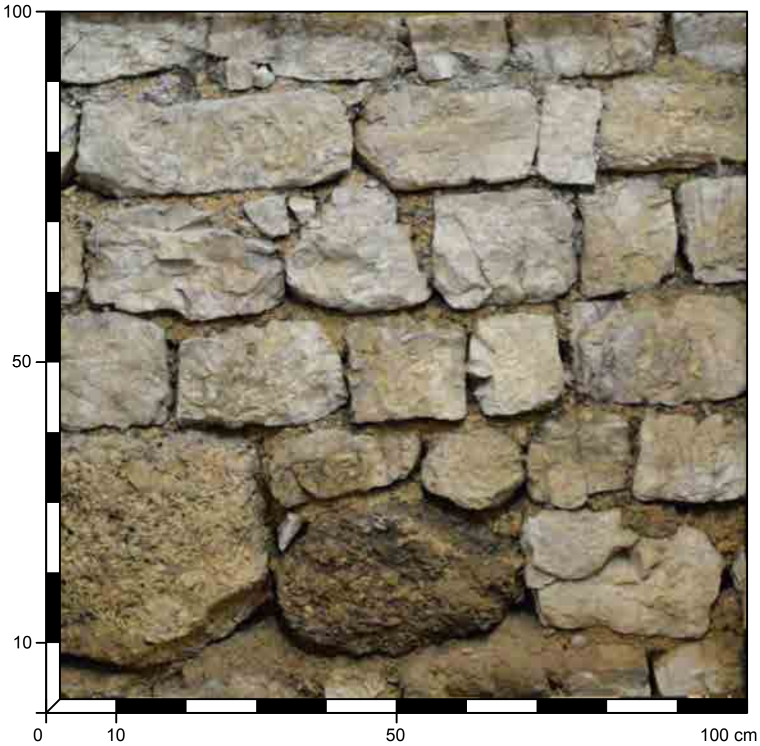
STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 1 to 2 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 20 to 45.5 cm; WIDTH from 35.5 to 58 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	DIMENSION: 1-4 mm
	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

CHIESA DI S. MARIA DI PLESTIA - COLFIORITO (PG)

PARAMENTO INTERNO DELLA MURATURA DI FONDAZIONE DELLA CHIESA
(PROBABILE FASE PALEOCRISTIANA)
DATA DEL RILIEVO 10/08/2016

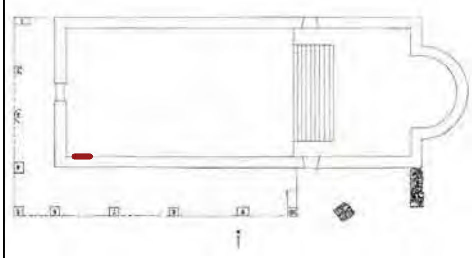
BIBLIOGRAPHICAL REFERENCES

- RAININI 2014, pp. 251-351;
- MARTELLI 1996, pp. 350-351.



060	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS AND REUSED BRICKS

CONSERVATION: GOOD
MASONRY THICKNESS: 90 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: IV CENTURY
MATERIALS: SCAGLIA BIANCA
LAYING: IRREGULAR



RAININI 2014, p. 253

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.5 to 2 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 14 to 16.5 cm; WIDTH from 17 to 40 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	DIMENSION: 1-8 mm
	COLOR: RED, WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: BROWN

CHURCH OF S. FRANCESCO - COSTACCIARO (PG)

MAIN FACADE
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- PARDI 2000, p. 171.

061	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 130 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERNAL	
DATING: 1282 - 1315	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	

STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.2 to 1 cm
QUARRY: CUCCO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 20 to 23 cm; WIDTH from 30 to 55 cm	DIMENSION: 1 mm
MANUFACTURE: SURFACE PROCESSING WITH A FINE-TOOTH CHISEL	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

CHURCH OF S. FRANCESCO - COSTACCIARO (PG)

LEFT FRONT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- PARDI 2000, p. 171.

062	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD	
MASONRY THICKNESS: 100 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERNAL	
DATING: 1282 - 1315	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	

STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.2 to 5 cm
QUARRY: CUCCO MOUNT	**BINDER:** LIME
SHAPE: ROUGH BLOCKS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 6.5 to 22 cm; WIDTH from 10 to 42 cm	DIMENSION: 1-5 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

PALAZZO DEL PODESTA - FABRIANO (AN)

DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- TABARELLI 1978, p. 145.

063	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS AND SLABS

CONSERVATION: GOOD
MASONRY THICKNESS: 120 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1255
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS

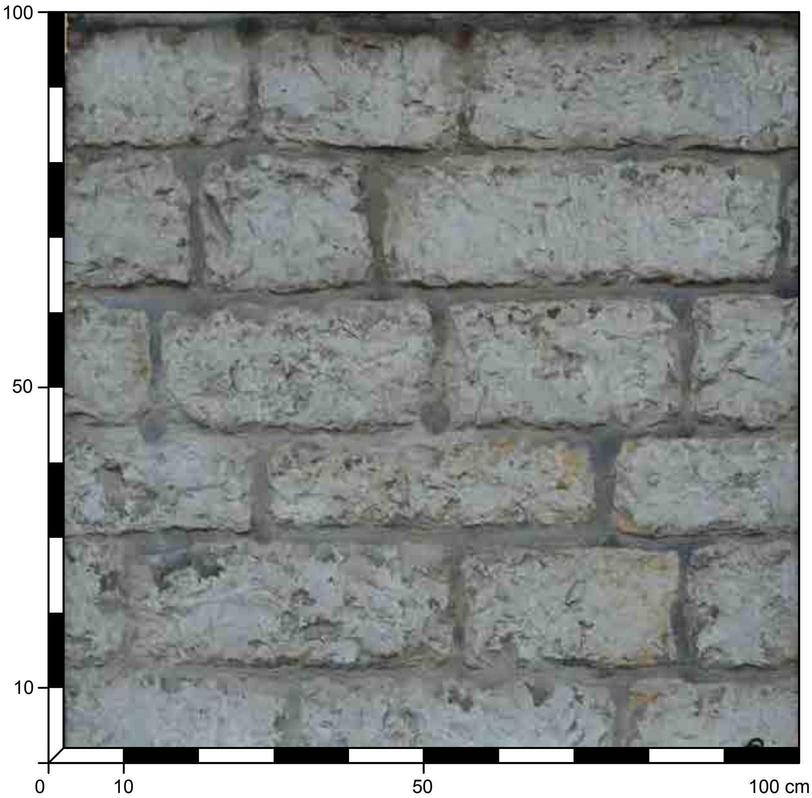
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 1-3 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 8 to 13.5 cm; WIDTH from 12 to 40.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH A FINE-TOOTH CHISEL	DIMENSION: from 1 to 5 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: PINK	DIMENSION: <1 mm
SHAPE: SLABS AND BLOCKS	COLOR: LIGHT BROWN
DIMENSIONS: HEIGHT from 5 to 13.5 cm; WIDTH from 11.3 to 58.2 cm	
MANUFACTURE: SURFACE PROCESSING WITH A FINE-TOOTH CHISEL	

PALAZZO DEL PODESTA - FABRIANO (AN)

DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- TABARELLI 1978, p. 145.



064	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS AND SLABS

CONSERVATION: GOOD

MASONRY THICKNESS: 120 cm

TYPE OF STRUCTURE: BEARING WALL

FACADE: EXTERIOR

DATING: 1255

MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA

LAYING: REGULAR IN PARALLEL ROWS

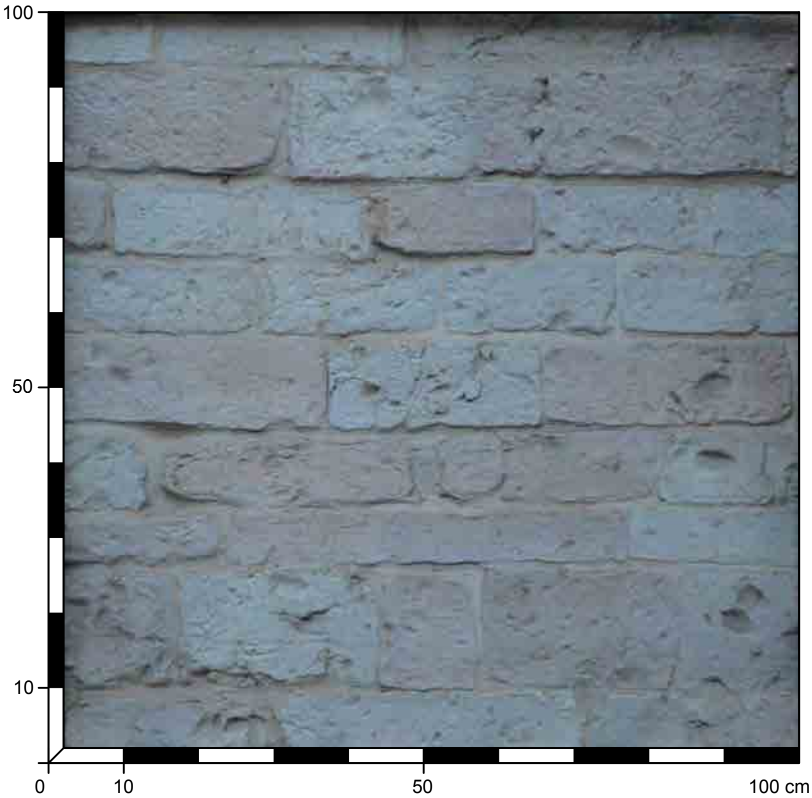
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** da 1.5 a 3 cm
SHAPE: BLOCKS	**BINDER:** CEMENT
DIMENSIONS: HEIGHT from 10.2 to 15 cm; WIDTH from 30 to 52.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	DIMENSION: from 1 to 4 mm
	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT BROWN

CHURCH OF S. VENANZIO - FABRIANO (AN)

EXTERIOR WALL FACING OF THE ABSE
DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- PARDI 2000, p.111.



065	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS AND SLABS

CONSERVATION: GOOD
MASONRY THICKNESS: 160 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 14TH CENTURY
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS

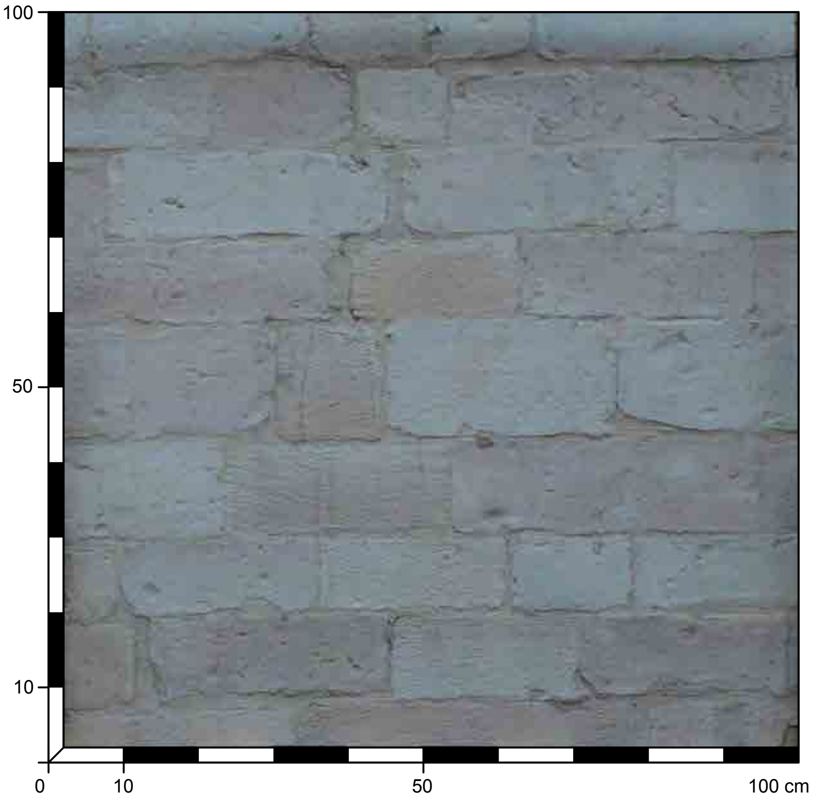
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.5 to 2 cm
SHAPE: ASHLARS AND SLABS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 6.5 to 16 cm; WIDTH from 18.8 to 41.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	DIMENSION: from 1 to 5 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: PINK	DIMENSION: <1 mm
SHAPE: ASHLARS AND SLABS	COLOR: LIGHT BROWN
DIMENSIONS: HEIGHT from 6.5 to 16.2 cm; WIDTH from 20.5 to 45.2 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	

CHURCH OF S. VENANZIO - FABRIANO (AN)

EXTERIOR WALL FACING OF THE ABSE
DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- PARDI 2000, p.111.



066	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS AND SLABS

CONSERVATION: GOOD
MASONRY THICKNESS: 160 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 14TH CENTURY
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.5 to 2 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 10 to 16 cm; WIDTH from 15 to 40 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	DIMENSION: from 1 to 5 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: PINK	DIMENSION: <1 mm
SHAPE: ASHLARS AND SLABS	COLOR: LIGHT BROWN
DIMENSIONS: HEIGHT from 6.5 to 16.2 cm; WIDTH from 20.5 to 45.2 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	

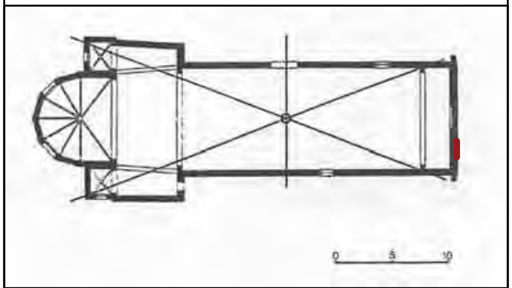
CHURCH OF S. DOMENICO - FOLIGNO (PG)

MAINFACADE
DATE OF SURVEY 07 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- De Angelis D'Ossat 1982, pp. 150-156.

067	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: VERY GOOD	
MASONRY THICKNESS: 90 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1351 (CHURCH CONSECRATION DATE)	
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



De Angelis D'Ossat 1982, p. 156.

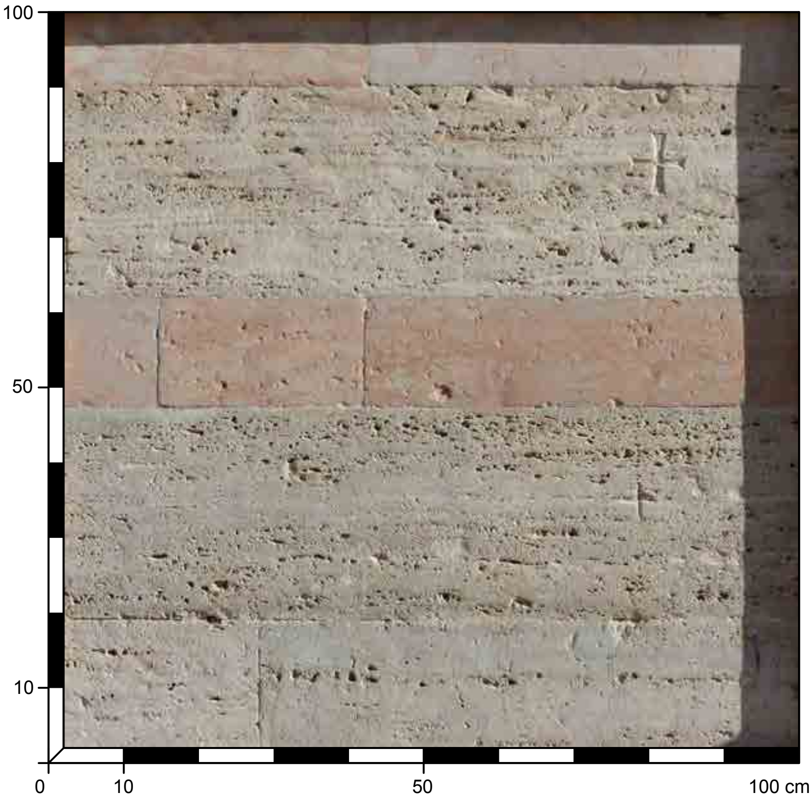
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: LIGHT PINK	**MORTAR (BEDDING) THICKNESS:** 0.1 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 16 to 21.6 cm; WIDTH from 28 to 36.7 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER AND PITCHING TOOLS	DIMENSION: <1 mm COLOR: LIGHT PINK
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <0.5 mm
COLOR: WHITE	COLOR: LIGHT BROWN
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 16 to 21.6 cm; WIDTH from 28 to 36.7 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER AND PITCHING TOOLS	
LITHOTYPE: SCAGLIA BIANCA	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: LIGHT PINK	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 16 to 21.6 cm; WIDTH from 28 to 36.7 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER AND PITCHING TOOLS	

CHURCH OF S. DOMENICO - FOLIGNO (PG)

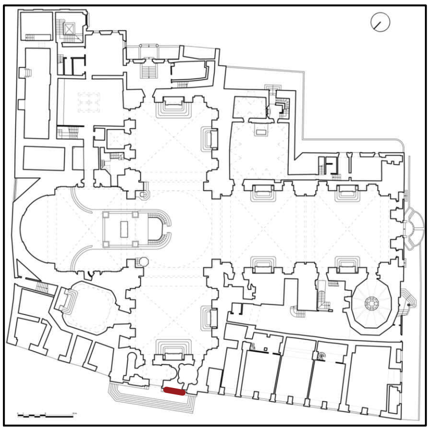
MAIN FACADE
DATE OF SURVEY 05 FEB 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 76;
- BERTINI, SENSI 2004;
- BENAZZI 1993.



068	RUBBLE MASONRY WITH WALL FACING IN BICHROMATIC LIMESTONE ASHLARS AND SLABS
CONSERVATION: VERY GOOD	
MASONRY THICKNESS: >100 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1201	
MATERIALS: TRAVERTINE, ROSSO AMMONITICO	
LAYING: REGULAR IN PARALLEL BICHROMATIC ROWS	



STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.2 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT 28.1 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER AND PITCHING TOOLS	DIMENSION: <1 mm COLOR: WHITE
LITHOTYPE: ROSSO AMMONITICO	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <0.5 mm
COLOR: PINK	COLOR: LIGHT BROWN
SHAPE: SLABS	
DIMENSIONS: HEIGHT 14.6 cm	
MANUFACTURE: SURFACE PROCESSING WITH PITCHING TOOLS	

CHURCH OF S. DOMENICO - FOLIGNO (PG)

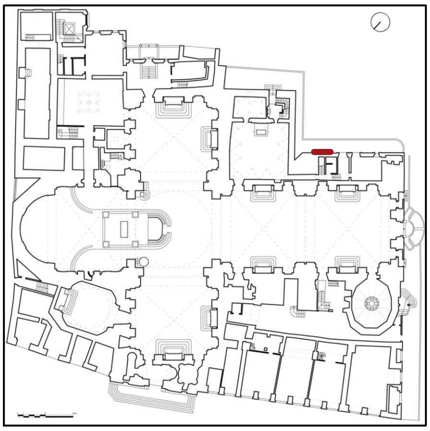
WALL FACING OF THE CHURCH RIGHT FRONT
DATE OF SURVEY 05 FEB 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 76;
- BERTINI, SENSI 2004;
- BENAZZI 1993.

070	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS

CONSERVATION: FAIRLY GOOD
MASONRY THICKNESS: >90 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: END OF 15TH CENTURY - BEGINNING OF 16TH CENTURY
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA
LAYING: IN ROWS



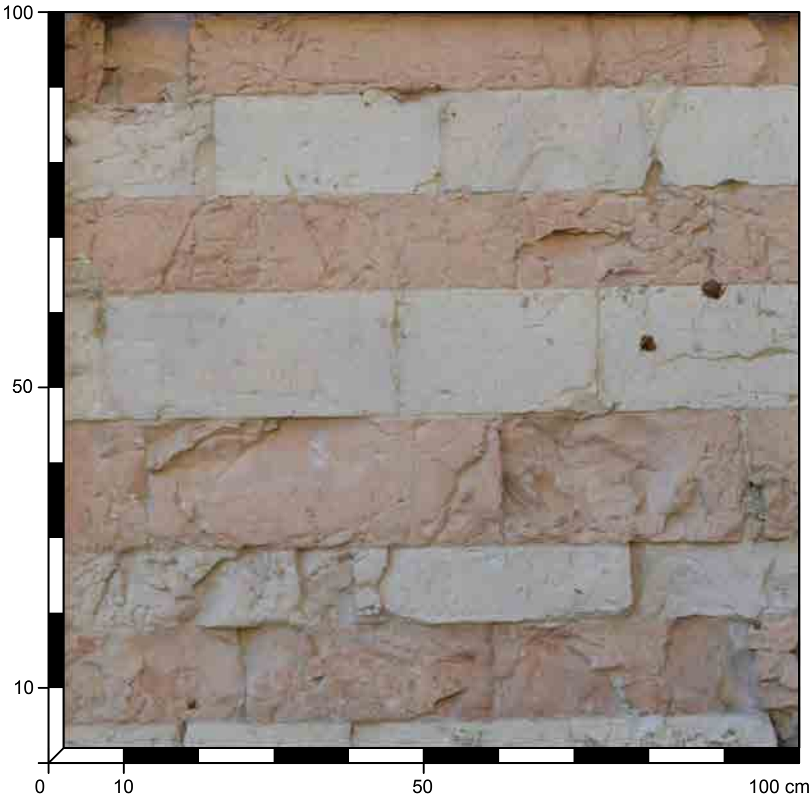
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:**
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 10 to 18.5 cm; WIDTH from 12.5 to 38 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	DIMENSION: 2-5 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <0.5 mm
SHAPE: BLOCKS	COLOR: LIGHT BROWN
DIMENSIONS: HEIGHT from 9.5 to 20 cm; WIDTH from 10.5 to 40.2 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	

CHURCH OF S. DOMENICO - FOLIGNO (PG)

WALL FACING OF THE CHURCH RIGHT FRONT
DATE OF SURVEY 05 FEB 2016

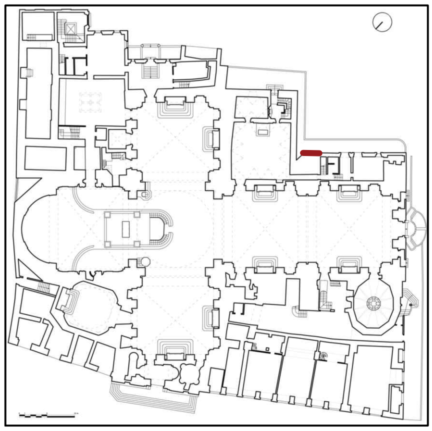
BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 76;
- BERTINI, SENSI 2004;
- BENAZZI 1993.



071	RUBBLE MASONRY WITH WALL FACING IN BICHROMATIC LIMESTONE ASHLARS

CONSERVATION: FAIRLY GOOD
MASONRY THICKNESS: >60 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 14TH CENTURY
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL BICHROMATIC ROWS



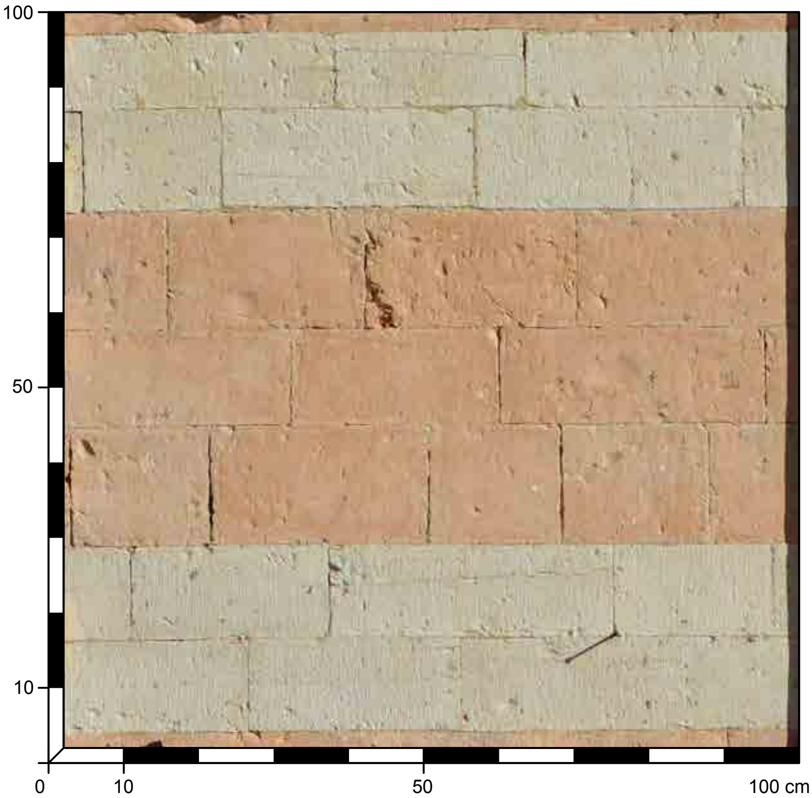
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** 0.1-0.5 cm
QUARRY: COLLE S. LORENZO	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 12.2 to 17.3 cm; WIDTH from 28.5 to 47.5 cm	DIMENSION: 2-5 mm
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER AND PITCHING TOOLS	COLOR: WHITE
LITHOTYPE: SCAGLIA BIANCA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <0.5 mm
COLOR: WHITE	COLOR: LIGHT BROWN
QUARRY: COLLE S. LORENZO	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 9.8 to 16.5 cm; WIDTH from 25 to 37.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH PITCHING TOOLS	

CHURCH OF S. GIACOMO - FOLIGNO (PG)

MAIN FACADE
DATE OF SURVEY 05 FEB 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010.



072	RUBBLE MASONRY WITH WALL FACING IN BICHROMATIC LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: --
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1402
MATERIALS: SCAGLIA BIANCA,SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL BICHROMATIC BOUNDLES OF ROWS

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.1-0.2 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 9.3 to 13.5 cm; WIDTH from 14 to 37.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL AND BUSH HAMMER	DIMENSION: 1-2 mm COLOR: WHITE
LITHOTYPE: SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <0.5 mm
COLOR: PINK	COLOR: LIGHT BROWN
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 12 to 15.5 cm; WIDTH from 17.3 to 38 cm	
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL AND BUSH HAMMER	

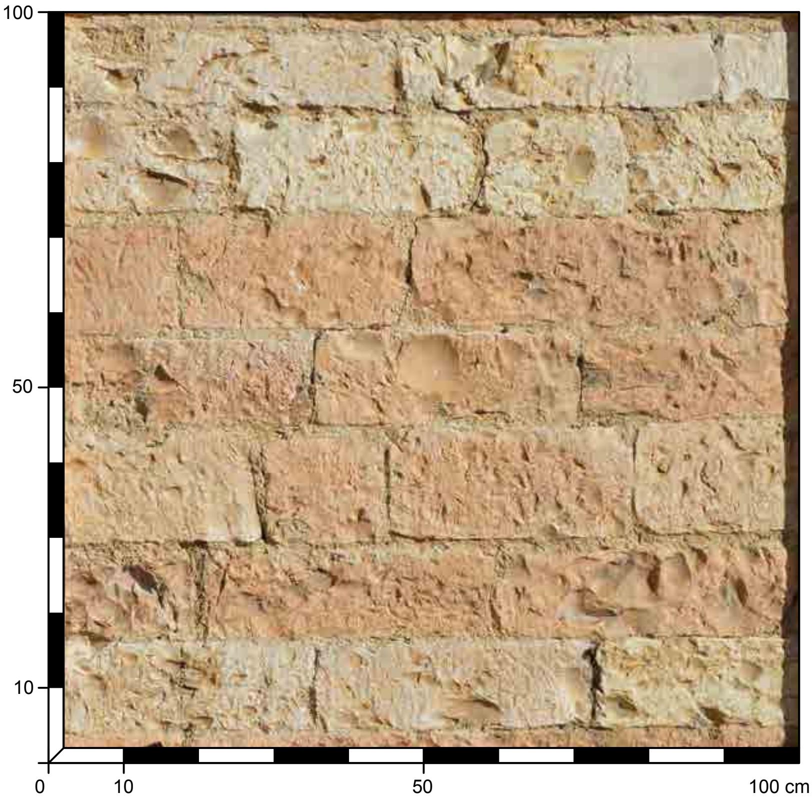
CHURCH OF S. GIACOMO - FOLIGNO (PG)

MAIN FACADE

DATE OF SURVEY 05 FEB 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010.



073	RUBBLE MASONRY WITH WALL FACING IN BICHROMATIC LIMESTONE ASHLARS

CONSERVATION: FAIRLY GOOD

MASONRY THICKNESS: --

TYPE OF STRUCTURE: BEARING WALL

FACADE: EXTERIOR

DATING: 1402

MATERIALS: SCAGLIA BIANCA,SCAGLIA ROSSA

LAYING: REGULAR IN PARALLEL BICHROMATIC BOUNDLES OF ROWS

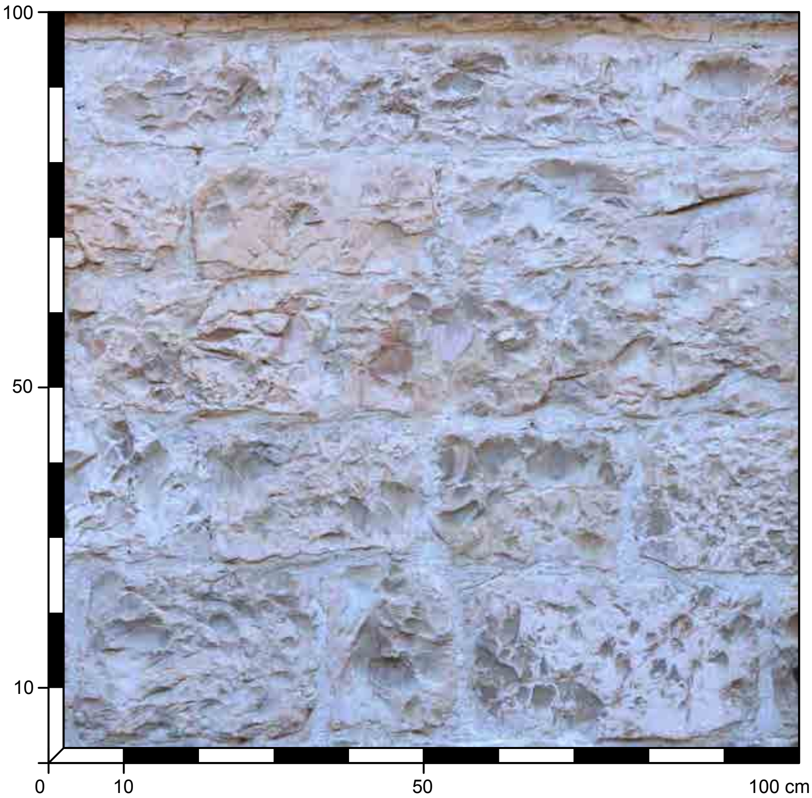
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.2 to 1 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 9.3 to 13 cm; WIDTH from 15 to 36.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	DIMENSION: 1-2 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: PINK	DIMENSION: <0.5 mm
SHAPE: ASHLARS	COLOR: LIGHT BROWN
DIMENSIONS: HEIGHT from 10.5 to 15 cm; WIDTH from 14.3 to 51.4 cm	
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	

CHIESA DI S. GIACOMO - FOLIGNO (PG)

LEFT FRONT
DATE OF SURVEY 05 FEB 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010.



074	RUBBLE MASONRY WITH WALL FACING IN BICHROMATIC LIMESTONE ASHLARS

CONSERVATION: FAIRLY GOOD
MASONRY THICKNESS: --
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: POST 1402
MATERIALS: SCAGLIA BIANCA,SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS

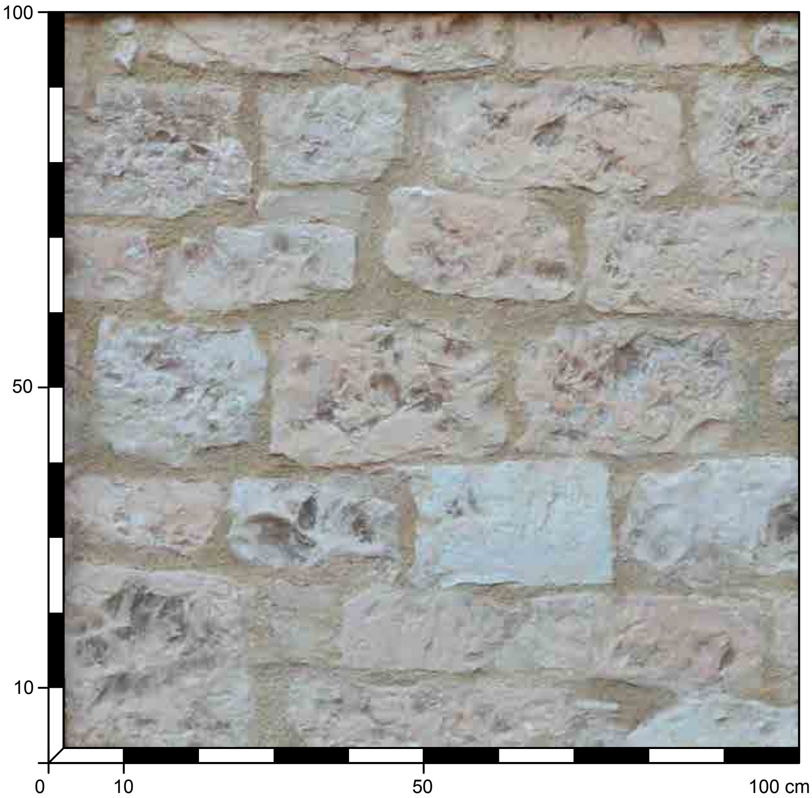
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 1 to 2.5 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 14 to 22.4 cm; WIDTH from 16.3 to 46.8 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH AXE AND POINT CHISEL	DIMENSION: 1-5 mm
	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <0.5 mm
	COLOR: LIGHT BROWN

CHURCH OF S. LUCIA - FOLIGNO (PG)

LEFT FRONT
DATE OF SURVEY 07 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010.



075	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS

CONSERVATION: FAIRLY GOOD
MASONRY THICKNESS: >60 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 14TH CENTURY
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA, SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS

STONE ELEMENTS	**MORTAR**
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 1 to 3 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 9.8 to 17 cm; WIDTH from 11.2 to 22 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND PITCHING TOOLS	DIMENSION: 1-5 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: PINK	DIMENSION: <0.5 mm
SHAPE: BLOCKS	COLOR: LIGHT BROWN
DIMENSIONS: HEIGHT from 9.8 to 23.5 cm; WIDTH from 12.5 to 25.8 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND PITCHING TOOLS	

CHURCH OF S. LUCIA - FOLIGNO (PG)

LEFT FRONT
DATE OF SURVEY 07 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010.

076	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS

CONSERVATION: GOOD
MASONRY THICKNESS: <60 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 14TH CENTURY
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS

STONE ELEMENTS	MORTAR
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 1 to 3 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 9.8 to 23.5 cm; WIDTH from 12.5 to 25.8 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND PITCHING TOOLS	DIMENSION: 1-5 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: PINK	DIMENSION: <0.5 mm
SHAPE: BLOCKS	COLOR: LIGHT BROWN
DIMENSIONS: HEIGHT from 10.5 to 25 cm; WIDTH from 14.2 to 32 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND PITCHING TOOLS	

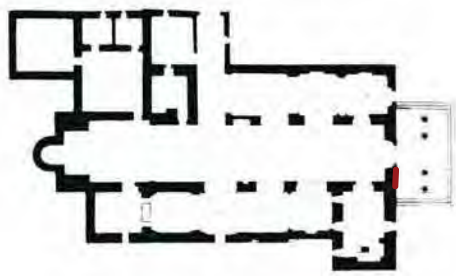
CHURCH OF S. MARIA INFRAPORTA - FOLIGNO (PG)

MAIN FACADE. LEFT SIDE
DATE OF SURVEY 07 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, p. 99;
- ERMINI PANI 2002, pp. 824-829.

077	RUBBLE MASONRY WITH WALL FACING IN BICHROMATIC LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 110 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: END OF 14TH CENTURY	
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA	
LAYING: REGULAR IN PARALLEL BICHROMATIC BOUNDLES OF ROWS	



QUINTERIO, CANALI 2010, p. 99.

STONE ELEMENTS	**MORTAR**
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 1 to 3 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 9.8 to 17 cm; WIDTH from 11.2 to 22 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND PITCHING TOOLS	DIMENSION: 1-5 mm
LITHOTYPE: DISCOLOURED SCAGLIA BIANCA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <0.5 mm
SHAPE: ASHLARS	COLOR: LIGHT BROWN
DIMENSIONS: HEIGHT from 9.8 to 23.5 cm; WIDTH from 12.5 to 25.8 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND PITCHING TOOLS	

CHURCH OF S. MARIA INFRAPORTA - FOLIGNO (PG)

MAIN FACADE. RIGHT SIDE

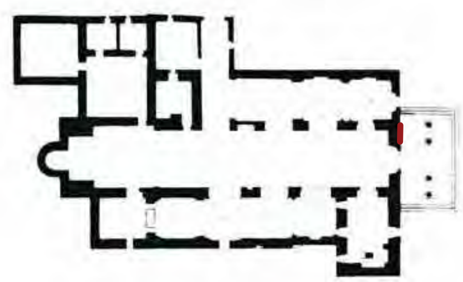
DATE OF SURVEY 07 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, p. 99;
- ERMINI PANI 2002, pp. 824-829.

078	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 110 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: END OF 14TH CENTURY
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA, SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS



QUINTERIO, CANALI 2010, p. 99.

STONE ELEMENTS	**MORTAR**
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.5 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 18 to 21 cm; WIDTH from 24 to 43.4 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND PITCHING TOOLS	DIMENSION: 1-2 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: PINK	DIMENSION: <0.5 mm
SHAPE: ASHLARS	COLOR: LIGHT BROWN
DIMENSIONS: HEIGHT from 19 to 21 cm; WIDTH from 28 to 55.2 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER AND PITCHING TOOLS	

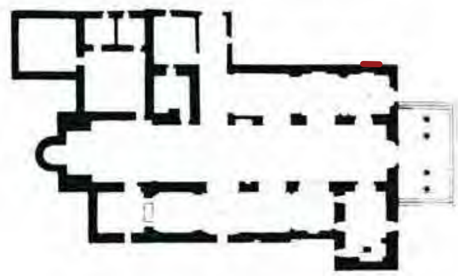
CHURCH OF S. MARIA INFRAPORTA - FOLIGNO (PG)

RIGHT FRONT
DATE OF SURVEY 07 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- Quinterio, Canali 2010, p. 99;
- Ermini Pani 2002, pp. 824-829.

079	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: GOOD	
MASONRY THICKNESS: 100 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: POST 14TH CENTURY	
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: QUITE REGULAR IN PARALLEL ROWS	



Quinterio, Canali 2010, p. 99.

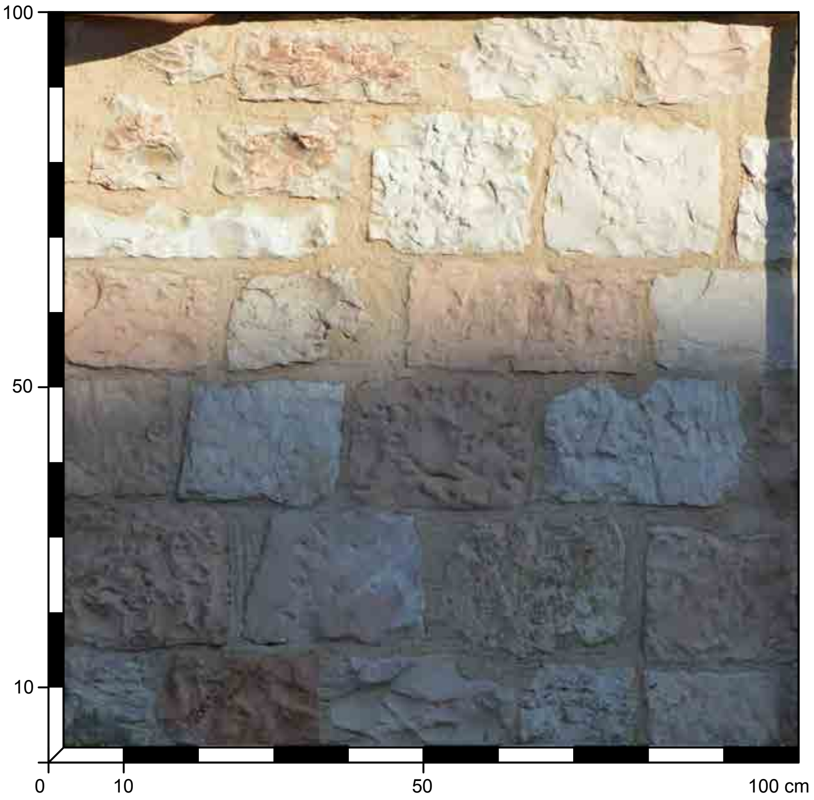
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 1 to 3 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 9.8 to 17 cm; WIDTH from 11.2 to 22 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND PITCHING TOOLS	DIMENSION: 1-2 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: PINK	DIMENSION: <1 mm
SHAPE: BLOCKS	COLOR: LIGHT BROWN
DIMENSIONS: HEIGHT from 9.8 to 23.5 cm; WIDTH from 12.5 to 25.8 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER AND PITCHING TOOLS	

CHURCH OF S. MARIA INFRAPORTA - FOLIGNO (PG)

RIGHT FRONT
DATE OF SURVEY 07 AGO 2016

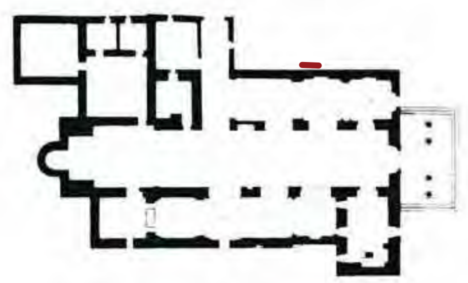
BIBLIOGRAPHICAL REFERENCES

- Quinterio, Canali 2010, p. 99;
- Ermini Pani 2002, pp. 824-829.



080	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS

CONSERVATION: GOOD
MASONRY THICKNESS: 100 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 15TH CENTURY
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS



Quinterio, Canali 2010, p. 99.

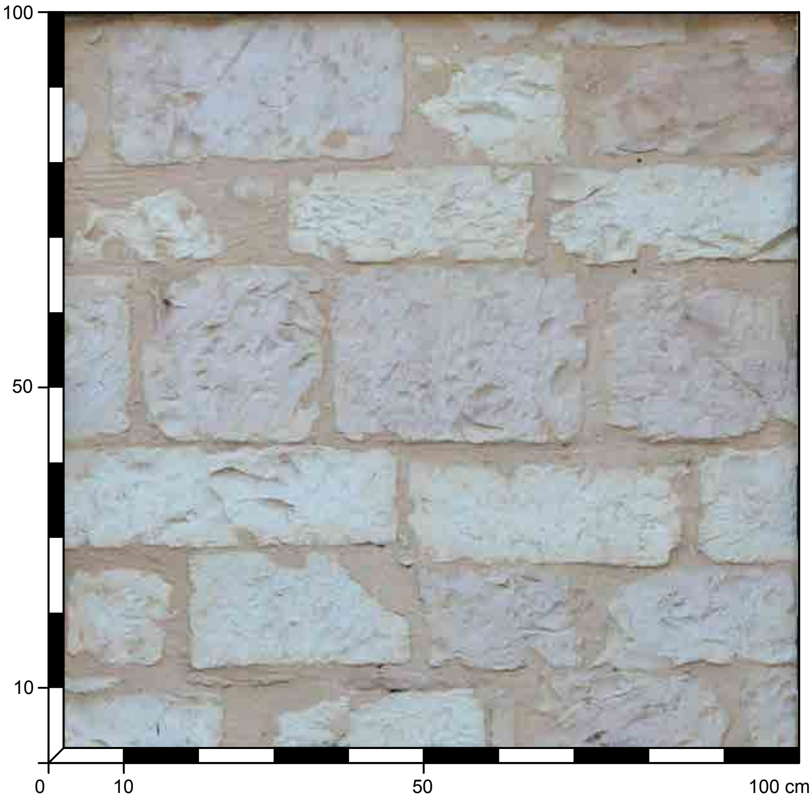
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 1 to 3 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 9.8 to 17 cm; WIDTH from 11.2 to 22 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND PITCHING TOOLS	DIMENSION: 1-4 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: PINK	DIMENSION: <1 mm
SHAPE: BLOCKS	COLOR: LIGHT BROWN
DIMENSIONS: HEIGHT from 9.8 to 23.5 cm; WIDTH from 12.5 to 25.8 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER AND PITCHING TOOLS	

CHURCH OF S. MARIA INFRAPORTA - FOLIGNO (PG)

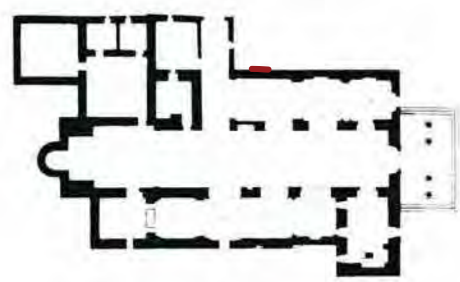
RIGHT FRONT
DATE OF SURVEY 07 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, p. 99;
- ERMINI PANI 2002, pp. 824-829.



081	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: GOOD	
MASONRY THICKNESS: 100 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 15TH CENTURY	
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



QUINTERIO, CANALI 2010, p. 99.

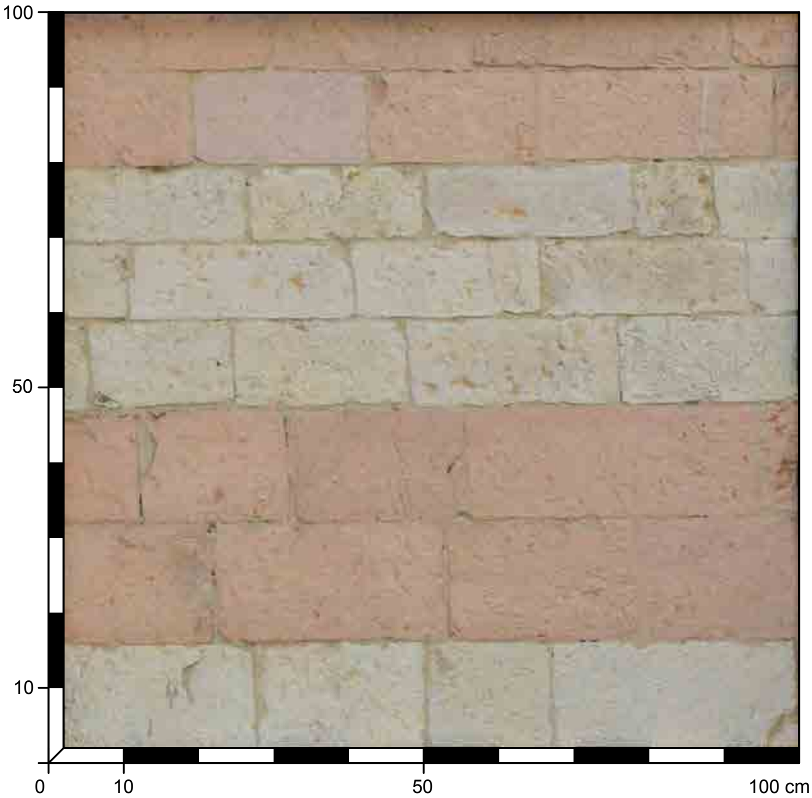
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 1 to 3 cm
SHAPE: BLOCKS AND ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 9.8 to 17 cm; WIDTH from 11.2 to 22 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND PITCHING TOOLS	DIMENSION: 1-4 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: PINK	DIMENSION: <1 mm
SHAPE: BLOCKS AND ASHLARS	COLOR: LIGHT BROWN
DIMENSIONS: HEIGHT from 9.8 to 23.5 cm; WIDTH from 12.5 to 25.8 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER AND PITCHING TOOLS	

CHURCH OF S. SALVATORE - FOLIGNO (PG)

MAIN FACADE. LEFT SIDE
DATE OF SURVEY 07 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- TOGNI 2014, p. 51



082	RUBBLE MASONRY WITH WALL FACING IN BICHROMATIC LIMESTONE ASHLARS

CONSERVATION: GOOD

MASONRY THICKNESS: >80 cm

TYPE OF STRUCTURE: BEARING WALL

FACADE: EXTERIOR

DATING: 12TH CENTURY

MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA, DISCOLOURED SCAGLIA ROSSA

LAYING: REGULAR IN PARALLEL BICHROMATIC BOUNDLES OF ROWS

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 0.2 to 0.4 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 9.3 to 15.5 cm; WIDTH from 9 to 32.4 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	DIMENSION: 1 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: LIGHT BROWN
DIMENSIONS: HEIGHT from 11.1 to 16.5 cm; WIDTH from 20.5 to 46.4 cm	
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	
LITHOTYPE: DISCOLOURED SCAGLIA BIANCA	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 9.8 to 12.5 cm; WIDTH from 12.5 to 22.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	

CHURCH OF S. SALVATORE - FOLIGNO (PG)

MAIN FACADE. LEFT SIDE
DATE OF SURVEY 07 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- TOGNI 2014, p. 51

083	RUBBLE MASONRY WITH WALL FACING IN BICHROMATIC LIMESTONE ASHLARS

CONSERVATION: GOOD

MASONRY THICKNESS: >80 cm

TYPE OF STRUCTURE: BEARING WALL

FACADE: EXTERIOR

DATING: 12TH CENTURY

MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA, DISCOLOURED SCAGLIA ROSSA

LAYING: REGULAR IN PARALLEL BICHROMATIC BOUNDLES OF ROWS

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 0.2 to 0.4 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 9.3 to 15.5 cm; WIDTH from 9 to 32.4 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	DIMENSION: 1 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: LIGHT BROWN
DIMENSIONS: HEIGHT from 11.1 to 16.5 cm; WIDTH from 20.5 to 46.4 cm	
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	
LITHOTYPE: DISCOLOURED SCAGLIA BIANCA	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 9.8 to 12.5 cm; WIDTH from 12.5 to 22.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	

CHURCH OF S. SALVATORE - FOLIGNO (PG)

MAIN FACADE. RIGHT SIDE
DATE OF SURVEY 07 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- TOGNI 2014, p. 51

084	RUBBLE MASONRY WITH WALL FACING IN BICHROMATIC LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: >80 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 12TH CENTURY	
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL BICHROMATIC BOUNDLES OF ROWS	

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 0.2 to 0.4 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 9.3 to 15.5 cm; WIDTH from 9 to 32.4 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	DIMENSION: 1 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: LIGHT BROWN
DIMENSIONS: HEIGHT from 11.1 to 16.5 cm; WIDTH from 20.5 to 46.4 cm	
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	

CHURCH OF S. SALVATORE - FOLIGNO (PG)

MAIN FACADE. RIGHT SIDE
DATE OF SURVEY 07 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- TOGNI 2014, p. 51

085	RUBBLE MASONRY WITH WALL FACING IN BICHROMATIC LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: >80 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 12TH CENTURY	
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL BICHROMATIC BOUNDLES OF ROWS	

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 0.2 to 1 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 9.3 to 15.5 cm; WIDTH from 15.5 to 48.2 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	DIMENSION: 1 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: LIGHT BROWN
DIMENSIONS: HEIGHT from 12.5 to 13.2 cm; WIDTH from 21.8 to 37.4 cm	
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	

CHURCH OF S. SALVATORE - FOLIGNO (PG)

RIGHT FRONT
DATE OF SURVEY 07 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- TOGNI 2014, p. 51

086	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: GOOD	
MASONRY THICKNESS: >80 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 12TH CENTURY	
MATERIALS: SCAGLIA ROSSA	
LAYING: REGULAR IN PARALLEL BICHROMATIC BOUNDLES OF ROWS	

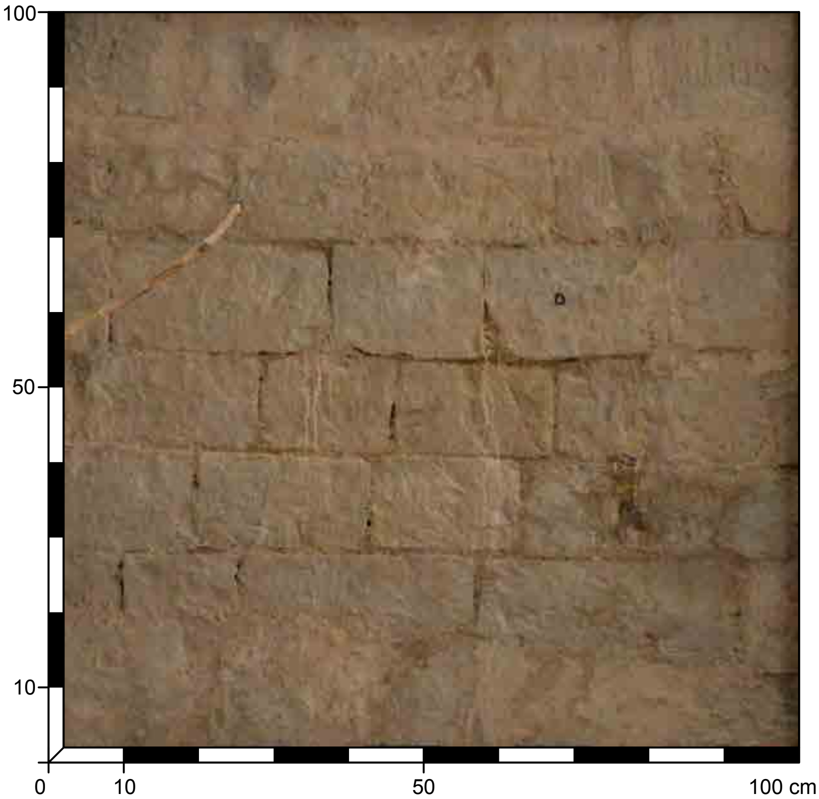
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 0.2 to 0.4 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 7 to 16.5 cm; WIDTH from 18.5 to 31 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH LARGE-TOOTH CHISEL	DIMENSION: 1 mm
	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT BROWN

ABBEY OF S. CROCE - FONTE AVELLANA (PU)

CRYPT MASONRY
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 77-86;
- PARDI 1972, p. 72.



087	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 100 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: XII CENTURY (consecration 1197)	
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA	
LAYING: REGULAR IN PARALLEL ROWS	

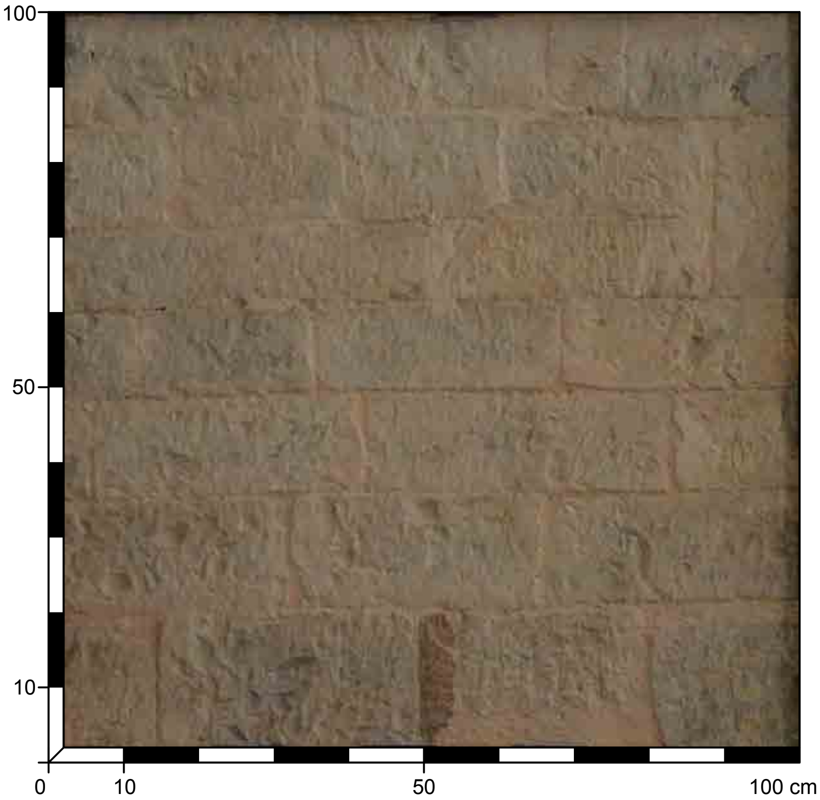
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.4--0.5 cm
QUARRY: CATRIA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 12 to 13.8 cm; WIDTH from 13.5 to 38.4 cm	DIMENSION: 1-8 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	COLOR: WHITE, PINK
LITHOTYPE: SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: LIGHT PINK	COLOR: GREY
QUARRY: CATRIA MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 12 to 15 cm; WIDTH from 12 to 40.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	

ABBEY OF S. CROCE - FONTE AVELLANA (PU)

CRYPT MASONRY
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 77-86;
- PARDI 1972, p. 72.



088	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: GOOD	
MASONRY THICKNESS: 100 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: XII CENTURY (consecration 1197)	
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA	
LAYING: REGULAR IN PARALLEL ROWS	

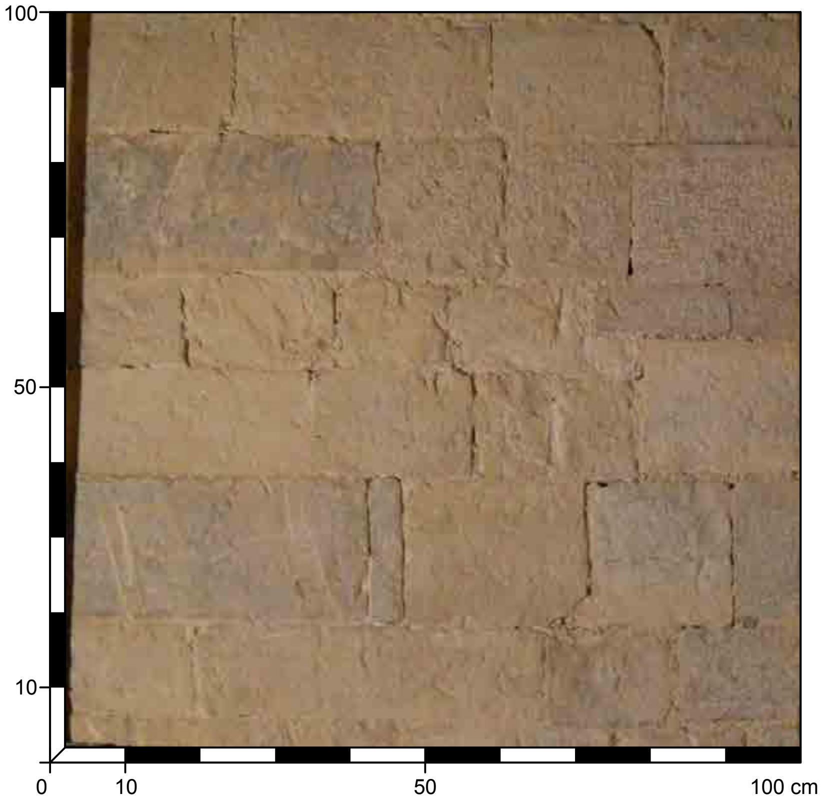
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.5 cm
QUARRY: CATRIA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 11 to 20.4 cm; WIDTH from 10 to 40.5 cm	DIMENSION: 1-2 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	COLOR: WHITE
LITHOTYPE: SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: LIGHT PINK	COLOR: WHITE
QUARRY: CATRIA MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 11 to 21 cm; WIDTH from 18 to 38.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	

ABBEY OF S. CROCE - FONTE AVELLANA (PU)

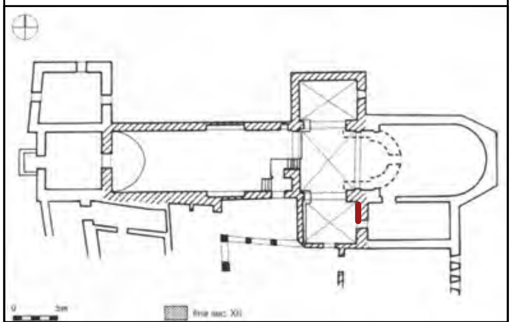
TRANSEPT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 77-86;
- PARDI 1972, p. 72.



090	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 100 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: XII CENTURY (consecration 1197)	
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA, CALCARI E MARNE A FUCOIDI	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 86.

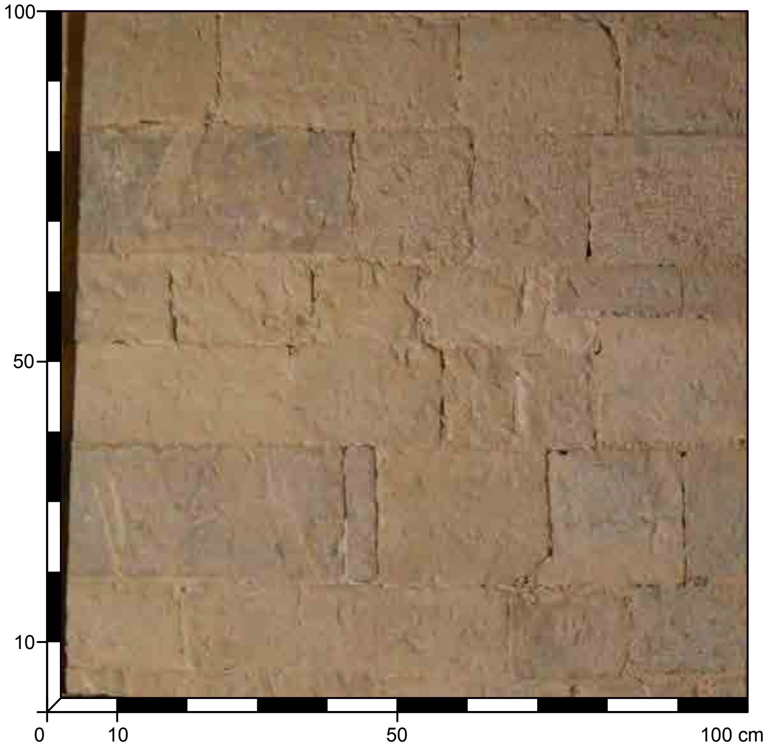
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.3-1.4 cm
QUARRY: CATRIA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 12.5 to 20 cm; WIDTH from 12 to 38.5 cm	DIMENSION: 2-8 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	COLOR: WHITE
LITHOTYPE: SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: LIGHT PINK	COLOR: WHITE
QUARRY: CATRIA MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 10 to 20 cm; WIDTH from 10.5 to 30 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	
LITHOTYPE: CALCARI E MARNE A FUCOIDI	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: GREY	
QUARRY: CATRIA MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 5 to 21 cm; WIDTH from 10.5 to 40.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	

ABBEY OF S. CROCE - FONTE AVELLANA (PU)

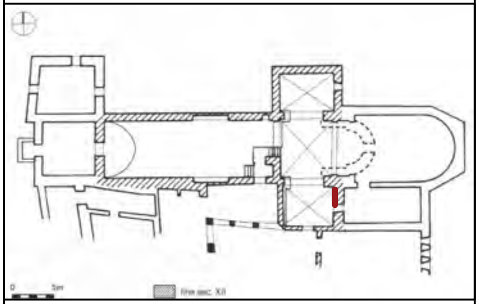
TRANSEPT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 77-86;
- PARDI 1972, p. 72.



090	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 100 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: XII CENTURY (consecration 1197)	
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA, CALCARI E MARNE A FUCOIDI	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 86.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.3-1.4 cm
QUARRY: CATRIA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 12.5 to 20 cm; WIDTH from 12 to 38.5 cm	DIMENSION: 2-8 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	COLOR: WHITE
LITHOTYPE: SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: LIGHT PINK	COLOR: WHITE
QUARRY: CATRIA MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 10 to 20 cm; WIDTH from 10.5 to 30 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	
LITHOTYPE: CALCARI E MARNE A FUCOIDI	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: GREY	
QUARRY: CATRIA MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 5 to 21 cm; WIDTH from 10.5 to 40.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	

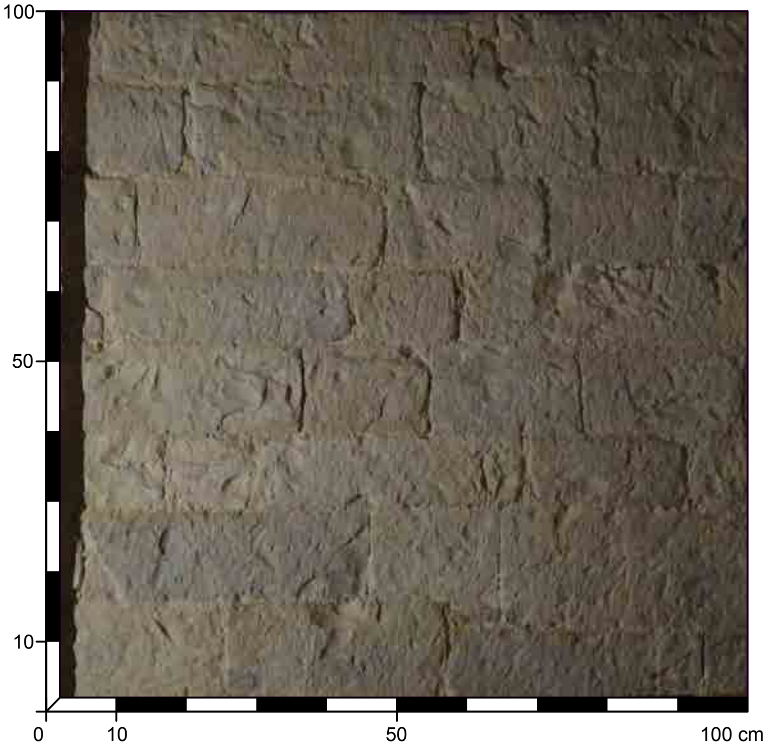
ABBEY OF S. CROCE - FONTE AVELLANA (PU)

TRANSEPT

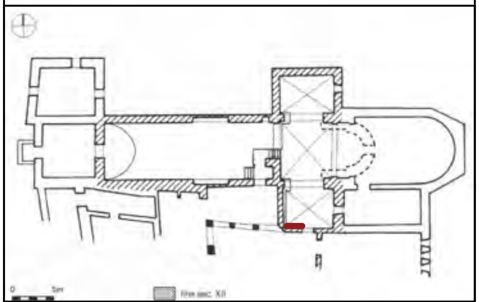
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 77-86;
- PARDI 1972, p. 72.



091	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 100 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: XII CENTURY (consecration 1197)	
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA, CALCARI E MARNE A FUCOIDI	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 86.

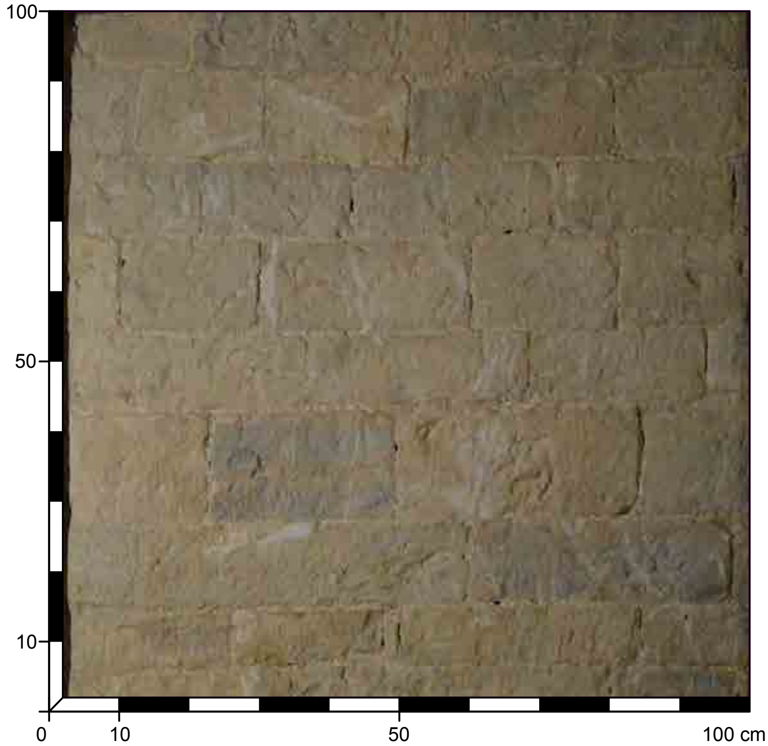
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.8-1 cm
QUARRY: CATRIA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 12.5 to 20 cm; WIDTH from 12 to 38.5 cm	DIMENSION: 2-8 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	COLOR: WHITE
LITHOTYPE: SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: LIGHT PINK	COLOR: WHITE
QUARRY: CATRIA MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 12.5 to 20 cm; WIDTH from 12.5 to 35 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	
LITHOTYPE: CALCARI E MARNE A FUCOIDI	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: GREY	
QUARRY: CATRIA MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 5 to 21 cm; WIDTH from 10.5 to 40.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	

ABBEY OF S. CROCE - FONTE AVELLANA (PU)

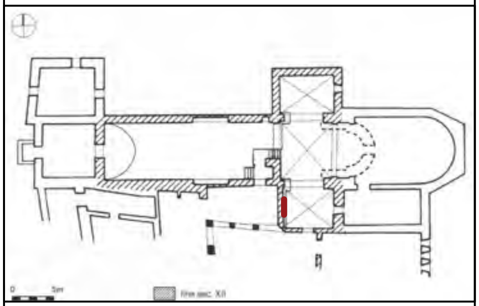
TRANSEPT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 77-86;
- PARDI 1972, p. 72.



092	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 100 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: XII CENTURY (consecration 1197)	
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA, CALCARI E MARNE A FUCOIDI	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 86.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.8-1 cm
QUARRY: CATRIA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 12.5 to 20 cm; WIDTH from 12 to 38.5 cm	DIMENSION: 2-8 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	COLOR: WHITE
LITHOTYPE: SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: LIGHT PINK	COLOR: WHITE
QUARRY: CATRIA MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 12.5 to 20 cm; WIDTH from 12.5 to 35 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	
LITHOTYPE: CALCARI E MARNE A FUCOIDI	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: GREY	
QUARRY: CATRIA MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 5 to 21 cm; WIDTH from 10.5 to 40.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	

ABBEY OF S. CROCE - FONTE AVELLANA (PU)

TRANSEPT

DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 77-86;
- PARDI 1972, p. 72.

093 RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD

MASONRY THICKNESS: 100 cm

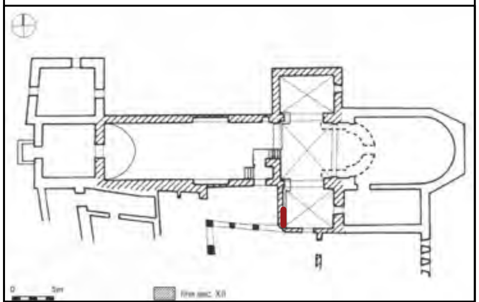
TYPE OF STRUCTURE: BEARING WALL

FACADE: INTERIOR

DATING: XII CENTURY (consecration 1197)

MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA, CALCARI E MARNE A FUCOIDI

LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 86.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.2 cm
QUARRY: CATRIA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 12.5 to 20 cm; WIDTH from 12 to 40 cm	DIMENSION: 1 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	COLOR: WHITE
LITHOTYPE: SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: LIGHT PINK	COLOR: WHITE
QUARRY: CATRIA MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 17.5 to 22 cm; WIDTH from 12. to 40.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	
LITHOTYPE: CALCARI E MARNE A FUCOIDI	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: GREY	
QUARRY: CATRIA MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 5 to 21 cm; WIDTH from 10.5 to 40.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	

ABBEY OF S. CROCE - FONTE AVELLANA (PU)

NAVE RIGHT WALL

DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 77-86;
- PARDI 1972, p. 72.

094	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD

MASONRY THICKNESS: 100 cm

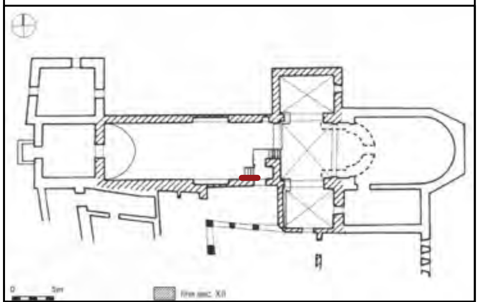
TYPE OF STRUCTURE: BEARING WALL

FACADE: INTERIOR

DATING: XII CENTURY (consecration 1197)

MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA, CALCARI E MARNE A FUCOIDI

LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 86.

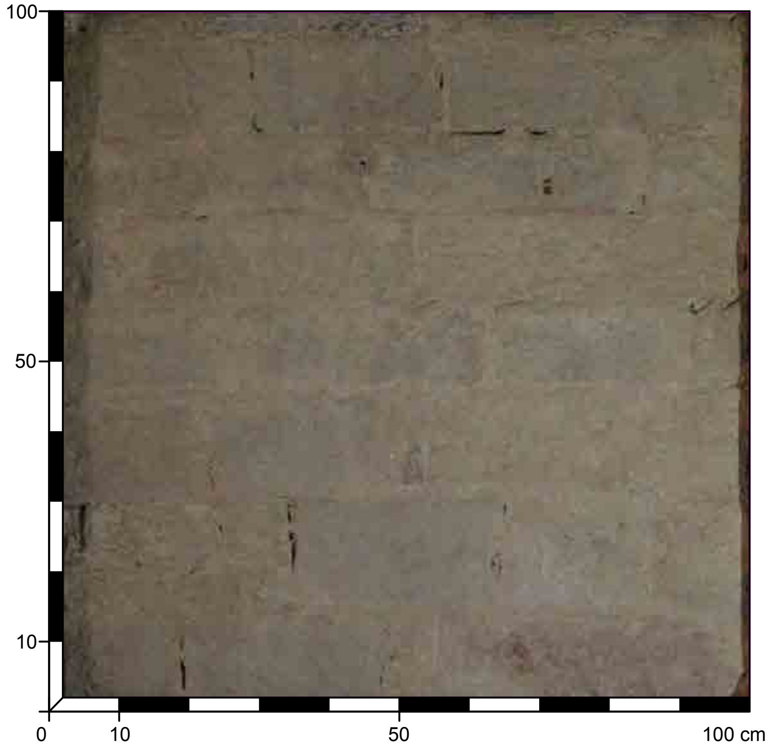
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 1.6-1.8 cm
QUARRY: CATRIA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 19.5 to 24.5 cm; WIDTH from 18.5 to 32 cm	DIMENSION: 2-8 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	COLOR: WHITE
LITHOTYPE: SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: LIGHT PINK	COLOR: WHITE
QUARRY: CATRIA MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 18 to 25 cm; WIDTH from 17.5 to 42 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	
LITHOTYPE: CALCARI E MARNE A FUCOIDI	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: GREY	
QUARRY: CATRIA MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 5 to 19 cm; WIDTH from 12 to 40 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	

ABBEY OF S. CROCE - FONTE AVELLANA (PU)

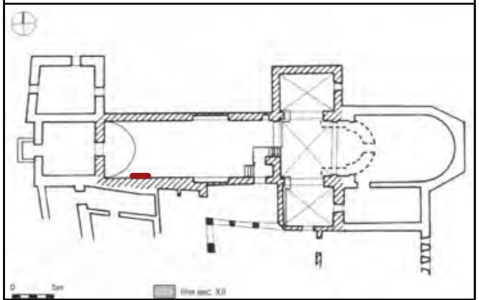
NAVE RIGHT WALL
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 77-86;
- PARDI 1972, p. 72.



095	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 100 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: XII CENTURY (consecration 1197)	
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA, CALCARI E MARNE A FUCOIDI	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 86.

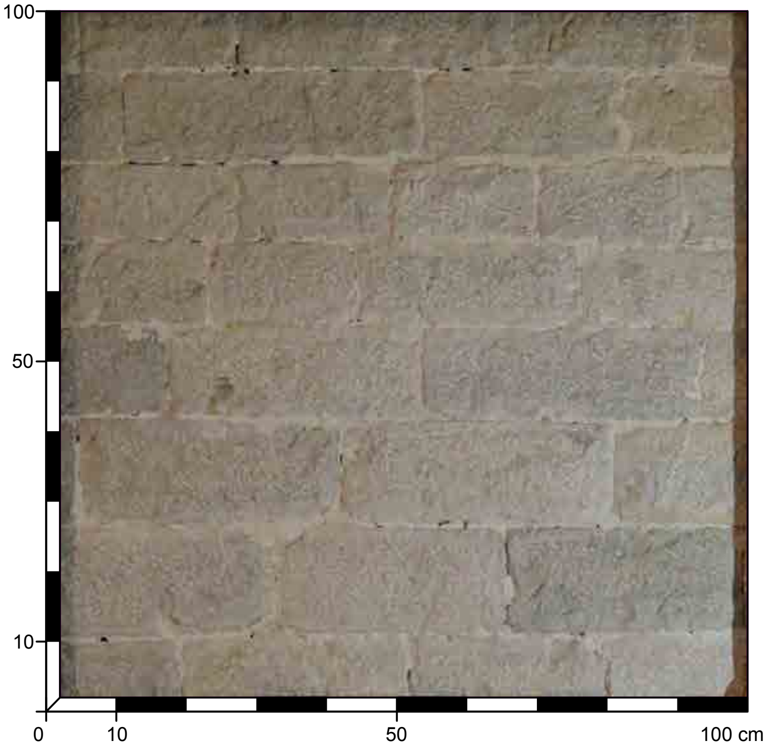
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 1.6-1.8 cm
QUARRY: CATRIA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 19 to 25 cm; WIDTH from 20.5 to 30 cm	DIMENSION: 2-8 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	COLOR: WHITE
LITHOTYPE: SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: LIGHT PINK	COLOR: WHITE
QUARRY: CATRIA MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 19 to 25 cm; WIDTH from 18 to 35 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	
LITHOTYPE: CALCARI E MARNE A FUCOIDI	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: GREY	
QUARRY: CATRIA MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 10 to 20 cm; WIDTH from 10 to 32 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	

ABBEY OF S. CROCE - FONTE AVELLANA (PU)

NAVE RIGHT WALL
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 77-86;
- PARDI 1972, p. 72.



096	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD

MASONRY THICKNESS: 100 cm

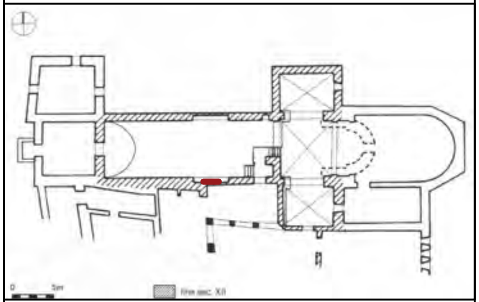
TYPE OF STRUCTURE: BEARING WALL

FACADE: INTERIOR

DATING: RESTORATION WORK

MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA

LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 86.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.6 cm
QUARRY: CATRIA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 106 to 14.5 cm; WIDTH from 20 to 42.5 cm	DIMENSION: 1-2 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND PITCHING TOOLS	COLOR: WHITE
LITHOTYPE: SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: LIGHT PINK	COLOR: LIGHT BROWN
QUARRY: CATRIA MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 10.5 to 14.2 cm; WIDTH from 22.2 to 38.4 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND PITCHING TOOLS	
LITHOTYPE: CALCARI E MARNE A FUCOIDI	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: GREY	
QUARRY: CATRIA MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 10.5 to 14.6 cm; WIDTH from 19.6 to 42.8 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND PITCHING TOOLS	

ABBEY OF S. CROCE - FONTE AVELLANA (PU)

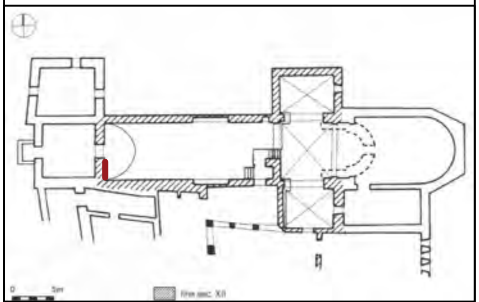
COUNTER FACADE
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 77-86;
- PARDI 1972, p. 72.

097	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 90 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: END OF XII CENTURY
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 86.

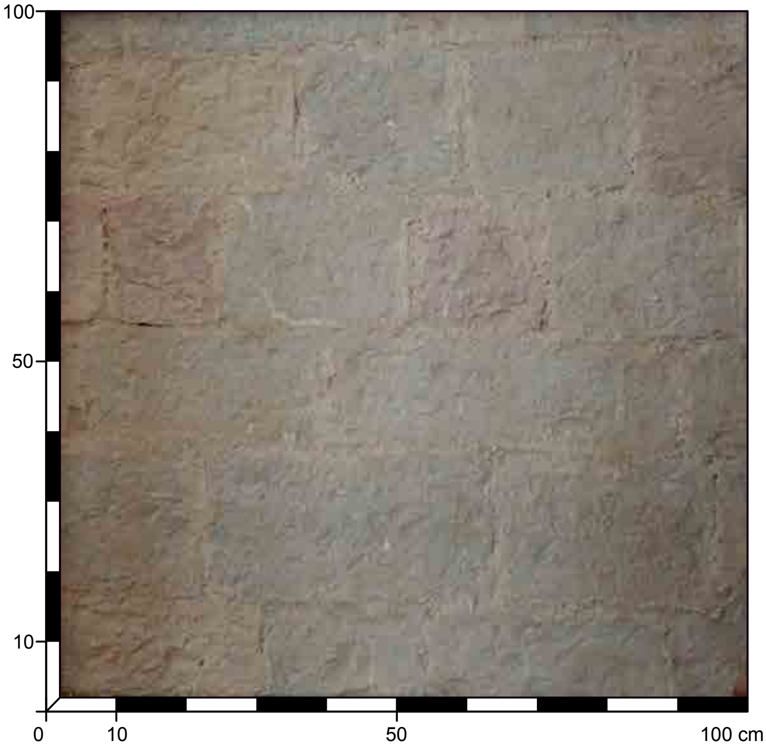
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.8-1 cm
QUARRY: CATRIA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 10.5 to 18.5 cm; WIDTH from 11.5 to 38 cm	DIMENSION: 1-2 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	COLOR: WHITE
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: LIGHT PINK	COLOR: WHITE
QUARRY: CATRIA MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 15 to 85 cm; WIDTH from 18 to 40 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	

ABBEY OF S. CROCE - FONTE AVELLANA (PU)

NAVE LEFT WALL
DATE OF SURVEY 09 AGO 2016

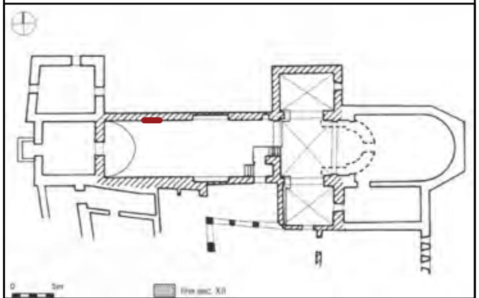
BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 77-86;
- PARDI 1972, p. 72.



098	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 70 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: SECOND HALF OF XII CENTURY
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 86.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 2 cm
QUARRY: CATRIA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 15.5 to 21.5 cm; WIDTH from 24.5 to 40 cm	DIMENSION:1-5 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	COLOR: WHITE
LITHOTYPE: SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: LIGHT PINK	COLOR: WHITE
QUARRY: CATRIA MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 15 to 21.5 cm; WIDTH from 18 to 28.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	

CHURCH OF S. BENEDETTO - GUALDO TADINO (PG)

MAIN FACADE
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- *Benedetto* 2008, p.93;
- STORELLI 1957, pp. 3-6.

099	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: >60 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: SECOND HALF OF 13TH CENTURY	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN ISOMETRIC PARALLEL ROWS	

STONE ELEMENTS	MORTAR (1)
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.1 cm
QUARRY: PENNA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 15.5 to 16.1 cm; WIDTH from 32.2 to 53.5 cm	DIMENSION: 1 mm
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER AND PITCHING TOOLS	COLOR: WHITE, PINK
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT BROWN
	MORTAR (2)
	CONSISTENCY: SOLID
	SIFT: FINE
	MORTAR (BEDDING) THICKNESS: 0.5 cm
	BINDER: CEMENT
	AGGREGATE: LIMESTONE FRAGMENTS
	DIMENSION: 1-4 mm
	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

CHURCH OF S. BENEDETTO - GUALDO TADINO (PG)

MAIN FACADE
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- *Benedetto* 2008, p.93;
- STORELLI 1957, pp. 3-6.

100	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: >60 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: SECOND HALF OF 13TH CENTURY
MATERIALS: SCAGLIA BIANCA
LAYING: REGULAR IN PSEUDO-ISOMETRIC PARALLEL ROWS

STONE ELEMENTS	MORTAR (1)
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.1 cm
QUARRY: PENNA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 15.5 to 22.5 cm; WIDTH from 18 to 56.5 cm	DIMENSION: 1 mm
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER AND PITCHING TOOLS	COLOR: WHITE, PINK
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT BROWN
	MORTAR (2)
	CONSISTENCY: SOLID
	SIFT: FINE
	MORTAR (BEDDING) THICKNESS: 0.5 cm
	BINDER: CEMENT
	AGGREGATE: LIMESTONE FRAGMENTS
	DIMENSION: 1-4 mm
	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

CHURCH OF S. BENEDETTO - GUALDO TADINO (PG)

RIGHT FRONT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- *Benedetto* 2008, p.93;
- STORELLI 1957, pp. 3-6.

101	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: >60 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: SECOND HALF OF 13TH CENTURY	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PSEUDO-ISOMETRIC PARALLEL ROWS	

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.5 cm
QUARRY: PENNA MOUNT	**BINDER:** CEMENT
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 16 to 20 cm; WIDTH from 18 to 41.8 cm	DIMENSION: 1-4 mm
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER AND PITCHING TOOLS	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

CHURCH OF S. BENEDETTO - GUALDO TADINO (PG)

RIGHT FRONT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- *Benedetto* 2008, p.93;
- STORELLI 1957, pp. 3-6.

102	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: >60 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: END OF 20TH CENTURY (POST 1997?)
MATERIALS: SCAGLIA BIANCA
LAYING: REGULAR IN PSEUDO-ISOMETRIC PARALLEL ROWS

STONE ELEMENTS	MORTAR (1)
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.5 cm
QUARRY: PENNA MOUNT	**BINDER:** CEMENT
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT 18 cm; WIDTH from 25 to 46.5 cm	DIMENSION: 1-4 mm
MANUFACTURE: SURFACE PROCESSING WITH INDUSTRIAL METHODS	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

CHURCH OF S. DONATO - GUALDO TADINO (PG)

LEFT FRONT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

• TARCHI 1937.

103	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: FAIRLY GOOD
MASONRY THICKNESS: >50 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: POST 1255
MATERIALS: SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 1-3 cm
QUARRY: PENNA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 15.5 to 16.1 cm; WIDTH from 32.2 to 53.5 cm	DIMENSION: 1-8 mm
MANUFACTURE: SURFACE PROCESSING WITH AXE AND/OR POINT CHISEL	COLOR: WHITE, PINK
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT BROWN

CHURCH OF S. DONATO - GUALDO TADINO (PG)

LEFT FRONT

DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- TARCHI 1937.

104	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: FAIRLY GOOD	
MASONRY THICKNESS: >50 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: POST 1255	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	

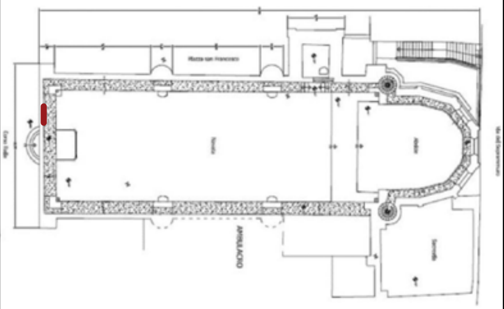
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 1-3 cm
QUARRY: PENNA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 5.5 to 21.8 cm; WIDTH from 20 to 35 cm	DIMENSION: 1-8 mm
MANUFACTURE: SURFACE PROCESSING WITH AXE AND/OR POINT CHISEL	COLOR: WHITE, PINK
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT BROWN

CHURCH OF S. FRANCESCO - GUALDO TADINO (PG)

MAIN FACADE

DATE OF SURVEY 09 AGO 2016

105	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 167 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1241-1315	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



Elaborato grafico tratto dal progetto di restauro dello Studio Marconi. (http://www.divisare.com)

STONE ELEMENTS	**MORTAR (POST 1997)**
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.5 cm
QUARRY: PENNA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 14.6 to 26.1 cm; WIDTH from 32.2 to 53.5 cm	DIMENSION: 1-2 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT GREY

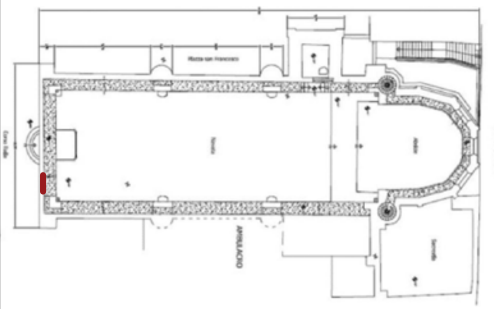
CHURCH OF S. FRANCESCO - GUALDO TADINO (PG)

MAIN FACADE

DATE OF SURVEY 09 AGO 2016

106	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 167 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1241-1315
MATERIALS: SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS



Elaborato grafico tratto dal progetto di restauro dello Studio Marconi. (http://www.divisare.com)

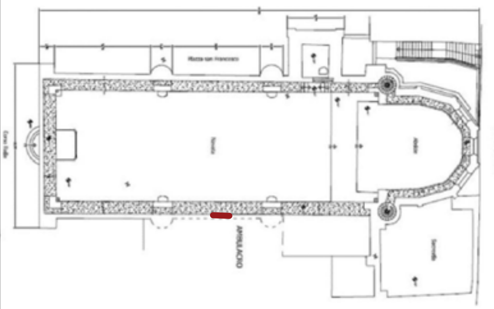
STONE ELEMENTS	MORTAR (POST 1997)
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.5 to 0.8 cm
QUARRY: PENNA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 14.6 to 25.5 cm; WIDTH from 25 to 37.2 cm	DIMENSION: 1-2 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT GREY

CHURCH OF S. FRANCESCO - GUALDO TADINO (PG)

RIGHT FRONT
DATE OF SURVEY 09 AGO 2016

107	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 172 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1241-1315
MATERIALS: SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS



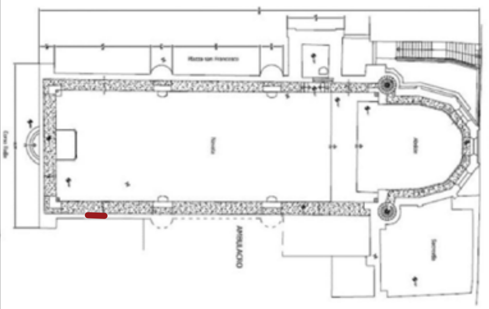
Elaborato grafico tratto dal progetto di restauro dello Studio Marconi. (http://www.divisare.com)

STONE ELEMENTS	MORTAR (POST 1997)
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.5 to 0.8 cm
QUARRY: PENNA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 11.7 to 16.2 cm; WIDTH from 16.5 to 31 cm	DIMENSION: 1-2 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT GREY

CHURCH OF S. FRANCESCO - GUALDO TADINO (PG)

RIGHT FRONT
DATE OF SURVEY 09 AGO 2016

108	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 172 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1241-1315	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



Elaborato grafico tratto dal progetto di restauro dello Studio Marconi. (http://www.divisare.com)

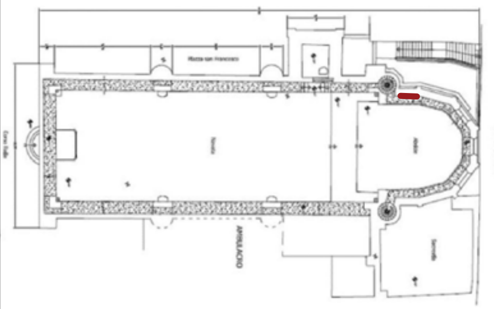
STONE ELEMENTS	**MORTAR (POST 1997)**
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.3 cm
QUARRY: PENNA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 10 to 15.5 cm; WIDTH from 12.8 to 41 cm	DIMENSION: 1-2 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT GREY

CHURCH OF S. FRANCESCO - GUALDO TADINO (PG)

APSE
DATE OF SURVEY 09 AGO 2016

109	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 170 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1241-1315
MATERIALS: SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS



Elaborato grafico tratto dal progetto di restauro dello Studio Marconi. (http://www.divisare.com)

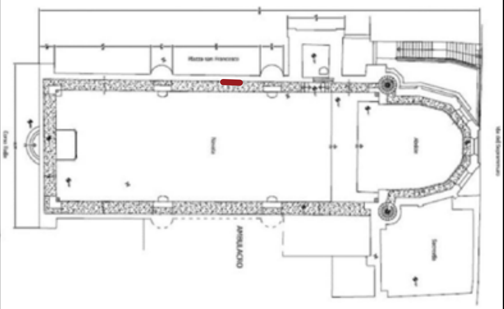
STONE ELEMENTS	MORTAR (POST 1997)
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.5 to 2 cm
QUARRY: PENNA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 11.7 to 21.5 cm; WIDTH from 26.7 to 49.5 cm	DIMENSION: 1-2 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT GREY

CHURCH OF S. FRANCESCO - GUALDO TADINO (PG)

LEFT FRONT
DATE OF SURVEY 09 AGO 2016

110	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 170 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1241-1315
MATERIALS: SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS



Elaborato grafico tratto dal progetto di restauro dello Studio Marconi. (http://www.divisare.com)

STONE ELEMENTS	MORTAR (POST 1997)
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.5 to 1 cm
QUARRY: PENNA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 9.5 to 20.5 cm; WIDTH from 17.8 to 44.7 cm	DIMENSION: 1-2 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT GREY

CHURCH OF S. MARIA - GUALDO TADINO (PG)

MAIN FACADE
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- TARCHI 1937.

111	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 130 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1270
MATERIALS: SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.5-06 cm
QUARRY: PENNA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 14.6 to 26.1 cm; WIDTH from 32.2 to 53.5 cm	DIMENSION: 1-2 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT BROWN

CHURCH OF S. MARIA - GUALDO TADINO (PG)

LEFT FRONT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- TARCHI 1937.

112	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 130 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1270
MATERIALS: SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 2.5 - 4 cm
QUARRY: PENNA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 14.6 to 26.1 cm; WIDTH from 32.2 to 53.5 cm	DIMENSION: 1-2 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

PALAZZO DEL BARGELLO - GUBBIO (PG)

NORTH-EAST FRONT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- CENNI 2010;
- TABARELLI 1978, p. 157.

113	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD

MASONRY THICKNESS: 105 cm

TYPE OF STRUCTURE: BEARING WALL

FACADE: EXTERIOR

DATING: 14TH CENTURY

MATERIALS: SCAGLIA BIANCA

LAYING: REGULAR IN PARALLEL ROWS

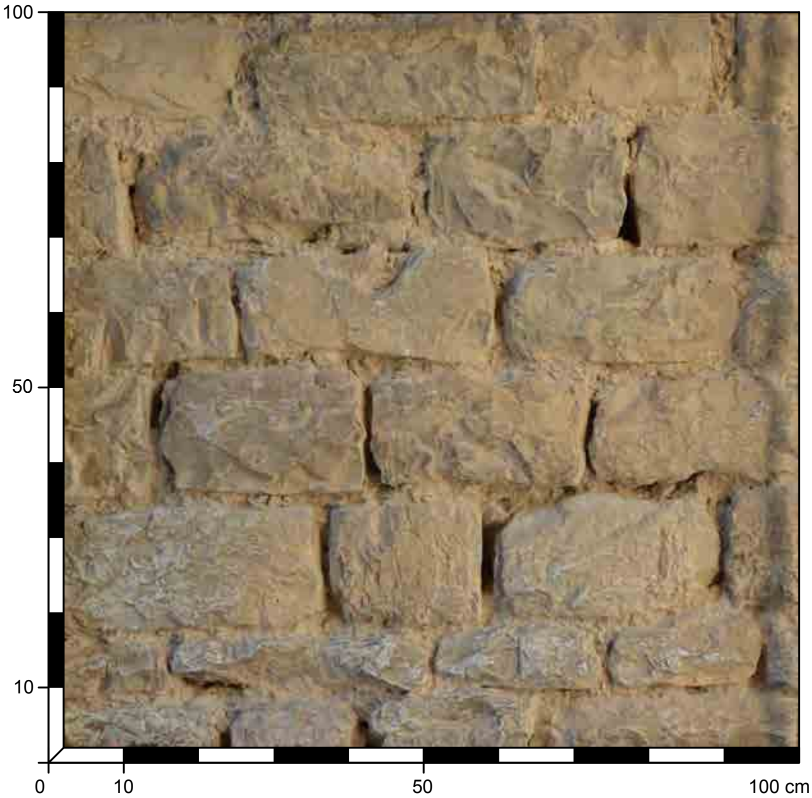
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.1 cm
QUARRY: INGINO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 14 to 26.7 cm; WIDTH from 32.2 to 53.5 cm	DIMENSION: <1 mm
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL (dist. 1 mm approximately) AND BUSH HAMMER	COLOR: RED, WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT BROWN

CITY WALLS - GUBBIO (PG)

S. UBALDO'S GATE
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- TABARELLI 1978, p. 157.



114	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: --	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 13-14TH CENTURY	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	

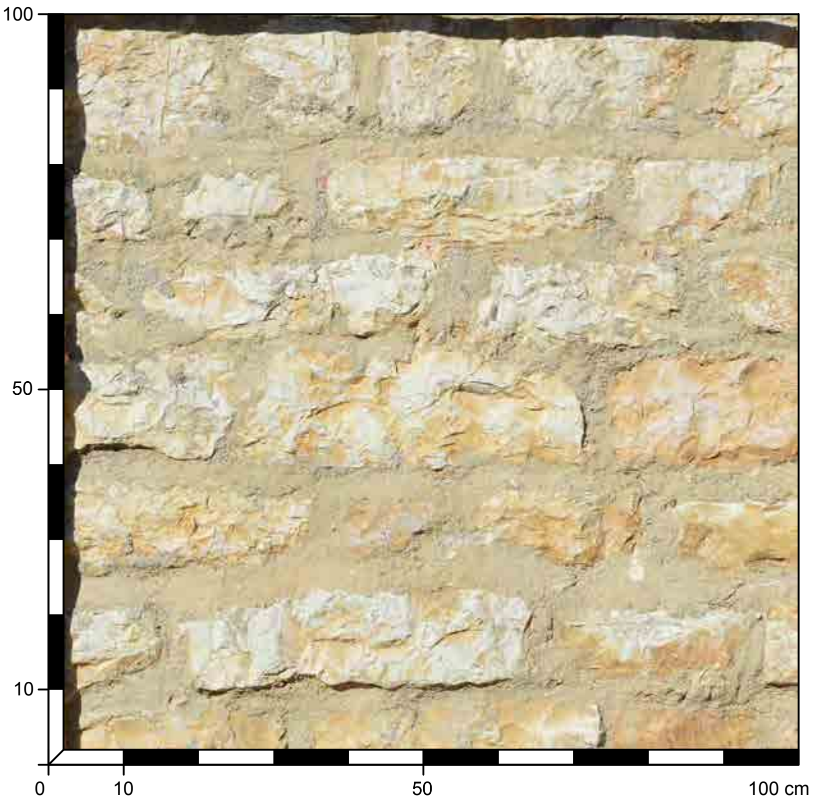
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 1.5 - 2 cm
QUARRY: INGINO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 8 to 16 cm; WIDTH from 20 to 35 cm	DIMENSION: <1 mm
MANUFACTURE: SURFACE PROCESSING WITH AXE AND/OR POINT CHISEL	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT BROWN

CITY WALLS - GUBBIO (PG)

WALLS CLOSE TO S. UBALDO'S GATE
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- TABARELLI 1978, p. 157.



115	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: --	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 13-14TH CENTURY	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 3 - 4 cm
QUARRY: INGINO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 8 to 16 cm; WIDTH from 12 to 47 cm	DIMENSION: 1-2 mm
MANUFACTURE: SURFACE PROCESSING WITH AXE AND/OR POINT CHISEL	COLOR: RED, WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT BROWN

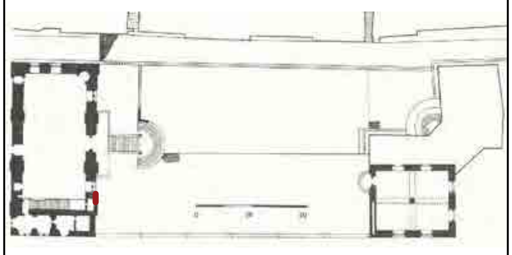
PALAZZO DEI CONSOLI - GUBBIO (PG)

SOUTH FRONT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- TABARELLI 1978, p. 157-158.

116	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 100 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1332-1338	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



TABARELLI 1978, p. 157.

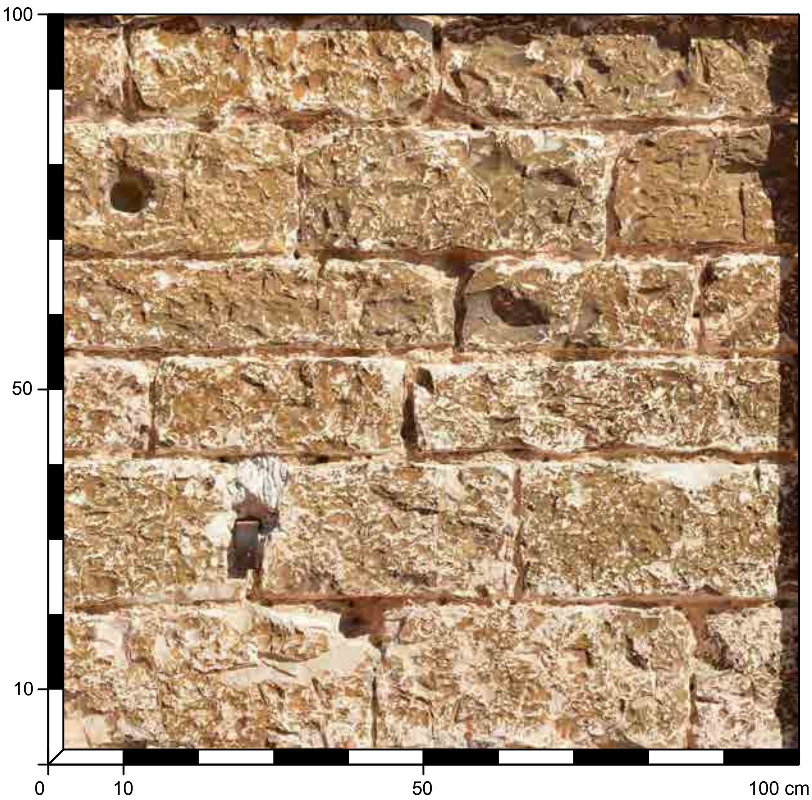
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.4 - 0.7 cm
QUARRY: INGINO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 17.3 to 25.5cm; WIDTH from 40.9 to 73.5 cm	DIMENSION: 2 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND PITCHING TOOLS	COLOR: RED
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT BROWN

PALAZZO PRETORIO - GUBBIO (PG)

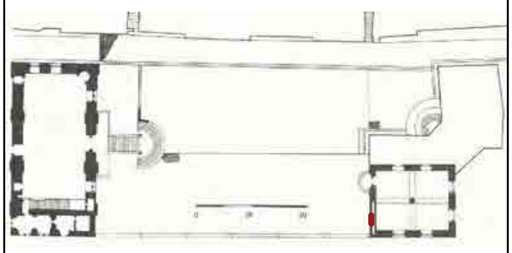
NORTH FRONT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- TABARELLI 1978, p. 157-158.



117	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: >60 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



TABARELLI 1978, p. 157.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 1.2 - 2.2 cm
QUARRY: INGINO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 11.7 to 19 cm; WIDTH from 20 to 35 cm	DIMENSION:1- 2 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND/OR AXE	COLOR: RED
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: LIGHT BROWN

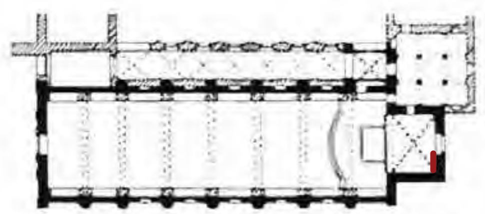
CHURCH OF S. AGOSTINO - GUBBIO (PG)

APSE
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, pp. 190-193.

118	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: FAIRLY GOOD	
MASONRY THICKNESS: >80 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1251-1294	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN SEMI-PARALLEL ROWS	



QUINTERIO, CANALI 2010, p. 193.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** --
QUARRY: LOCAL	**BINDER:** LIME
SHAPE: BLOCKS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 7 to 16.5 cm; WIDTH from 16 to 40 cm	DIMENSION: from 1 to 5 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND AXE	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

CHURCH OF S. AGOSTINO - GUBBIO (PG)

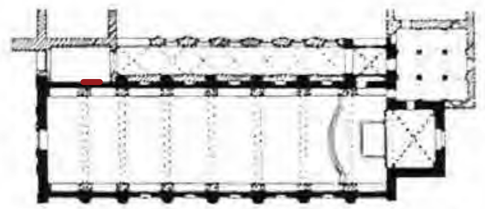
LEFT FRONT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, pp. 190-193.

119	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS

CONSERVATION: FAIRLY GOOD
MASONRY THICKNESS: >80 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1251-1294
MATERIALS: SCAGLIA BIANCA
LAYING: REGULAR IN SEMI-PARALLEL ROWS



QUINTERIO, CANALI 2010, p. 193.

STONE ELEMENTS	**MORTAR**
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 1.5 - 2.5 cm
QUARRY: LOCAL	**BINDER:** LIME
SHAPE: BLOCKS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 7 to 19 cm; WIDTH from 15.5 to 40 cm	DIMENSION: 1-2 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND AXE	COLOR: WHITE, RED
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

CHURCH OF S. AGOSTINO - GUBBIO (PG)

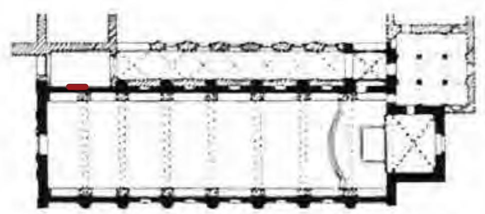
LEFT FRONT

DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, pp. 190-193.

120	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: FAIRLY GOOD	
MASONRY THICKNESS: >80 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1251-1294	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



QUINTERIO, CANALI 2010, p. 193.

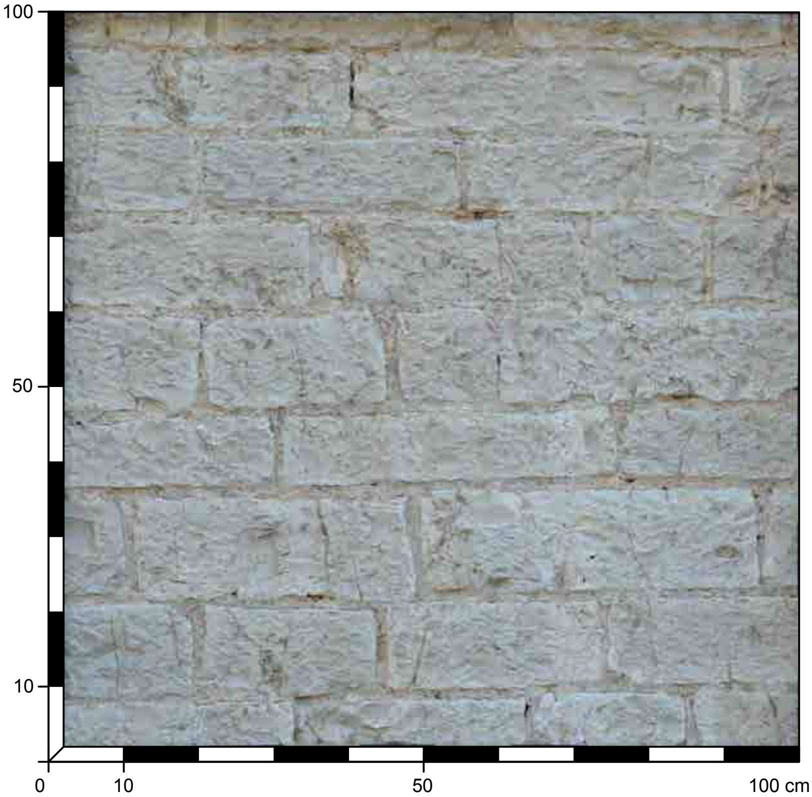
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 1.7 - 2 cm
QUARRY: LOCAL	**BINDER:** LIME
SHAPE: BLOCKS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 10.5 to 13 cm; WIDTH from 14 to 31.5 cm	DIMENSION: 1-2 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND AXE	COLOR: WHITE, RED
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

CHURCH OF S. BENEDETTO - GUBBIO (PG)

RIGHT FRONT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, p. 167.



121	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: >70 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: POST 1226	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 1.2 cm approximately
QUARRY: LOCAL	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 8.8 to 13.5cm; WIDTH from 13 to 44.3 cm	DIMENSION: 1-8 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND AXE	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

CHURCH OF S. DOMENICO - GUBBIO (PG)

LEFT FRONT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, p.150.

122	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: >60 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 14TH CENTURY	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.8 to 1.4 cm
QUARRY: INGINO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 11.8 to 16.5cm; WIDTH from 22.8 to 43.5 cm	DIMENSION: 5 mm
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH (dist.1 mm) CHISEL AND BUSH HAMMER	COLOR: RED, WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

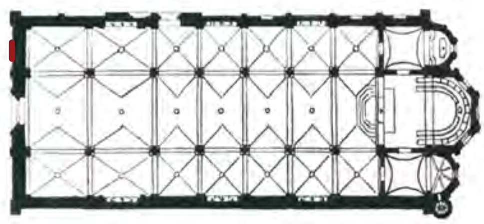
CHURCH OF S. FRANCESCO - GUBBIO (PG)

MAIN FACADE
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, pp.188-189.
- PARDI 1972, p. 222.

123	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 85 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 13TH CENTURY	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



QUINTERIO, CANALI 2010, p. 188.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.2 cm
QUARRY: INGINO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 11.8 to 16.5cm; WIDTH from 22.8 to 43.5 cm	DIMENSION: 1-3 mm
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH (dist.1 mm) CHISEL AND BUSH HAMMER	COLOR: RED, WHITE, GREY, OCHER
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

CHURCH OF S. FRANCESCO - GUBBIO (PG)

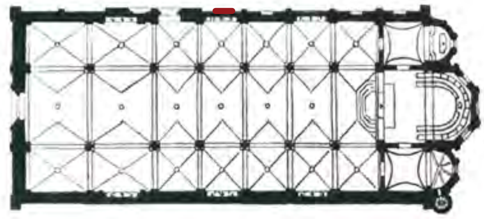
LEFT FRONT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, pp.188-189.
- PARDI 1972, p. 222.

124	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS (AND SLABS)

CONSERVATION: GOOD
MASONRY THICKNESS: 78 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1250 approximately
MATERIALS: SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS



QUINTERIO, CANALI 2010, p. 188.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.2 cm
QUARRY: INGINO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 11.8 to 16.5cm; WIDTH from 22.8 to 43.5 cm	DIMENSION: 1-3 mm
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH (dist.1 mm) CHISEL AND BUSH HAMMER	COLOR: RED, WHITE, GREY, OCHER
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

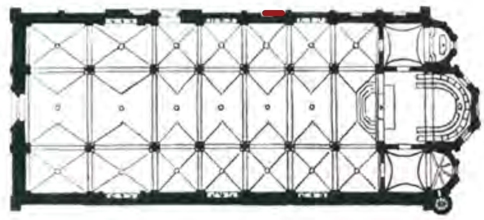
CHURCH OF S. FRANCESCO - GUBBIO (PG)

LEFT FRONT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, pp.188-189.
- PARDI 1972, p. 222.

125	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 75 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1250 approximately	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



QUINTERIO, CANALI 2010, p. 188.

STONE ELEMENTS	**MORTAR**
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 1 - 1.2 cm
QUARRY: INGINO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 12.7 to 18 cm; WIDTH from 23 to 51.6 cm	DIMENSION: 1-3 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	COLOR: RED, WHITE, GREY, OCHER
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

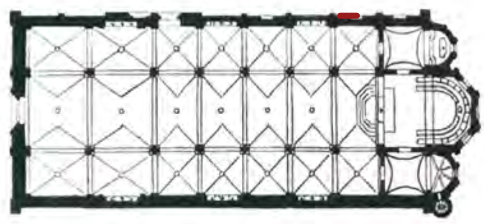
CHURCH OF S. FRANCESCO - GUBBIO (PG)

LEFT FRONT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, pp.188-189.
- PARDI 1972, p. 222.

126	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS (AND SLABS)
CONSERVATION: GOOD	
MASONRY THICKNESS: 78 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1250 approximately	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



QUINTERIO, CANALI 2010, p. 188.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.2 cm
QUARRY: INGINO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS BLOCKS: HEIGHT from 18.5 to 25.2 cm; WIDTH from 41.6 to 72 cm DIMENSIONS SLABS: HEIGHT 37.8 cm; WIDTH 120.4 cm	DIMENSION: 1-3 mm COLOR: RED, WHITE, GREY, OCHER
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH (dist 1 mm approx.) CHISEL AND PITCHING TOOLS	**AGGREGATE:** SAND DIMENSION: <1 mm
	COLOR: GREY

CHURCH OF S. FRANCESCO - GUBBIO (PG)

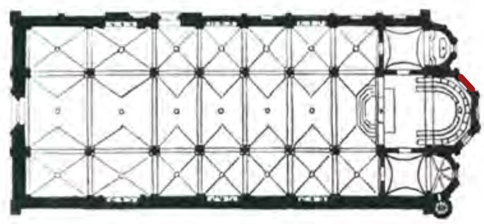
APSE
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, pp.188-189.
- PARDI 1972, p. 222.

127	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS

CONSERVATION: GOOD
MASONRY THICKNESS: >80 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1250 approximately
MATERIALS: SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS



QUINTERIO, CANALI 2010, p. 188.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.5 to 1.7 cm
QUARRY: INGINO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 14 to 19.7 cm; WIDTH from 19 to 40.1 cm	DIMENSION: 1-3 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	COLOR: RED, WHITE, GREY, OCHER
LITHOTYPE: SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: LIGHT PINK	COLOR: GREY
QUARRY: INGINO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 7.7 to 15.5 cm; WIDTH from 22.2 to 36.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	

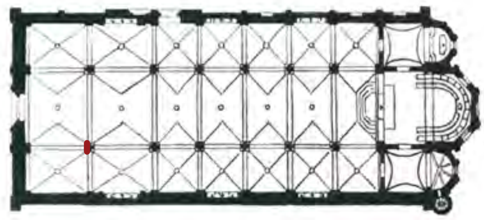
CHURCH OF S. FRANCESCO - GUBBIO (PG)

PILLAR
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, pp.188-189.
- PARDI 1972, p. 222.

128	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 100 cm approx.	
TYPE OF STRUCTURE: PILLAR	
FACADE: INTERIOR	
DATING: 1250 approximately	
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA	
LAYING: REGULAR IN PARALLEL ROWS	



QUINTERIO, CANALI 2010, p. 188.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.1 - 0.2 cm
QUARRY: INGINO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 19.5 to 20 cm	DIMENSION: 1 mm
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH (dist 1 mm approx.) CHISEL AND PITCHING TOOLS	COLOR: RED, WHITE, GREY, OCHER **AGGREGATE:** SAND
LITHOTYPE: SCAGLIA ROSSA	DIMENSION: <1 mm
NATURE: CARBONATIC LIMESTONE ROCK	COLOR: GREY
COLOR: LIGHT PINK	
QUARRY: INGINO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 19 to 19.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH (dist 1 mm approx.) CHISEL AND PITCHING TOOLS	

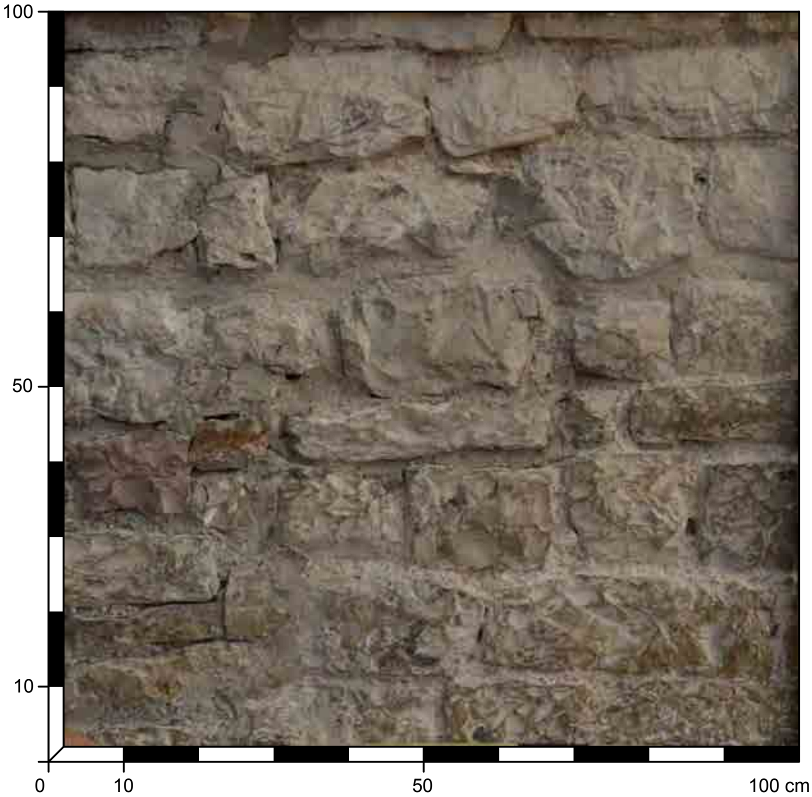
CHURCH OF S. FRANCESCO - GUBBIO (PG)

RIGHT NAVE

DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, pp.188-189.
- PARDI 1972, p. 222.



129	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ELEMENTS

CONSERVATION: GOOD

MASONRY THICKNESS: --

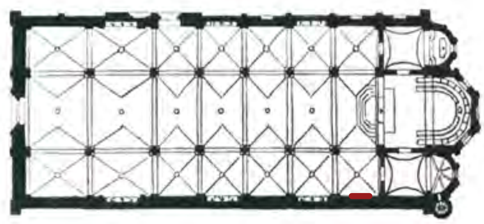
TYPE OF STRUCTURE: BEARING WALL

FACADE: INTERIOR

DATING: 1250 approximately

MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA

LAYING: REGULAR IN PARALLEL ROWS



QUINTERIO, CANALI 2010, p. 188.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 1 to 2.5 cm
QUARRY: INGINO MOUNT	**BINDER:** LIME
SHAPE: BLOCKS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 6 to 14.5 cm; WIDTH from 9.5 to 40 cm	DIMENSION: 1-2 mm
MANUFACTURE: SURFACE PROCESSING WITH AXE AND POINT CHISEL	COLOR: RED, WHITE, GREY, OCHER
LITHOTYPE: SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: LIGHT PINK	COLOR: GREY
QUARRY: INGINO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 6.5 to 12.5 cm; WIDTH from 5 to 16 cm	
MANUFACTURE: SURFACE PROCESSING WITH AXE AND POINT CHISEL	

CATHEDRAL OF SS. MARIANO E GIACOMO - GUBBIO (PG)

MAIN FACADE
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010.

130	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: >70 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1194 1350
MATERIALS: DISCOLOURED SCAGLIA ROSSA, SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.4 cm
QUARRY: LOCAL	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 122.5 to 23.5 cm AND 15 cm	DIMENSION: 1-3 mm
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH (dist.1 mm) CHISEL AND BUSH HAMMER	COLOR: RED, WHITE, GREY, OCHER **AGGREGATE:** SAND
LITHOTYPE: SCAGLIA ROSSA	DIMENSION: <1 mm
NATURE: CARBONATIC LIMESTONE ROCK	COLOR: GREY
COLOR: PINK	
QUARRY: LOCAL	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 11.8 to 16.5cm; WIDTH from 22.8 to 43.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	

CATHEDRAL OF SS. MARIANO E GIACOMO - GUBBIO (PG)

MAIN FACADE
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010.

131	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS AND SLABS

CONSERVATION: GOOD
MASONRY THICKNESS: --
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1194 - 1350
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 1 cm
QUARRY: LOCAL	**BINDER:** LIME
SHAPE: ASHLARS AND SLABS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS BLOCKS: HEIGHT 24 cm DIMENSIONS SLABS: HEIGHT 48.1 cm	DIMENSION: 1-3 mm COLOR: WHITE, GREY
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH (dist.1 mm) CHISEL AND BUSH HAMMER	**AGGREGATE:** SAND DIMENSION: <1 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: GREY
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: PINK	
QUARRY: LOCAL	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT 24 cm approx.; WIDTH from 27.5 to 41.3 cm	
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH (dist.1 mm) CHISEL AND BUSH HAMMER	

CATHEDRAL OF SS. MARIANO E GIACOMO - GUBBIO (PG)

SACRISTY
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010.

132	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: GOOD	
MASONRY THICKNESS: >70 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1194 - 1350	
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA. BRICKS	
LAYING: REGULAR IN PARALLEL ROWS	

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** 1.8 - 2.3 cm
QUARRY: LOCAL	**BINDER:** LIME
SHAPE: BLOCKS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from7.2 to 16.8 cm; WIDTH from 7 to 45.8 cm	DIMENSION: 1-5 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	COLOR: RED, WHITE, GREY
LITHOTYPE: SCAGLIA BIANCA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: WHITE	COLOR: GREY
QUARRY: LOCAL	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT 13-15 cm ;WIDTH from 13.5 to 16 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	
LITHOTYPE: BRICKS	
NATURE: REUSE CERAMIC MATERIAL	
COLOR: OCHER	
DIMENSIONS BRICKS: HEIGHT 3 cm DIMENSIONS TILES: HEIGHT 1.4 cm	

CATHEDRAL OF SS. MARIANO E GIACOMO - GUBBIO (PG)

SACRISTY
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010.

133	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: GOOD	
MASONRY THICKNESS: --	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: 1194 - 1350	
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA, BRICKS	
LAYING: REGULAR IN PARALLEL ROWS	

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 1.8 to 2.3 cm
QUARRY: LOCAL	**BINDER:** LIME
SHAPE: BLOCKS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 7.2 to 16.8 cm; WIDTH from 7 to 45.8 cm	DIMENSION: 1-5 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	COLOR: RED, WHITE, GREY
LITHOTYPE: SCAGLIA BIANCA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: WHITE	COLOR: GREY
QUARRY: LOCAL	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT 13-15 cm ;WIDTH from 13.5 to 16 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	
LITHOTYPE: BRICKS	
NATURE: REUSE CERAMIC MATERIAL	
COLOR: OCHER	
DIMENSIONS BRICKS: HEIGHT 3 cm DIMENSIONS TILES: HEIGHT 1.4 cm	

CATHEDRAL OF SS. MARIANO E GIACOMO - GUBBIO (PG)

LEFT FRONT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010.

134	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: GOOD	
MASONRY THICKNESS: --	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1194 - 1350	
MATERIALS: DISCOLOURED SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 1.8 to 2.3 cm
QUARRY: LOCAL	**BINDER:** LIME
SHAPE: BLOCKS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 15 to 19.5 cm; WIDTH from 7 to 46.5 cm	DIMENSION: 1-3 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	COLOR: WHITE
LITHOTYPE: SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: PINK	COLOR: GREY
QUARRY: LOCAL	
SHAPE: BLOCKS	
DIMENSIONS: HEIGHT from 10.5 to 16.5 cm; WIDTH from 12 to 46.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	

CHIESA DI S. GIOVANNI - GUBBIO (PG)

PARAMENTO ESTRENO DELLA MURATURA DELLA FACCIATA DELLA CHIESA
DATA DEL RILIEVO 11/08/2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010.

135	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: --
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 20TH CENTURY
MATERIALS: SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS

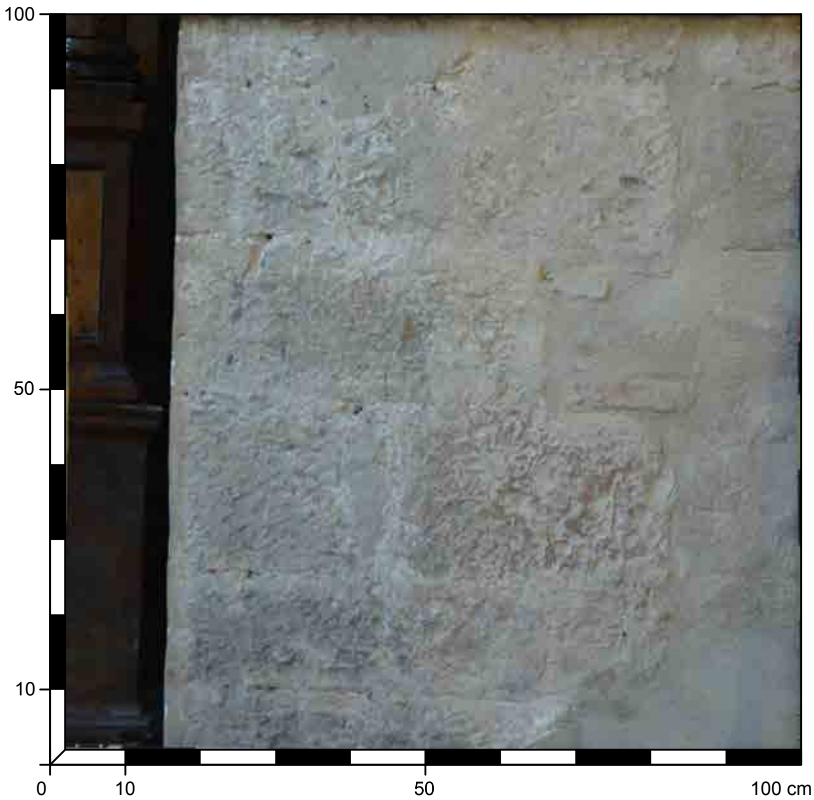
STONE ELEMENTS	MORTAR
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.2 cm
QUARRY: INGINO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 10 to 25.5 cm	DIMENSION: 1-3 mm
MANUFACTURE: SURFACE PROCESSING WITH INDUSTRIAL METHODS	COLOR: RED, WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

CHIESA DI S. GIOVANNI - GUBBIO (PG)

PARAMENTO INTERNO DELLA MURATURA DELLA CAPELLA - LATO DESTRO
DATA DEL RILIEVO 11/08/2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010.



136	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: --	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: 13TH CENTURY	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	

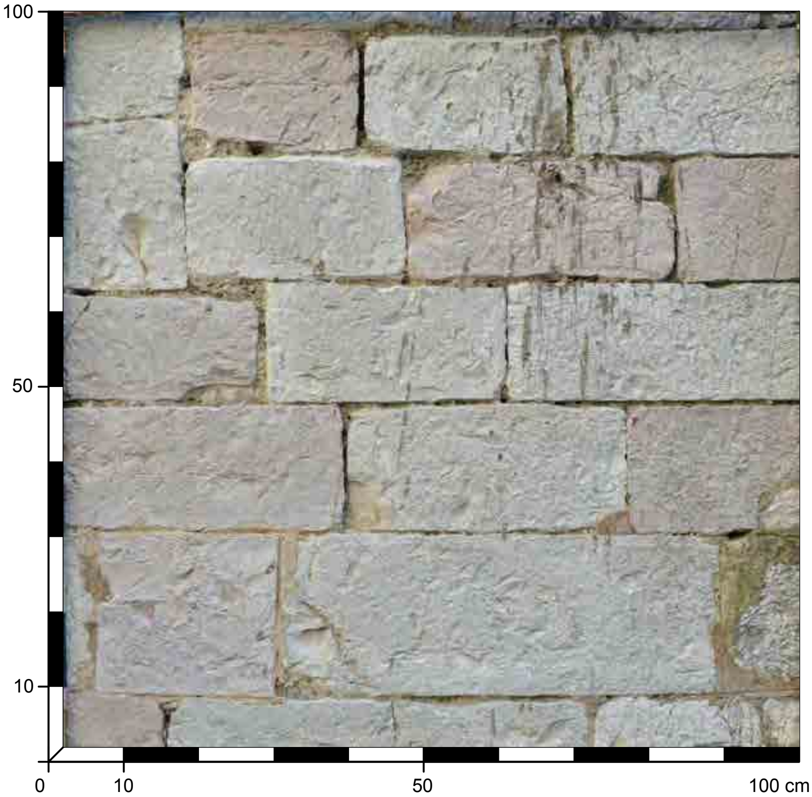
STONE ELEMENTS	MORTAR
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.7 cm
QUARRY: INGINO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 14 to 23.5 cm	DIMENSION: 1-3 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	COLOR: RED, WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

CHIESA DI S. GIULIANO - GUBBIO (PG)

PARAMENTO ESTERNO DELLA MURATURA DELLA FACCIATA DELLA CHIESA (PARTE DESTRA)
DATA DEL RILIEVO 11/08/2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010.



137	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: --	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1188 - 1194	
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA	
LAYING: REGULAR IN PARALLEL ROWS	

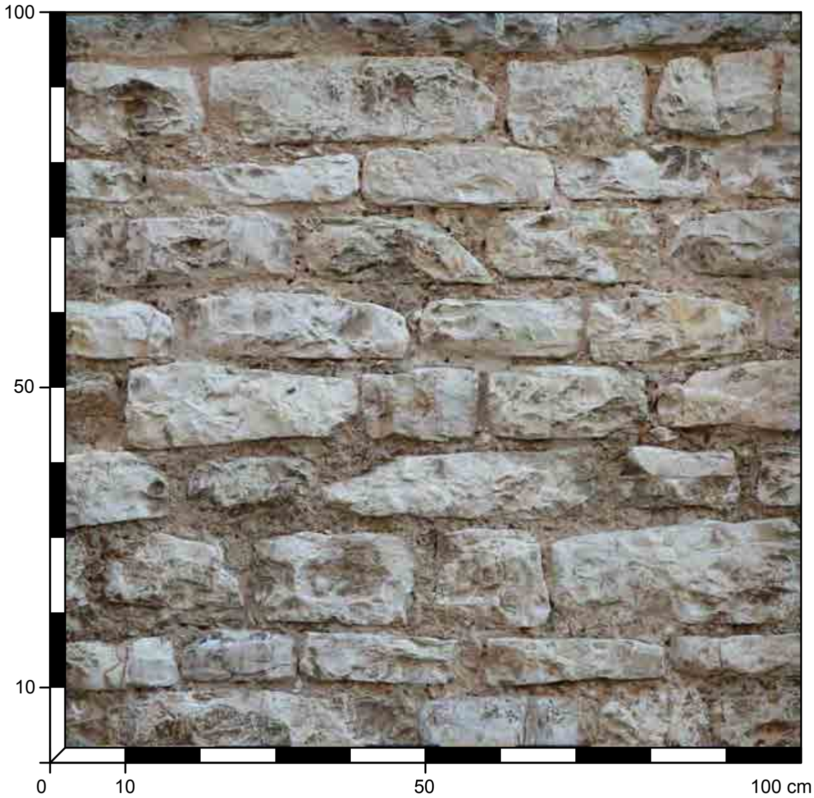
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.6 cm
QUARRY: INGINO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 14,7 to 21.2 cm; WIDTH from 21.8 to 58.3 cm	DIMENSION: 2-6 mm
MANUFACTURE: SURFACE PROCESSING WITH A POINT CHISEL AND A FINE-TOOTH (dist.1 mm) CHISEL	COLOR: RED, WHITE **AGGREGATE:** SAND
LITHOTYPE: SCAGLIA ROSSA	DIMENSION: <1 mm
NATURE: CARBONATIC LIMESTONE ROCK	COLOR: GREY
COLOR: PINK	
QUARRY: INGINO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 14.7 to 16.5 cm; WIDTH from 22.5 to 40 cm	
MANUFACTURE: SURFACE PROCESSING WITH A POINT CHISEL AND A FINE-TOOTH (dist.1 mm) CHISEL	

CHIESA DI S. MARIA DEI LAICI - GUBBIO (PG)

PARAMENTO ESTERNO DEL PROSPETTO PRINCIPALE (FACCIATA?) DELLA CHIESA
DATA DEL RILIEVO 11/08/2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010.



138	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: >60 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 14TH CENTURY
MATERIALS: SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS

STONE ELEMENTS	**MORTAR**
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 1.4 a 2 cm
QUARRY: INGINO MOUNT	**BINDER:** LIME
SHAPE: BLOCKS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 4.8 to 13.5 cm; WIDTH from14 to 35 cm	DIMENSION: 5-10 mm
MANUFACTURE: SURFACE PROCESSING WITH A POINT CHISEL	COLOR: RED, WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

CHIESA DI S. MARIA NOVA - GUBBIO (PG)

PARAMENTO ESTERNO DELLA FACCIATA DELLA CHIESA (PORZIONE DESTRA)
DATA DEL RILIEVO 11/08/2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010.

139	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: GOOD	
MASONRY THICKNESS: >60 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 13TH CENTURY	
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA	
LAYING: REGULAR IN PARALLEL ROWS	

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 1.4 a 2 cm
QUARRY: INGINO MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 11.6 to 21.5 cm; WIDTH from 20 to 37.7 cm	DIMENSION: 5-10 mm
MANUFACTURE: SURFACE PROCESSING WITH A FINE-TOOTH (dist. 2.5 mm) CHISEL	COLOR: RED, WHITE
LITHOTYPE: SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: PINK	COLOR: GREY
QUARRY: INGINO MOUNT	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 11.5 to 21.5 cm; WIDTH from 21 to 29.8 cm	
MANUFACTURE: SURFACE PROCESSING WITH A FINE-TOOTH (dist. 2.5 mm) CHISEL	

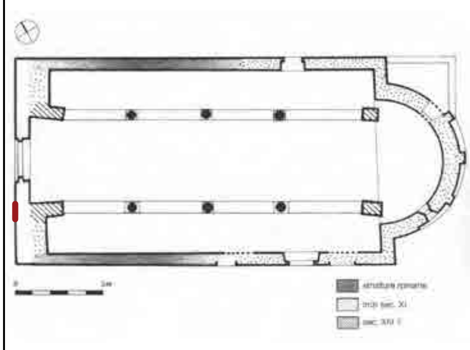
CHURCH OF S. MARIA IN PANTANO - MASSA MARTANA (PG)

MAIN FACADE
DATE OF SURVEY 18 MAR 2017

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 25-28;
- PARDI 1972, p. 44;
- MARTELLI 1966, p. 350-351.

140	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 60-70 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: XIII-XIV CENTURY	
MATERIALS: TRAVERTINE	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 46.

STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTNE	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.6 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 36.8 to 40.2 cm; WIDTH from 7 to 45.8 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	DIMENSION: 1-6 mm
	COLOR: WHITE, PINK
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

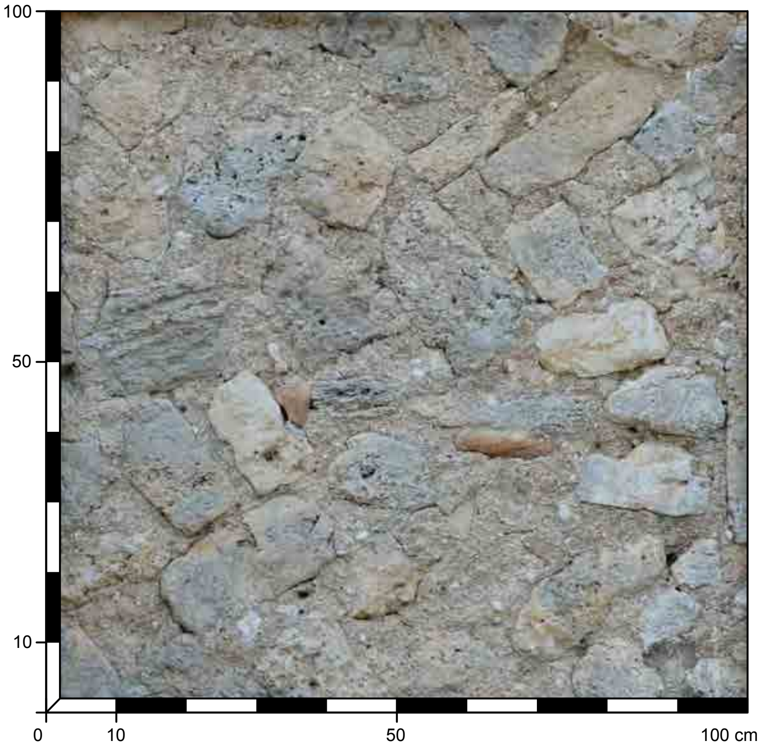
CHURCH OF S. MARIA IN PANTANO - MASSA MARTANA (PG)

RIGHT FRONT

DATE OF SURVEY 18 MAR 2017

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 25-28;
- PARDI 1972, p. 44;
- MARTELLI 1966, p. 350-351.



141	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ELEMENT

CONSERVATION: GOOD

MASONRY THICKNESS: 50 cm

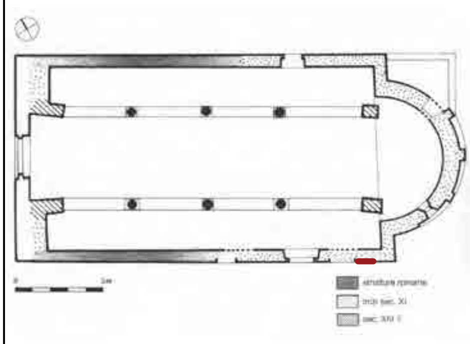
TYPE OF STRUCTURE: BEARING WALL

FACADE: EXTERIOR

DATING: 1000 approximately

MATERIALS: TRAVERTINE, SCAGLIA BIANCA, CALCARI E MARNE A FUCOIDI, LATERIZIO

LAYING: IRREGULAR



GIGLIOZZI 2013, p. 46.

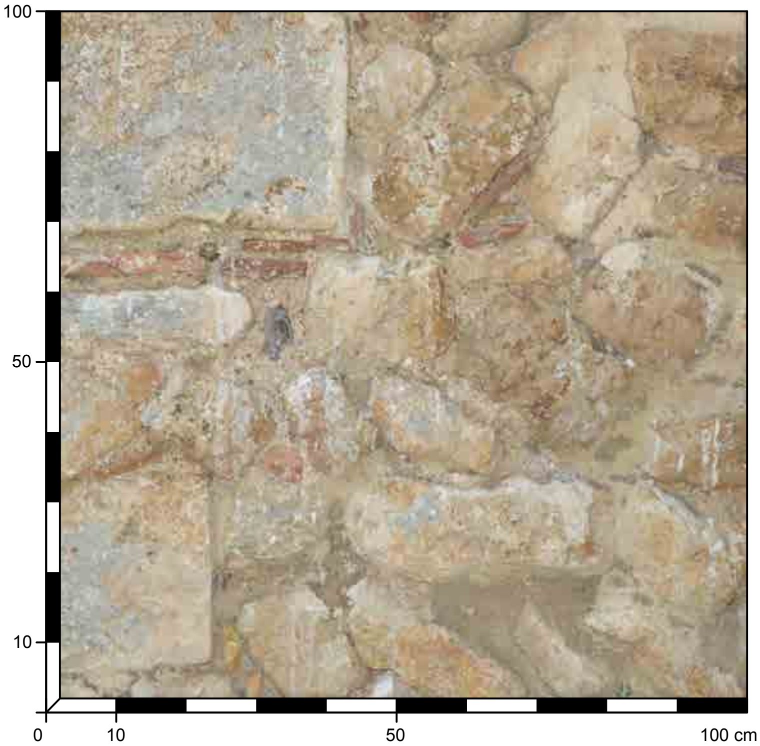
STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTNE	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** --
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 10 to 20 cm; WIDTH from 10 to 18 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
LITHOTYPE: SCAGLIA BIANCA	DIMENSION: 1 to 2.5 mm
NATURE: CARBONATIC LIMESTONE ROCK	COLOR: WHITE, PINK
COLOR: WHITE	**AGGREGATE:** LIMESTONE FRAGMENTS
SHAPE: IRREGULAR ELEMENTS	DIMENSION: 1 to 3 mm
DIMENSIONS: HEIGHT from 5 to 12 cm; WIDTH from 12 to 21 cm	COLOR: WHITE, PINK, GREY
LITHOTYPE: CALCARI E MARNE A FUCOIDI	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: GREY	COLOR: WHITE
SHAPE: IRREGULAR ELEMENTS	
DIMENSIONS: HEIGHT from 6 to 18 cm; WIDTH from 12 to 21 cm	
LITHOTYPE: BRICK FRAGMENTS	
NATURE: REUSE CERAMIC MATERIAL	
COLOR: LIGHT BROWN	

CHURCH OF S. MARIA IN PANTANO - MASSA MARTANA (PG)

RIGHT FRONT CLOSE TO THE ABSE
DATE OF SURVEY 18 MAR 2017

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 25-28;
- PARDI 1972, p. 44;
- MARTELLI 1966, p. 350-351.



142	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ELEMENTS

CONSERVATION: FAIRLY GOOD

MASONRY THICKNESS: 45-50 cm

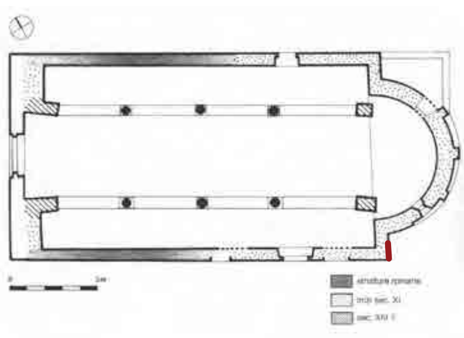
TYPE OF STRUCTURE: BEARING WALL

FACADE: EXTERIOR

DATING: 1000 approximately

MATERIALS: SCAGLIA BIANCA, BRICKS, TRAVERTINE, SCAGLIA ROSSA

LAYING: IRREGULAR



GIGLIOZZI 2013, p. 46.

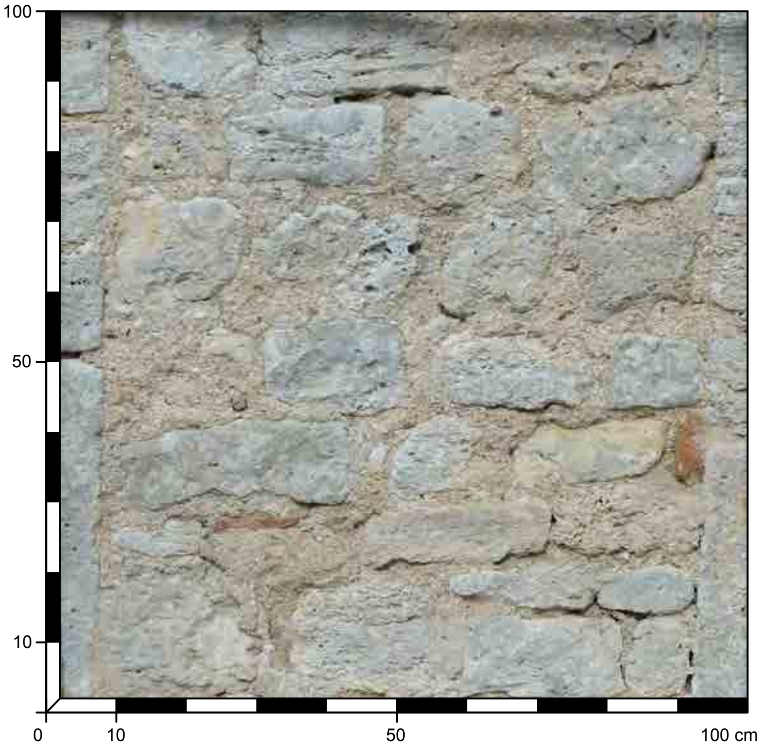
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** --
SHAPE: BLOCKS AND IRREGULAR ELEMENTS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 8 to 18 cm; WIDTH from 11 to 35.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
LITHOTYPE: BRICK FRAGMENTS	DIMENSION: 1 to 4 cm
NATURE: REUSE CERAMIC MATERIAL	COLOR: WHITE, PINK, GREY
COLOR: RED, LIGHT BROWN	**AGGREGATE:** LIMESTONE FRAGMENTS
LITHOTYPE: TRAVERTNE	DIMENSION: 1 to 5 mm
NATURE: CARBONATIC LIMESTONE ROCK	COLOR: WHITE, PINK, GREY
COLOR: WHITE	**AGGREGATE:** SAND
SHAPE: IRREGULAR ELEMENTS	DIMENSION: <1 mm
DIMENSIONS: HEIGHT from 21.5 to 34.8 cm; WIDTH from 28 to 52 cm	COLOR: WHITE
LITHOTYPE: SCAGLIA ROSSA	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: DARK PINK	
SHAPE: IRREGULAR ELEMENTS	
DIMENSIONS: HEIGHT from 10 to 20 cm; WIDTH from 10 to 18 cm	

CHURCH OF S. MARIA IN PANTANO - MASSA MARTANA (PG)

RIGHT FRONT
DATE OF SURVEY 18 MAR 2017

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 25-28;
- PARDI 1972, p. 44;
- MARTELLI 1966, p. 350-351.



143	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS

CONSERVATION: GOOD

MASONRY THICKNESS: 15-20 cm

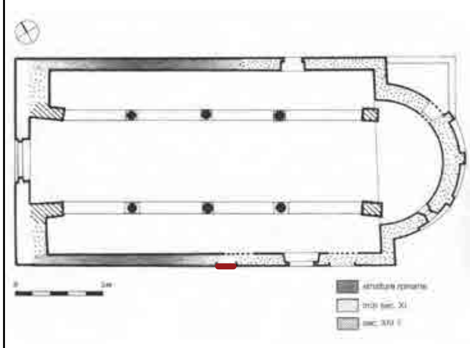
TYPE OF STRUCTURE: BEARING WALL

FACADE: EXTERIOR

DATING: POST XII CENTURY

MATERIALS: TRAVERTINE, SCAGLIA BIANCA, SCAGLIA ROSSA, BRICKS

LAYING: REGULAR IN SEMI-PARALLEL ROWS



GIGLIOZZI 2013, p. 46.

STONE ELEMENTS
LITHOTYPE: TRAVERTNE
NATURE: CARBONATIC LIMESTONE ROCK
COLOR: WHITE
SHAPE: IRREGULAR ELEMENTS
DIMENSIONS: HEIGHT from 12.5 to 15.6 cm; WIDTH from 14 to 25 cm
LITHOTYPE: SCAGLIA BIANCA
NATURE: CARBONATIC LIMESTONE ROCK
COLOR: WHITE
SHAPE: BLOCKS AND IRREGULAR ELEMENTS
DIMENSIONS: HEIGHT from 4 to 17 cm; WIDTH from 10 to 32.5 cm
LITHOTYPE: SCAGLIA ROSSA
NATURE: CARBONATIC LIMESTONE ROCK
COLOR: DARK PINK
SHAPE: IRREGULAR ELEMENTS
DIMENSIONS: HEIGHT from 8 to 10.5 cm; WIDTH from 12 to 25 cm
LITHOTYPE: BRICK FRAGMENTS
NATURE: REUSE CERAMIC MATERIAL
COLOR: RED, LIGHT BROWN

MORTAR
CONSISTENCY: SOLID
SIFT: ROUGH
MORTAR (BEDDING) THICKNESS: --
BINDER: LIME
AGGREGATE: LIMESTONE FRAGMENTS
DIMENSION: 1 to 4 cm
COLOR: WHITE, PINK, GREY
AGGREGATE: LIMESTONE FRAGMENTS
DIMENSION: 1 to 5 mm
COLOR: WHITE, PINK, GREY
AGGREGATE: SAND
DIMENSION: <1 mm
COLOR: WHITE

CHURCH OF S. LORENZO IN NIFLIS - MONTECASTRILLI (TR)

MAIN FACADE (RIGHT SIDE)
DATE OF SURVEY 18 MAR 2017

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 87;
- PARDI 1972, p. 94.

144	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: >80 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 10-11TH CENTURY	
MATERIALS: TRAVERTINE, BRICKS	
LAYING: REGULAR IN SEMI-PARALLEL ROWS	

STONE ELEMENTS	**MORTAR (1)**
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.8 cm
QUARRY: REUSE MATERIAL	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 38.5 to 50.8 cm; WIDTH from21.8 to 65.4 cm	DIMENSION: 2-4 mm
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	COLOR: OCHER, PINK, WHITE
LITHOTYPE: BRICK	**AGGREGATE:** SAND
NATURE: REUSE CERAMIC MATERIAL	DIMENSION: <1 mm
COLOR: RED	COLOR: WHITE
QUARRY: REUSE MATERIAL	**MORTAR (2)**
DIMENSIONS: HEIGHT from 3.8 to 5 cm	
	CONSISTENCY: SOLID
	SIFT: MEDIUM-FINE
	MORTAR (BEDDING) THICKNESS: 0.8 cm
	BINDER: LIME
	AGGREGATE: LIMESTONE FRAGMENTS
	DIMENSION: 1-4 cm
	COLOR: PINK, WHITE, GREY
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE, PINK, GREY

CHURCH OF S. LORENZO IN NIFLIS - MONTECASTRILLI (TR)

MAIN FACADE (RIGHT SIDE)
DATE OF SURVEY 18 MAR 2017

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 87;
- PARDI 1972, p. 94.

145	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: >80 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 10-11TH CENTURY
MATERIALS: TRAVERTINE, BRICKS
LAYING: REGULAR IN SEMI-PARALLEL ROWS

STONE ELEMENTS	MORTAR (1)
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.8 cm
QUARRY: REUSE MATERIAL	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 38.5 to 50.8 cm; WIDTH from21.8 to 65.4 cm	DIMENSION: 2-4 mm
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	COLOR: OCHER, PINK, WHITE
LITHOTYPE: BRICK	**AGGREGATE:** SAND
NATURE: REUSE CERAMIC MATERIAL	DIMENSION: <1 mm
COLOR: RED	COLOR: WHITE
QUARRY: REUSE MATERIAL	**MORTAR (2)**
DIMENSIONS: HEIGHT from 3.8 to 5 cm	
	CONSISTENCY: SOLID
	SIFT: MEDIUM-FINE
	MORTAR (BEDDING) THICKNESS: 0.8 cm
	BINDER: LIME
	AGGREGATE: LIMESTONE FRAGMENTS
	DIMENSION: 1-4 cm
	COLOR: PINK, WHITE, GREY
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE, PINK, GREY

CHURCH OF S. LORENZO IN NIFLIS - MONTECASTRILLI (TR)

MAIN FACADE (LEFT SIDE)
DATE OF SURVEY 18 MAR 2017

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 87;
- PARDI 1972, p. 94.

146	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: >65 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: POST 12TH CENTURY	
MATERIALS: TRAVERTINE, BRICKS	
LAYING: REGULAR IN SEMI-PARALLEL ROWS	

STONE ELEMENTS	MORTAR (1)
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.8 cm
QUARRY: REUSE MATERIAL	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 19.1 to 21.8 cm; WIDTH from 24.2 to 51.1 cm	DIMENSION: 2-4 mm
MANUFACTURE: SURFACE PROCESSING WITH AXE	COLOR: OCHER, PINK, WHITE
LITHOTYPE: BRICK	**AGGREGATE:** SAND
NATURE: REUSE CERAMIC MATERIAL	DIMENSION: <1 mm
COLOR: RED	COLOR: WHITE
QUARRY: REUSE MATERIAL	**MORTAR (2)**
DIMENSIONS: HEIGHT 4.6 cm; WIDTH 24.4 cm	
	CONSISTENCY: SOLID
	SIFT: MEDIUM-FINE
	MORTAR (BEDDING) THICKNESS: 0.8 cm
	BINDER: LIME
	AGGREGATE: LIMESTONE FRAGMENTS
	DIMENSION: 1-4 cm
	COLOR: PINK, WHITE, GREY
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE, PINK, GREY

CHURCH OF S. LORENZO IN NIFLIS - MONTECASTRILLI (TR)

LEFT FRONT

DATE OF SURVEY 18 MAR 2017

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 87;
- PARDI 1972, p. 94.

147	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: FAIRLY GOOD	
MASONRY THICKNESS: >65 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: POST 12TH CENTURY	
MATERIALS: TRAVERTINE, BRICKS, SCAGLIA BIANCA	
LAYING: IRREGULAR	

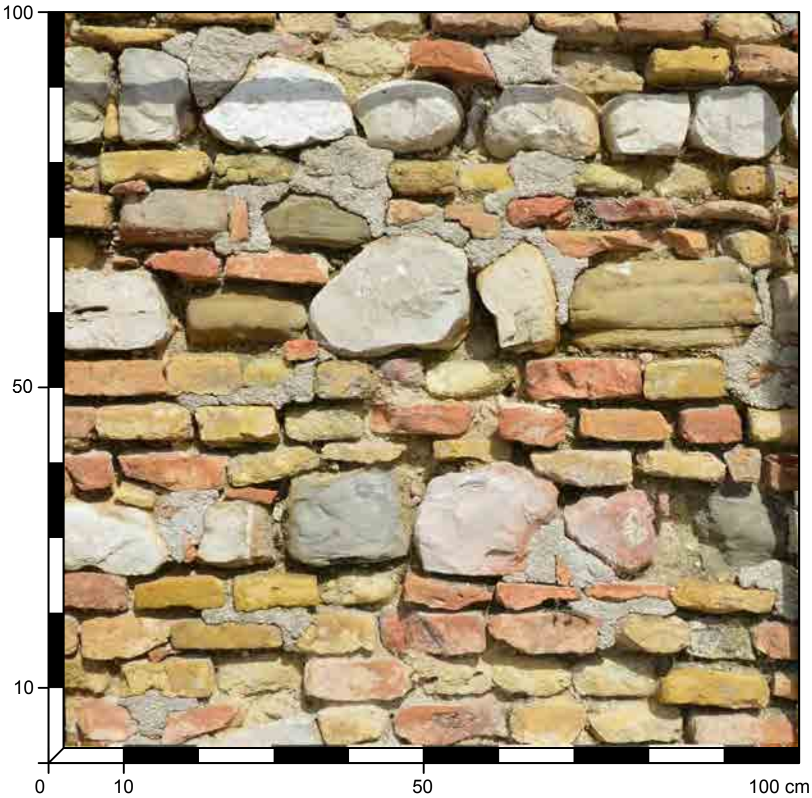
STONE ELEMENTS	**MORTAR (1)**
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 1 to 15 mm
QUARRY: REUSE MATERIAL	**BINDER:** LIME
SHAPE: IRREGULAR ELEMENTS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 10 to 32.2 cm; WIDTH from 17.2 to 30 cm	DIMENSION: 1 mm
MANUFACTURE: SURFACE PROCESSING WITH AXE	COLOR: OCHER, PINK, WHITE
LITHOTYPE: BRICK	**AGGREGATE:** SAND
NATURE: REUSE CERAMIC MATERIAL	DIMENSION: <1 mm
COLOR: RED	COLOR: WHITE
QUARRY: REUSE MATERIAL	**MORTAR (2)**
DIMENSIONS: HEIGHT 3.6 cm; WIDTH 5.3 cm	
	CONSISTENCY: SOLID
	SIFT: MEDIUM-FINE
	MORTAR (BEDDING) THICKNESS: 0.8 cm
	BINDER: LIME
	AGGREGATE: LIMESTONE FRAGMENTS
	DIMENSION: 1-4 cm
	COLOR: PINK, WHITE, GREY
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE, PINK, GREY

CITY WALLS - MONTEFALCO (PG)

WALLS CLOSE TO S. AGOSTINO'S GATE
DATE OF SURVEY 06 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- ULIANICH, VITOLO 2001, pp. 35-47.



148	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ELEMENTS AND BRICKS

CONSERVATION: GOOD
MASONRY THICKNESS: 140-90 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING:FIRST HALF OF 14TH CENTURY
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA, SANDSTONE
LAYING: IRREGULAR IN PARALLEL WITH BOUNDLE OF BRICKS

STONE ELEMENTS	MORTAR (1)
TYPE: BRICKS	**CONSISTENCY:** FRIABLE
NATURE: REUSE CERAMIC MATERIAL	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 1.2 cm
DIMENSIONS: HEIGHT 0.36 AND 4.5-5 cm; WIDTH from 6.5 to 14.2 cm	**BINDER:** LIME
LITHOTYPE: SCAGLIA BIANCA	**AGGREGATE:** LIMESTONE FRAGMENTS
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION:1-5 mm
COLOR: WHITE	COLOR: WHITE
SHAPE: IRREGULAR ELEMENTS	**AGGREGATE:** SAND
DIMENSIONS: HEIGHT from 8 to 12 cm; WIDTH from 11 to 22 cm	DIMENSION: <1 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	COLOR: WHITE
LITHOTYPE: SCAGLIA ROSSA	**MORTAR (2)**
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: LIGHT PINK	**CONSISTENCY:** SOLID
SHAPE: IRREGULAR ELEMENTS	**SIFT:** ROUGH
DIMENSIONS: HEIGHT from 5 to 10 cm; WIDTH from 7 to 20 cm	**MORTAR (BEDDING) THICKNESS:** --
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	**BINDER:** CEMENT
LITHOTYPE: SANDSTONE	**AGGREGATE:** LIMESTONE FRAGMENTS
NATURE: SEDIMENTARY ROCK	DIMENSION: 2-5 mm
COLOR: LIGHT PINK	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

CHIESA DI S. AGOSTINO - MONTEFALCO (PG)

PARAMENTO ESTERNO DEL FIANCO DESTRO DELLA CHIESA
DATA DEL RILIEVO 06/08/2016

BIBLIOGRAPHICAL REFERENCES

- BASTIANINI 2002.

149	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ELEMENTS AND BRICKS

CONSERVATION: FAIRLY GOOD
MASONRY THICKNESS: >65 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1327
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA, BRICKS, SANDSTONE
LAYING: IRREGULAR

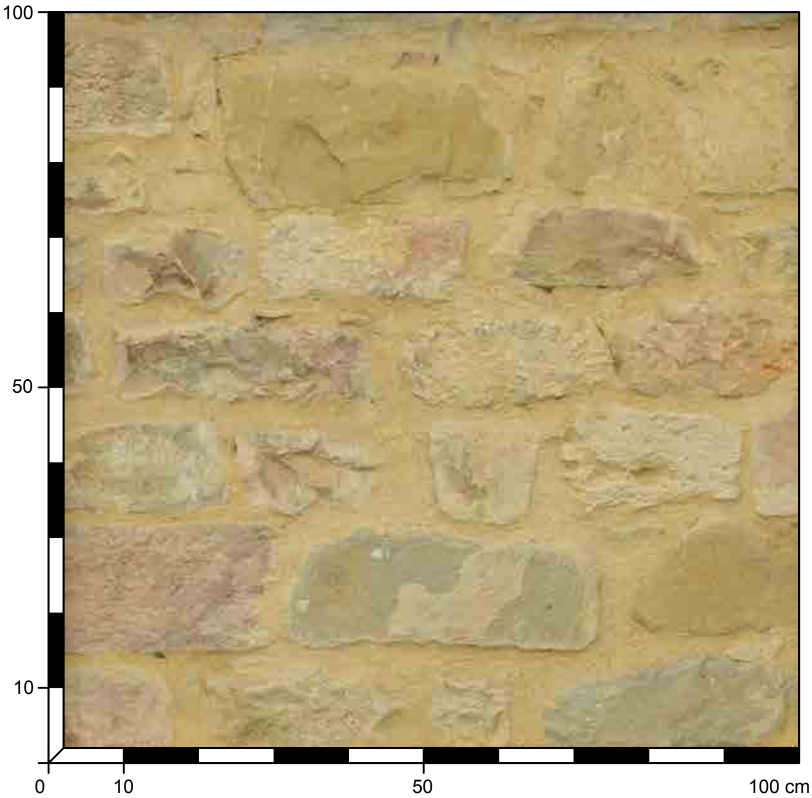
STONE ELEMENTS	MORTAR (1)
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: LIGHT PINK	**MORTAR (BEDDING) THICKNESS: 1-1**.5 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 7 to 16.6 cm; WIDTH from 7 to 36.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	DIMENSION:1-2 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: RED, WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: IRREGULAR ELEMENTS	COLOR: WHITE
DIMENSIONS: HEIGHT from 9 to 8.5 cm; WIDTH from 10 to 12 cm	**MORTAR (2)**
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	
TYPE: BRICKS	**CONSISTENCY:** SOLID
NATURE: REUSE CERAMIC MATERIAL	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 1 to 15 cm
DIMENSIONS: HEIGHT 3 AND 5.9-6 cm; WIDTH from 2.9 to 4.5 cm	**BINDER:** CEMENT
LITHOTYPE: SANDSTONE	**AGGREGATE:** LIMESTONE FRAGMENTS
NATURE: SEDIMENTARY ROCK	DIMENSION: 1-2 mm
COLOR: LIGHT BROWN	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

CHIESA DI S. AGOSTINO - MONTEFALCO (PG)

PARAMENTO ESTERNO DEL FIANCO DESTRO DELLA CHIESA
DATA DEL RILIEVO 06/08/2016

BIBLIOGRAPHICAL REFERENCES

- BASTIANINI 2002.



150	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ELEMENTS
CONSERVATION: FAIRLY GOOD	
MASONRY THICKNESS: >65 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1327	
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA, SANDSTONE	
LAYING: IRREGULAR	

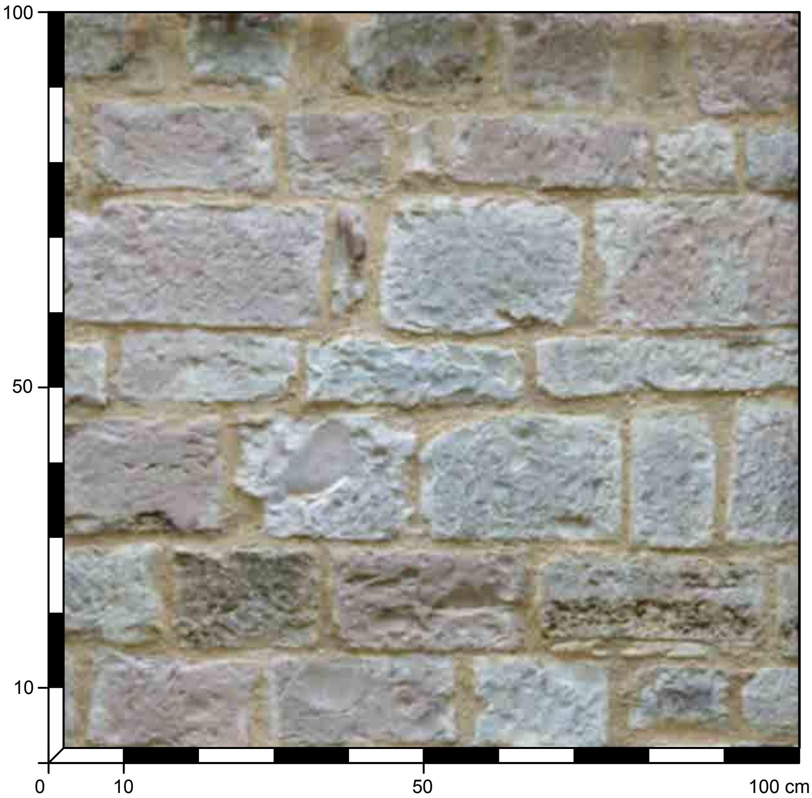
STONE ELEMENTS	MORTAR (1)
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: LIGHT PINK	**MORTAR (BEDDING) THICKNESS:** from 2.5 to 4.5 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 10.6 to 16.6 cm; WIDTH from 8.5 to 36.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	DIMENSION:1-2 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: RED, WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: BLOCKS	COLOR: LIGHT BROWN
DIMENSIONS: HEIGHT from 5.5 to 14.1 cm; WIDTH from 9.6 to 25.6 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	
LITHOTYPE: SANDSTONE	
NATURE: SEDIMENTARY ROCK	
COLOR: LIGHT BROWN	
SHAPE: BLOCKS	
DIMENSIONS: HEIGHT from 15.4 to 16.6 cm; WIDTH from 10.9 to 39.6 cm	

CHIESA DI S. AGOSTINO - MONTEFALCO (PG)

PARAMENTO ESTERNO DELL'ABSIDE DELLA CHIESA
DATA DEL RILIEVO 06/08/2016

BIBLIOGRAPHICAL REFERENCES

- BASTIANINI 2002.

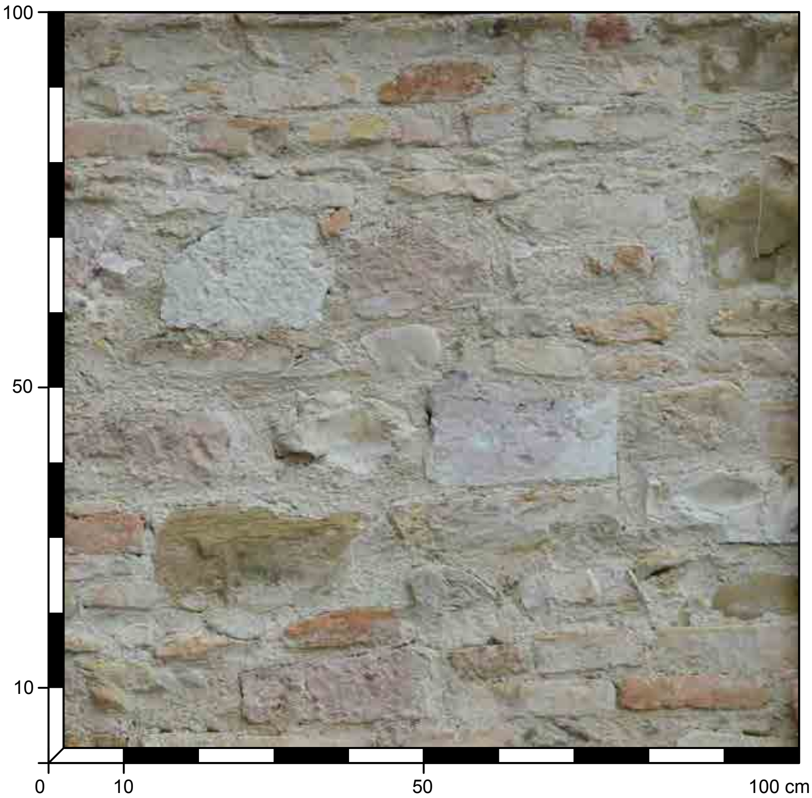


151	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: FAIRLY GOOD	
MASONRY THICKNESS: >65 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1275	
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA, BRICKS, SANDSTONE	
LAYING: IN PARALLEL ROWS	

STONE ELEMENTS	MORTAR (1)
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.7 to 1.8 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 5.5 to 17.2 cm; WIDTH from 13 to 35 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	DIMENSION:1-2 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: RED, WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: LIGHT PINK	DIMENSION: <1 mm
SHAPE: BLOCKS	COLOR: LIGHT BROWN
DIMENSIONS: HEIGHT from 9.2 to 16.8 cm; WIDTH from 11 to 26.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	
LITHOTYPE: TRAVERTINE	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
SHAPE: BLOCKS	
DIMENSIONS: HEIGHT from 10.5 to 13 cm; WIDTH from 9.6 to 25.6 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	

CHIESA DI S. BARTOLOMEO - MONTEFALCO (PG)

PARAMENTO DEL FIANCO SINISTRO DELLA CHIESA (VICINO ALL'INGRESSO LATERALE)
DATA DEL RILIEVO 06/08/2016



152	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ELEMENTS AND BRICKS
CONSERVATION: FAIRLY GOOD	
MASONRY THICKNESS: --	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 12TH CENTURY	
MATERIALS: SCAGLIA BIANCA, DISCOLOURED SCAGLIA ROSSA, BRICKS, SANDSTONE	
LAYING: IRREGULAR	

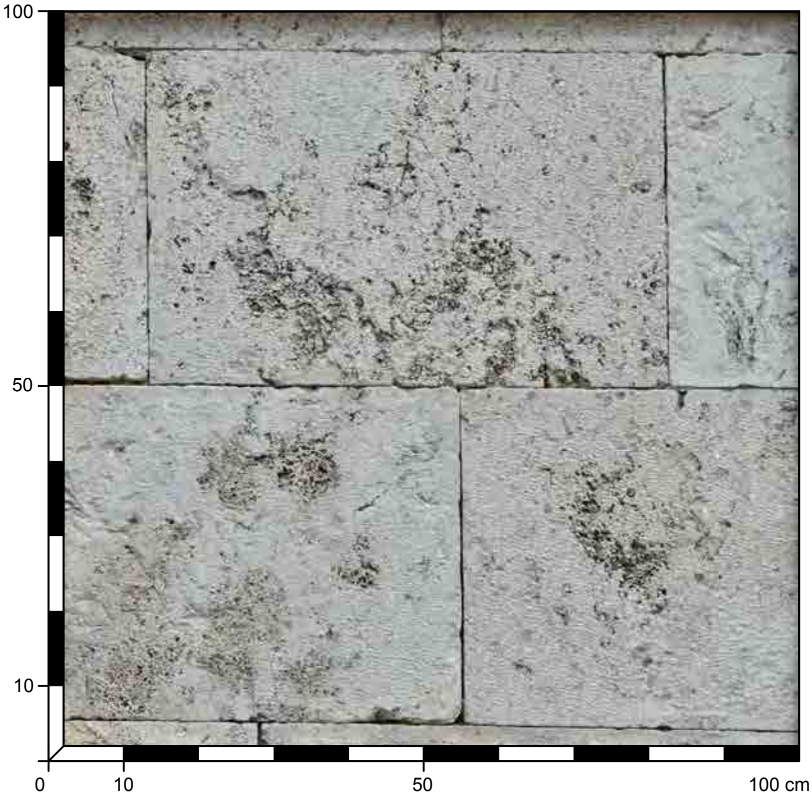
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 1-4.5 cm
SHAPE: IRREGULAR ELEMENTS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 5 to 14.5 cm; WIDTH from 5 to 25 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND AXE	DIMENSION:1-2 mm
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	COLOR: RED, WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: LIGHT PINK AND WHITE	DIMENSION: <1 mm
SHAPE: BLOCKS	COLOR: WHITE
DIMENSIONS: HEIGHT from 7 to 12.5 cm; WIDTH from 4 to 25.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND AXE	
TYPE: BRICKS	
NATURE: REUSE CERAMIC MATERIAL	
COLOR: WHITE	
DIMENSIONS: HEIGHT 3.3 AND 4.8-4.9 cm	
LITHOTYPE: SANDSTONE	
NATURE: SEDIMENTARY ROCK	
COLOR: LIGHT BROWN	

CHIESA DI S. FRANCESCO - MONTEFALCO (PG)

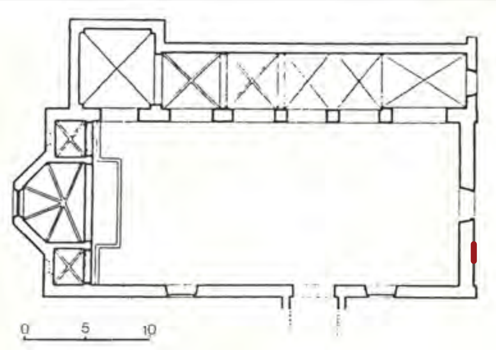
PARAMENTO ESTERNO DELLA FACCIATA DELLA CHIESA (PORZIONE SINISTRA)
DATA DEL RILIEVO 06/08/2016

BIBLIOGRAPHICAL REFERENCES

- CURUNI 1982, p. 104-105.



153	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE SLABS
CONSERVATION: GOOD	
MASONRY THICKNESS: 170 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 14TH CENTURY	
MATERIALS: TRAVERTINE	
LAYING: REGULAR IN PARALLEL ROWS	



CURUNI 1982, p. 104.

STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 2 mm
SHAPE: SLABS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 44.2 to 44.7 cm; WIDTH from 65.8 to 74.8 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH LARGE-TOOTH CHISEL AND PITCHING TOOLS	DIMENSION:1 mm
	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

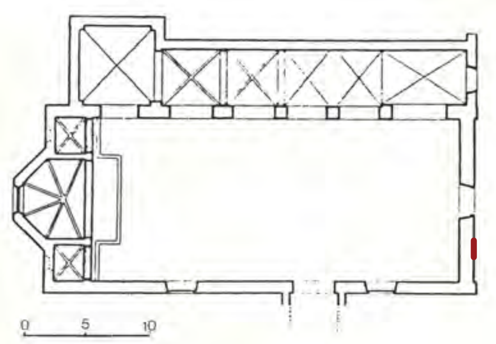
CHIESA DI S. FRANCESCO - MONTEFALCO (PG)

PARAMENTO ESTERNO DELLA FACCIATA DELLA CHIESA (PORZIONE DESTRA)
DATA DEL RILIEVO 06/08/2016

BIBLIOGRAPHICAL REFERENCES

- CURUNI 1982, p. 104-105.

154	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE SLABS
CONSERVATION: GOOD	
MASONRY THICKNESS: 170 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 14TH CENTURY	
MATERIALS: TRAVERTINE	
LAYING: REGULAR IN PARALLEL ROWS	



CURUNI 1982, p. 104.

STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 2 mm
SHAPE: SLABS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 44.2 to 44.7 cm; WIDTH from 65.8 to 74.8 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH LARGE-TOOTH CHISEL AND PITCHING TOOLS	DIMENSION:1 mm
	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

CHIESA DI S. LUCIA - MONTEFALCO (PG)

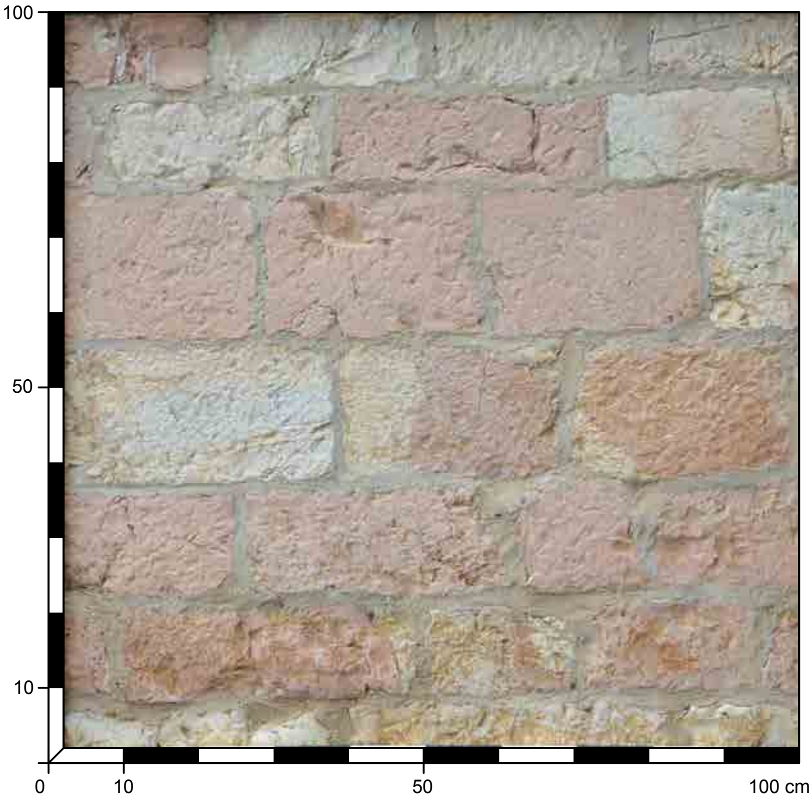
PARAMENTO ESTERNO DELLA FACCIATA DELLA CHIESA (PORZIONE SINISTRA)
DATA DEL RILIEVO 06/08/2016

155	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: GOOD	
MASONRY THICKNESS: >80 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 12TH CENTURY	
MATERIALS: SCAGLIA BIANCA, DISCOLOURED SCAGLIA ROSSA, BRICKS, SANDSTONE	
LAYING: REGULAR IN PARALLEL ROWS	

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 1-2 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 9 to 14 cm; WIDTH from 10 to 22 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND AXE	DIMENSION:1-2 mm
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	COLOR: RED, WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: LIGHT PINK AND WHITE	DIMENSION: <1 mm
SHAPE: BLOCKS	COLOR: WHITE
DIMENSIONS: HEIGHT from 8 to 15 cm; WIDTH from 10 to 25 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND AXE	
LITHOTYPE: SCAGLIA ROSSA	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: LIGHT PINK	
SHAPE: BLOCKS	
DIMENSIONS: HEIGHT from 8 to 12 cm; WIDTH from 8 to 18 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND AXE	

CHIESA DI S. MARIA MADDALENA - MONTEFALCO (PG)

PARAMENTO ESTERNO DELLA FACCIATA DELLA CHIESA (PORZIONE SINISTRA)
DATA DEL RILIEVO 06/08/2016



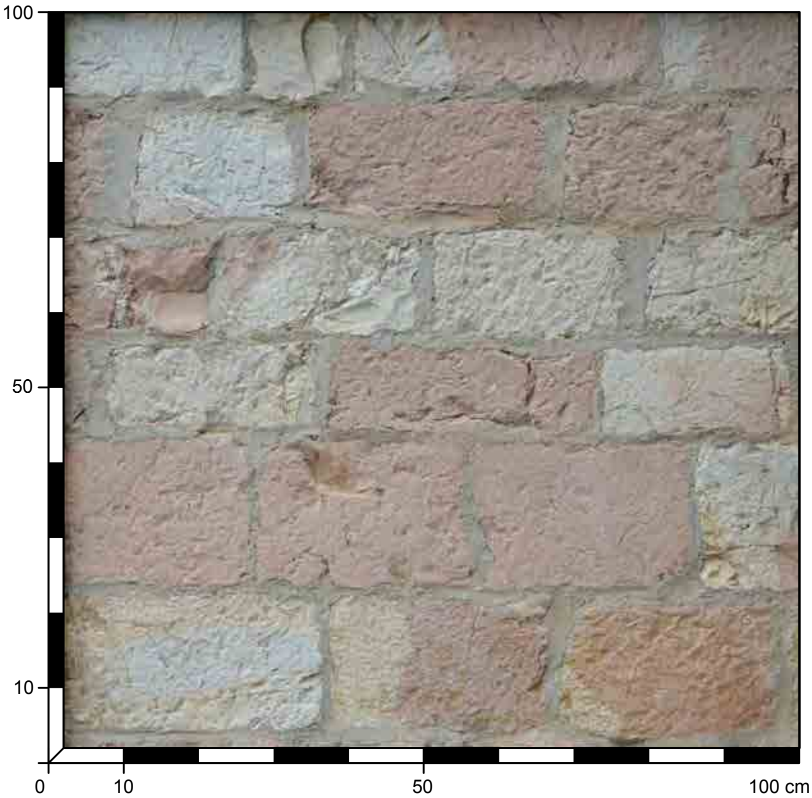
156	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: >60 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 15TH CENTURY
MATERIALS: DISCOLOURED SCAGLIA ROSSA, SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS

STONE ELEMENTS	MORTAR
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: LIGHT PINK AND WHITE	**MORTAR (BEDDING) THICKNESS:** 1.5 cm
SHAPE: ASHLARS	**BINDER:** CEMENT
DIMENSIONS: HEIGHT from 7 to 12.5 cm; WIDTH from 4 to 25.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND AXE	DIMENSION:1-2 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: PINK	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: GREY
DIMENSIONS: HEIGHT from 10 to 19.2 cm; WIDTH from 20.5 to 42 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	

CHIESA DI S. MARIA MADDALENA - MONTEFALCO (PG)

PARAMENTO ESTERNO DELLA FACCIATA DELLA CHIESA (PORZIONE SINISTRA)
DATA DEL RILIEVO 06/08/2016



157	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD

MASONRY THICKNESS: >60 cm

TYPE OF STRUCTURE: BEARING WALL

FACADE: EXTERIOR

DATING: 15TH CENTURY

MATERIALS: DISCOLOURED SCAGLIA ROSSA, SCAGLIA ROSSA

LAYING: REGULAR IN PARALLEL ROWS

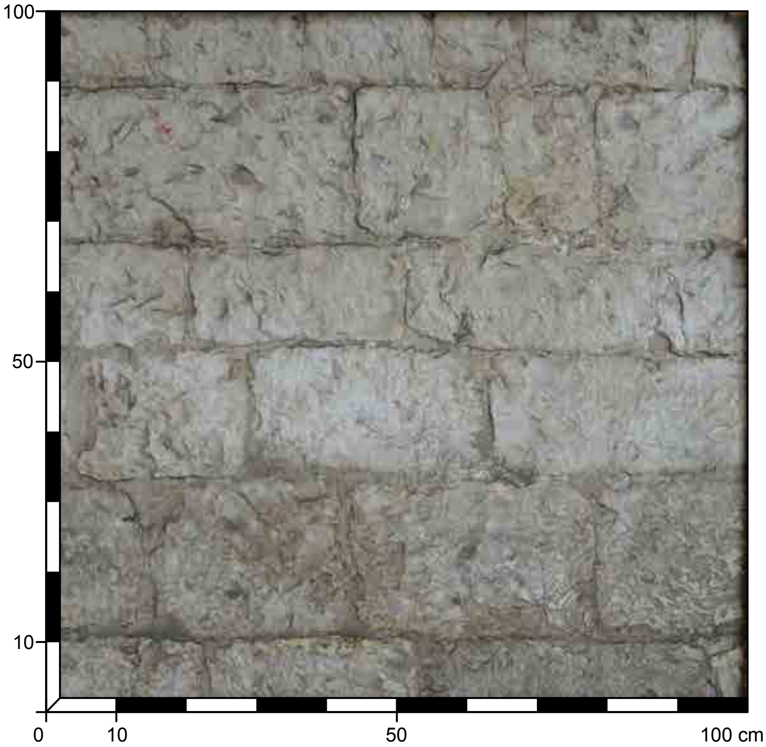
STONE ELEMENTS	MORTAR
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: LIGHT PINK AND WHITE	**MORTAR (BEDDING) THICKNESS:** 1.5 cm
SHAPE: ASHLARS	**BINDER:** CEMENT
DIMENSIONS: HEIGHT from 10.5 to 18.8 cm; WIDTH from 18 to 40 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	DIMENSION:1-2 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: PINK	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: GREY
DIMENSIONS: HEIGHT from 10 to 19.2 cm; WIDTH from 20.5 to 42 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	

CHURCH OF S. GIOVENALE - NARNI (TR)

MAIN FACADE
DATE OF SURVEY 28 FEB 2017

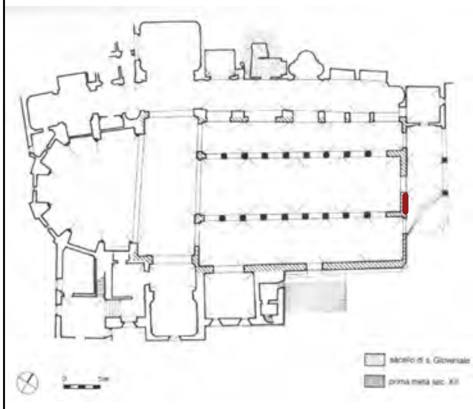
BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 141;
- PARDI 1972, p. 206.



158	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: FAIRLY GOOD
MASONRY THICKNESS: 90 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: FIRST HALF OF 12TH CENTURY
MATERIALS: SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 172.

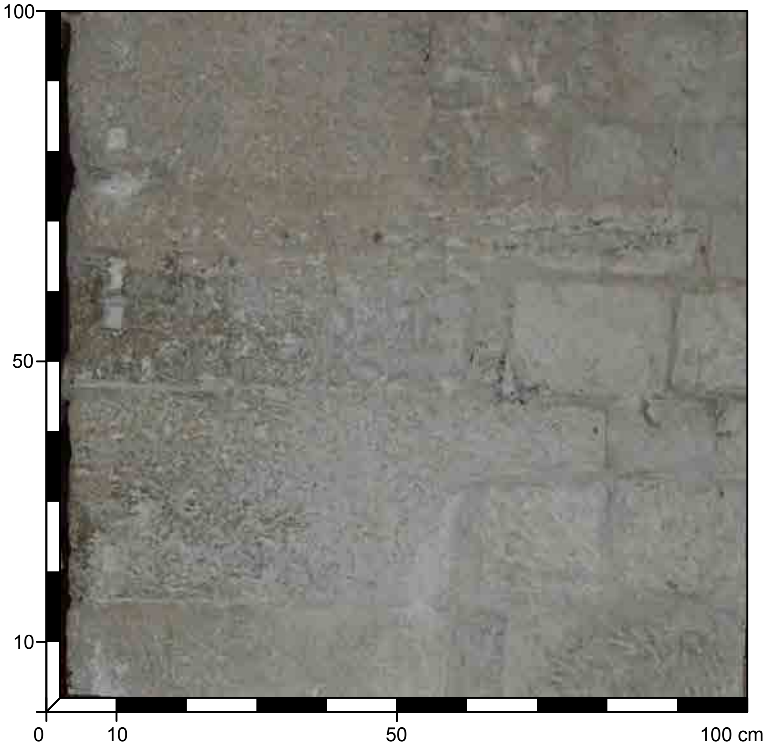
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.7 to 2 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 8 to 12 cm; WIDTH from 11 to 22 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND AXE	DIMENSION: 2-5 mm
	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

CHURCH OF S. GIOVENALE - NARNI (TR)

COUNTER FACADE
DATE OF SURVEY 28 FEB 2017

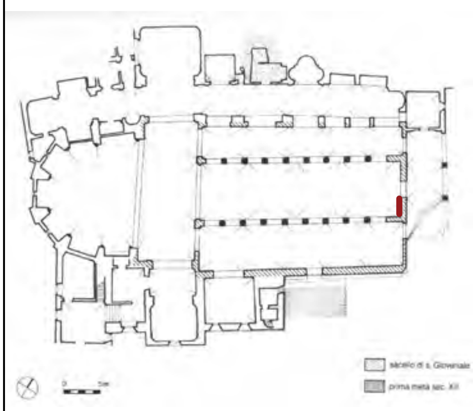
BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 141;
- PARDI 1972, p. 206.



159	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: FAIRLY GOOD
MASONRY THICKNESS: 90 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: FIRST HALF OF 12TH CENTURY
MATERIALS: SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 172.

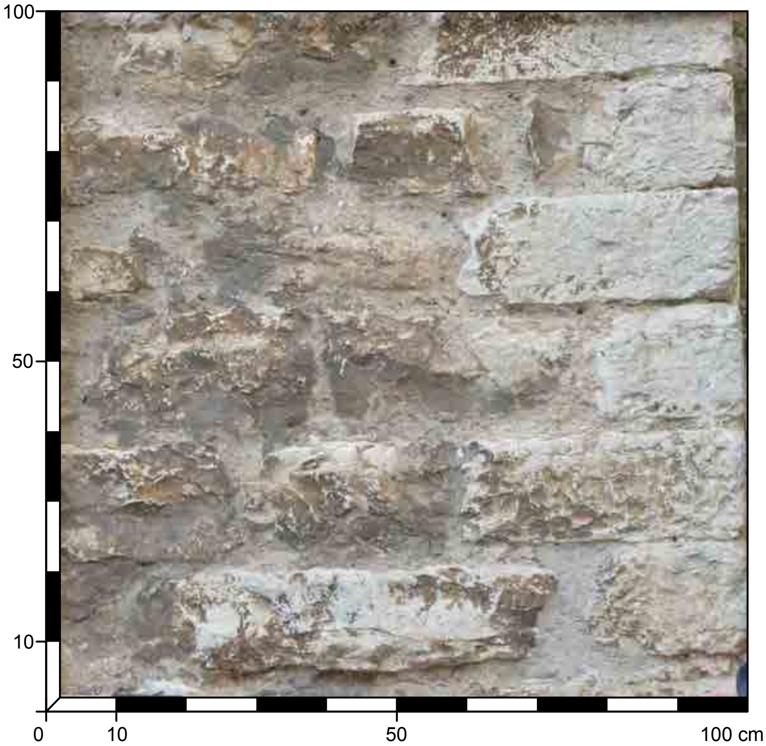
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.7 to 2 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 9.5 to 35.4 cm; WIDTH from 13.4 to 55.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND AXE	DIMENSION: 2-5 mm
	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

CHURCH OF S. GIOVENALE - NARNI (TR)

BELL TOWER
DATE OF SURVEY 28 FEB 2017

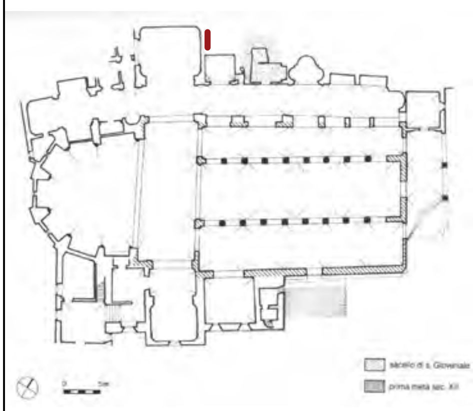
BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 141;
- PARDI 1972, p. 206.



160	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: FAIRLY GOOD
MASONRY THICKNESS: 100 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: 12TH CENTURY
MATERIALS: SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 172.

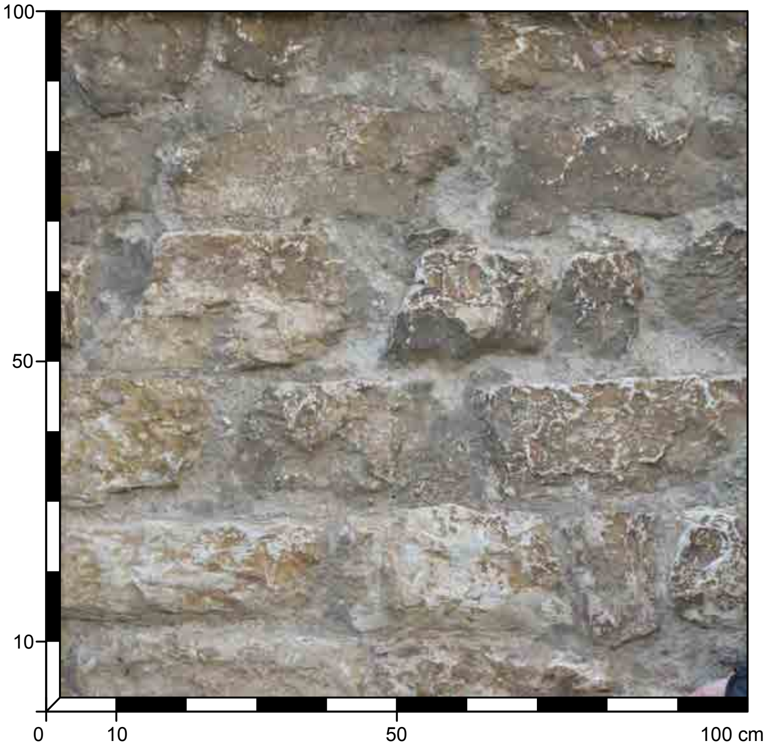
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 3 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 14.2 to 17.5 cm; WIDTH from 22.7 to 70.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	DIMENSION: 2-5 mm
	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

CHURCH OF S. GIOVENALE - NARNI (TR)

BELL TOWER
DATE OF SURVEY 28 FEB 2017

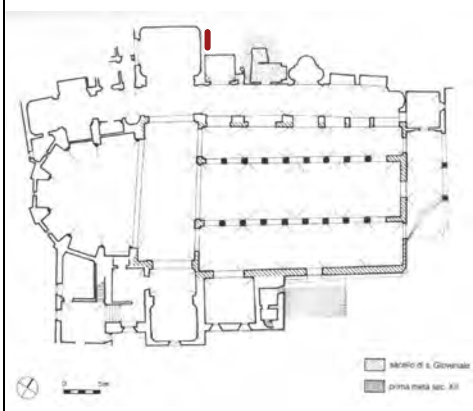
BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 141;
- PARDI 1972, p. 206.



161	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: FAIRLY GOOD
MASONRY THICKNESS: 100 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: 12TH CENTURY
MATERIALS: SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 172.

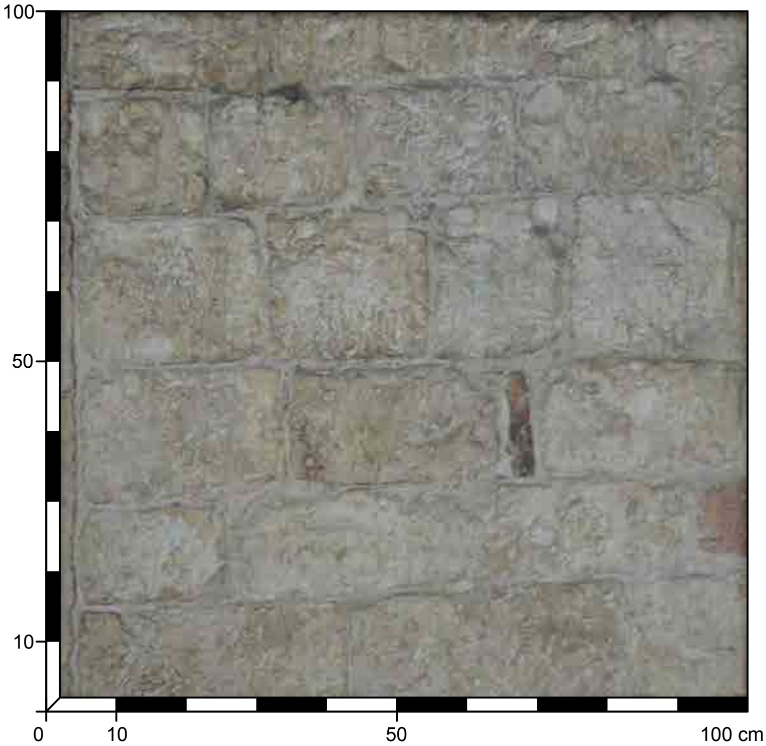
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS: from 1.5 to 3 cm**
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 15.4 to 17.5 cm; WIDTH from 12.4 to 42 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	DIMENSION: 2-8 mm
	COLOR: WHITE, GREY, RED
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

CHURCH OF S. MARIA IN PENSOLE - NARNI (TR)

MAIN FACADE. RIGHT SIDE
DATE OF SURVEY 28 FEB 2017

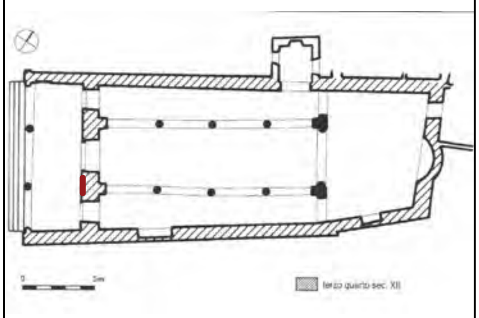
BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 146-149;
- PARDI 1972, p. 206.



162	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 115 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1175
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA, BRICKS
LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 173.

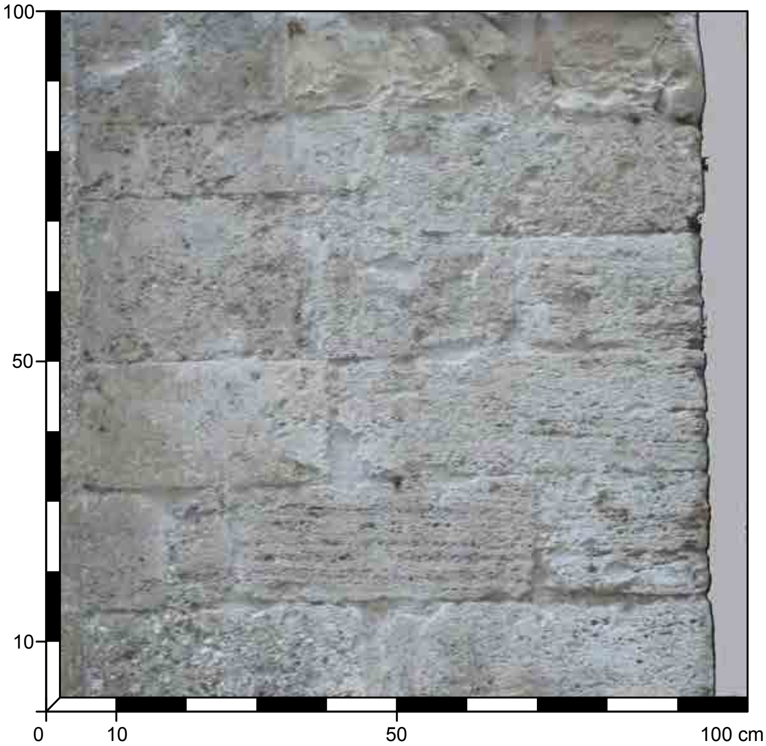
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.9 to 1.3 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 12.2 to 25.8 cm; WIDTH from 17.5 to 32.8 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND AXE	DIMENSION: 1-3 mm
TYPE: BRICKS	COLOR: WHITE, GREY
NATURE: CERAMIC MATERIAL	**AGGREGATE:** SAND
COLOR: RED	DIMENSION: <1 mm
DIMENSIONS: HEIGHT 3.2 cm; WIDTH15.5 cm	COLOR: WHITE

CHURCH OF S. MARIA IN PENSOLE - NARNI (TR)

PORTICO. RIGHT SIDE
DATE OF SURVEY 28 FEB 2017

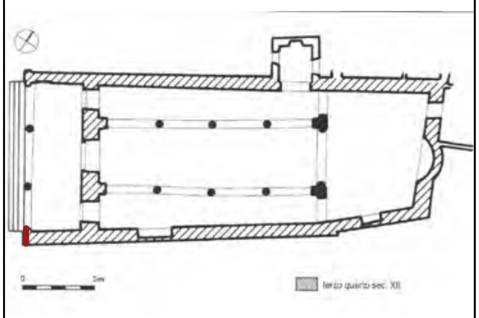
BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 146-149;
- PARDI 1972, p. 206.



163	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 100 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1175
MATERIALS: TRAVERTINE
LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 173.

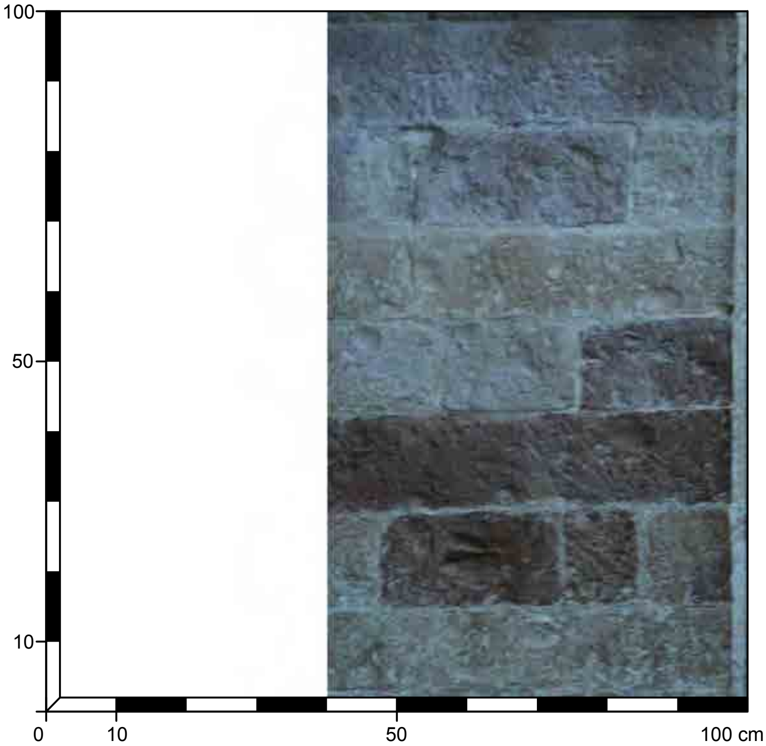
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.5 to 0.7 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 10 to 22.8 cm; WIDTH from 25.5 to 51.2 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH TOOTH CHISEL	DIMENSION: 1-2 mm
	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

CHURCH OF S. MARIA IN PENSOLE - NARNI (TR)

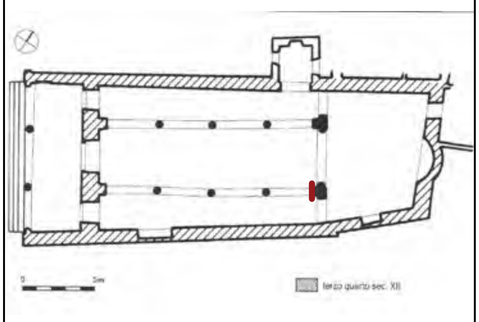
PILLAR
DATE OF SURVEY 28 FEB 2017

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 146-149;
- PARDI 1972, p. 206.



164	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 100 cm	
TYPE OF STRUCTURE: PILLAR	
FACADE: INTERIOR	
DATING: 1175	
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 173.

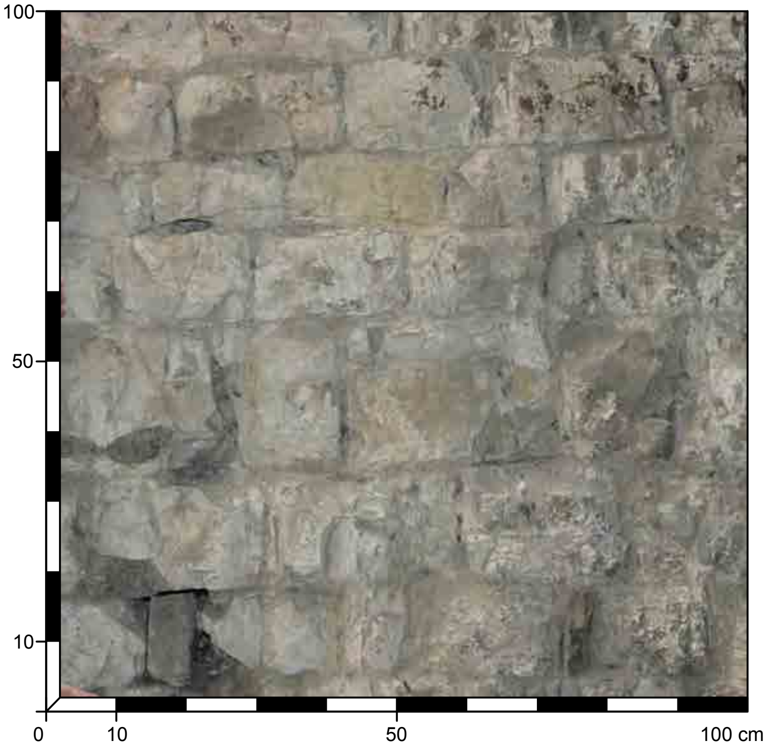
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.5 to 0.7 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 11.8 to 15.2 cm; WIDTH from 19 to 28.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND TOOTH CHISEL	DIMENSION: 1-2 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: PINK	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: WHITE
DIMENSIONS: HEIGHT from 11.8 to 15.2 cm; WIDTH from 22.5 to 62.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND TOOTH CHISEL	
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 11.5 to 15.2 cm; WIDTH from 28 to 70 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND TOOTH CHISEL	

CHURCH OF S. MARIA IN PENSOLE - NARNI (TR)

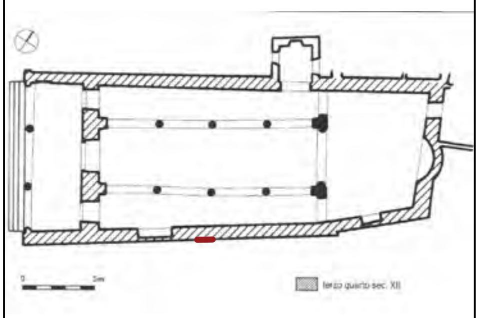
RIGHT FRONT
DATE OF SURVEY 28 FEB 2017

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 146-149;
- PARDI 1972, p. 206.



165	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: GOOD	
MASONRY THICKNESS: 115 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1175	
MATERIALS: SCAGLIA BIANCA, DISCOLOURED SCAGLIA ROSSA, BRICKS	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 173.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.9 to 1.5 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 11 to 22.8 cm; WIDTH from 13.2 to 37.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND AXE	DIMENSION: 1-8 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: WHITE, GREY, PINK
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: PINK	DIMENSION: <1 mm
SHAPE: BLOCKS	COLOR: WHITE
DIMENSIONS: HEIGHT from 11.8 to 18.5 cm; WIDTH from 9.6 to 27.8 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND AXE	
TYPE: BRICKS	
NATURE: CERAMIC MATERIAL	
COLOR: RED	
DIMENSIONS: HEIGHT 3.5 cm; WIDTH 12.3 cm	

S. ANGELO GATE - PERUGIA

DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- PETRANGELI 1999, p. 59.

166	RUBBLE MASONRY WITH WALL FACING IN SANDSTONE ASHLARS

CONSERVATION: FAIRLY GOOD
MASONRY THICKNESS: --
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: 1325
MATERIALS: SANDSTONE
LAYING: REGULAR IN PARALLEL ROWS

STONE ELEMENTS	**MORTAR**
LITHOTYPE: SANDSTONE	**CONSISTENCY:** SOLID
NATURE: SEDIMENTARY ROCK	**SIFT:** MEDIUM-FINE
COLOR: LIGHT BROWN	**MORTAR (BEDDING) THICKNESS: from0.4 to 1.4 cm**
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 13.5 to 22.5 cm; WIDTH from 22 to 50.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	DIMENSION: 1-2 mm
	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

S. ANGELO GATE - PERUGIA

DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- PETRANGELI 1999, p. 59.

167	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: --
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: 1325
MATERIALS: TRAVERTINE
LAYING: REGULAR IN PARALLEL ROWS

STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS**: from 0.2 to 1 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 17.3 to 20.5 cm; WIDTH from 20 to 36.8 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL AND PITCHING TOOLS	DIMENSION: 1-2 mm
	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

CHURCH OF S. AGATA - PERUGIA

MAIN FACADE
DATE OF SURVEY 10 AGO 2016

168	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: >60 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1290-1317	
MATERIALS: DISCOLOURED SCAGLIA ROSSA, SCAGLIA BIANCA, TRAVERTINE	
LAYING: REGULAR IN PARALLEL ROWS	

STONE ELEMENTS	MORTAR
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE AND LIGHT PINK	**MORTAR (BEDDING) THICKNESS**: from 0.2 to 0.5 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 7.5 to 17.5 cm; WIDTH from 14 to 35.8 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND FINE-TOOTH (dist. 1.5 cm) CHISEL	DIMENSION: 1-2 mm COLOR: WHITE
LITHOTYPE: SCAGLIA BIANCA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: WHITE	COLOR: WHITE
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 7.5 to 18 cm; WIDTH from 12 to 34.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND FINE-TOOTH (dist. 1.5 cm) CHISEL	
LITHOTYPE: TRAVERTINE	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 14.8 to 15.5 cm; WIDTH from 15 to 35 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND FINE-TOOTH (dist. 1.5 cm) CHISEL	

CHURCH OF S. AGATA - PERUGIA

LEFT FRONT
DATE OF SURVEY 10 AGO 2016

169	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: FAIRLY GOOD
MASONRY THICKNESS: >50 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1290-1317
MATERIALS: DISCOLOURED SCAGLIA ROSSA, SCAGLIA BIANCA, TRAVERTINE
LAYING: REGULAR IN PARALLEL ROWS

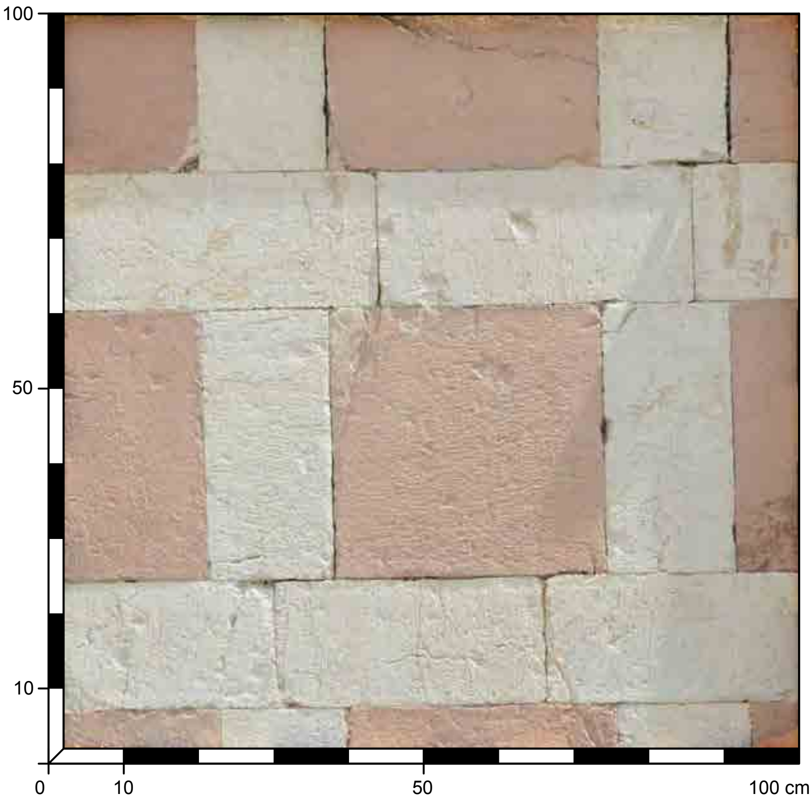
STONE ELEMENTS	MORTAR
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE AND LIGHT PINK	**MORTAR (BEDDING) THICKNESS**: from 0.2 to 0.8 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 7.5 to 17.5 cm; WIDTH from 14 to 35.8 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND LARGE-TOOTH (dist. 3 cm) CHISEL	DIMENSION: 1-2 mm COLOR: WHITE
LITHOTYPE: SCAGLIA BIANCA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: WHITE	COLOR: WHITE
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 7.5 to 18 cm; WIDTH from 12 to 34.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND LARGE-TOOTH (dist. 3 cm) CHISEL	
LITHOTYPE: TRAVERTINE	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 14.8 to 15.5 cm; WIDTH from 15 to 35 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND LARGE-TOOTH (dist. 3 cm) CHISEL	

CHURCH OF S. AGOSTINO - PERUGIA

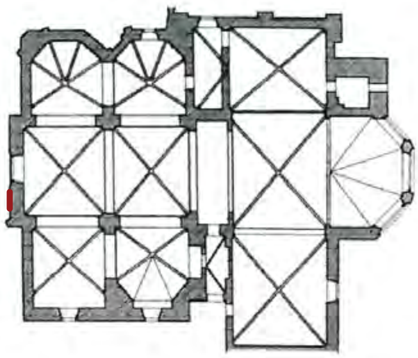
MAIN FACADE
DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, p. 227-228.



170	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS AND SLABS
CONSERVATION: GOOD	
MASONRY THICKNESS: >80 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1473	
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: BICHROMATIC NET	



QUINTERIO, CANALI 2010, p. 227.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS**: 1 mm
SHAPE: SLABS	**BINDER:** LIME
DIMENSIONS: HEIGHT 35.2 cm; WIDTH 36.2 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	DIMENSION: 1-2 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: WHITE
DIMENSIONS: HEIGHT from 16.6 to 17.8 cm; WIDTH from 35.4 to 41.7 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	

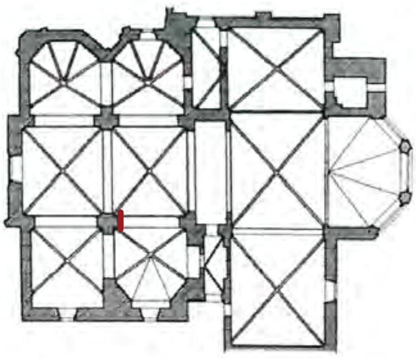
CHURCH OF S. AGOSTINO - PERUGIA

RIGHT CHAPEL
DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

• QUINTERIO, CANALI 2010, p. 227-228.

171	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: --	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: 15TH CENTURY	
MATERIALS: TRAVERTINO, SCAGLIA ROSSA	
LAYING: REGULAR IN PARALLEL ROWS	



QUINTERIO, CANALI 2010, p. 227.

STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS**: from 0.2 to 0.5 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 12 to 18 cm; WIDTH from 20 to 38.2 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH PITCHING TOOLS	DIMENSION: 1-2 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: WHITE
DIMENSIONS: HEIGHT from 7.5 to 18 cm; WIDTH from 12 to 34.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH PITCHING TOOLS	

CHURCH OF S. AGOSTINO - PERUGIA

PILLAR

DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, p. 227-228.

172	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS AND SLABS

CONSERVATION: GOOD

MASONRY THICKNESS: --

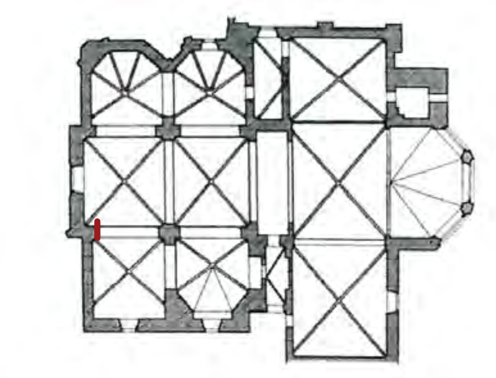
TYPE OF STRUCTURE: PILLAR

FACADE: INTERIOR

DATING: SECOND HALF OF 13TH CENTURY

MATERIALS: SCAGLIA ROSSA

LAYING: REGULAR IN PARALLEL ROWS



QUINTERIO, CANALI 2010, p. 227.

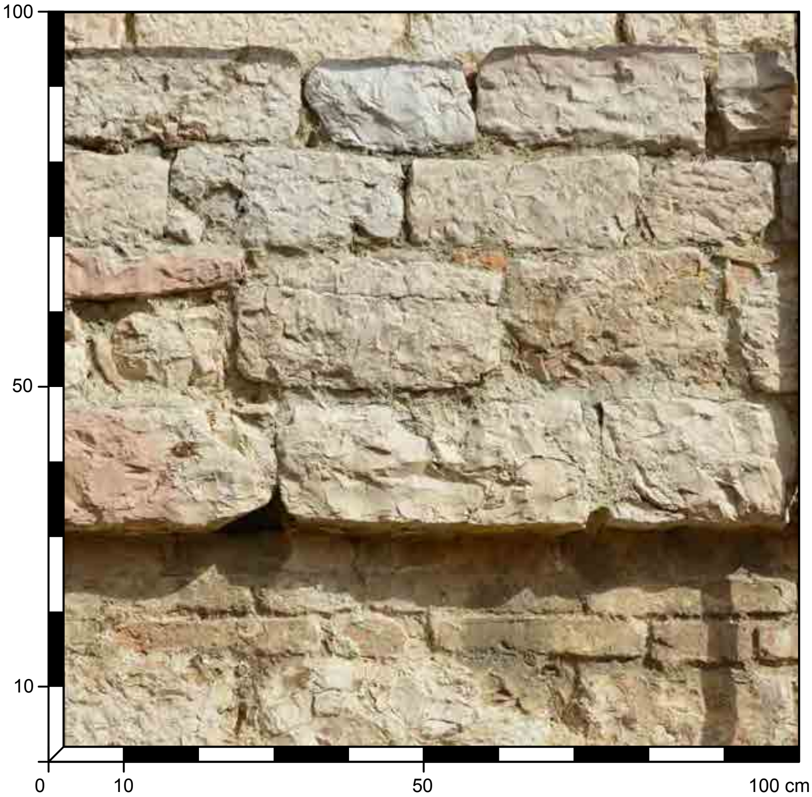
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: PINK AND LIGHT PINK	**MORTAR (BEDDING) THICKNESS**: from 0.7 to 1 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 12.5 to 30.5 cm; WIDTH 36.2 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	DIMENSION: 1-4 mm
	COLOR: WHITE, PINK
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

CHURCH OF S. DOMENICO - PERUGIA

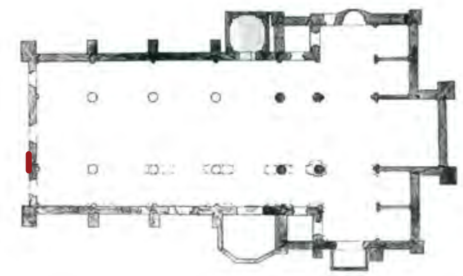
NUCLEUS OF MAIN FACADE
DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, p. 237-239;
- PARDI 1972, pp. 192-228.



173	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: GOOD	
MASONRY THICKNESS: --	
TYPE OF STRUCTURE: BEARING WALL	
NUCLEUS	
DATING: 14TH CENTURY (POST 1304)	
MATERIALS: SCAGLIA ROSSA, LATERIZIO, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



QUINTERIO, CANALI 2010, p. 227.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS**: from 0.2 to 0.5 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 12 to 18 cm; WIDTH from 16.6 to 42.2 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	DIMENSION: 1-2 mm
TYPE: BRICKS	COLOR: WHITE
NATURE: CERAMIC MATERIAL	**AGGREGATE:** SAND
COLOR: DARK RED	DIMENSION: <1 mm
DIMENSIONS: HEIGHT 4.6 cm; WIDTH from 26.5 to 28.5 cm	COLOR: WHITE
LITHOTYPE: SCAGLIA BIANCA	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 7.5 to 18 cm; WIDTH from 12 to 34.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH PITCHING TOOLS	

CHURCH OF S. DOMENICO - PERUGIA

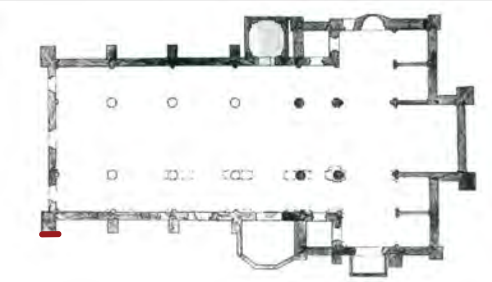
RIGHT FRONT
DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, p. 237-239;
- PARDI 1972, pp. 192-228.

174	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: --
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 14TH CENTURY (POST 1304)
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS



QUINTERIO, CANALI 2010, p. 227.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS**: from 0.1 to 0.5 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 11.3 to 17.5 cm; WIDTH from 19 to 52.2 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	DIMENSION: 1 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: WHITE
DIMENSIONS: HEIGHT from 12.8 to 16.5 cm; WIDTH from 19 to 45.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	

CHURCH OF S. DOMENICO - PERUGIA

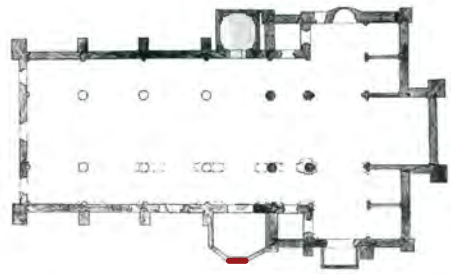
MADONNA DEL VOTO CHAPEL
DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, p. 237-239;
- PARDI 1972, pp. 192-228.

175	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: --
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 14TH-15TH CENTURY
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS



QUINTERIO, CANALI 2010, p. 227.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS**: from 0.5 to 0.7 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 12.8 to 16.5 cm; WIDTH from 19.5 to 40 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	DIMENSION: 1 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: WHITE, PINK
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: PINK	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: WHITE
DIMENSIONS: HEIGHT from 11.3 to 20 cm; WIDTH from 19 to 38.8 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	

CHURCH OF S. DOMENICO - PERUGIA

S. DOMENICO CHAPEL
DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, p. 237-239;
- PARDI 1972, pp. 192-228.

176	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD

MASONRY THICKNESS: --

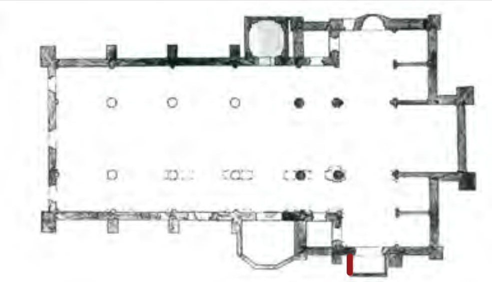
TYPE OF STRUCTURE: BEARING WALL

FACADE: EXTERIOR

DATING: 1454-1459

MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA

LAYING: REGULAR IN PARALLEL ROWS



QUINTERIO, CANALI 2010, p. 227.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS**: from 0.1 to 0.3 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 11.3 to 20.2 cm; WIDTH from 18 to 44.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	DIMENSION: 1 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE, PINK
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: WHITE
DIMENSIONS: HEIGHT from 12.8 to 20.2 cm; WIDTH from 23.5 to 32 cm	
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	

CHURCH OF S. DOMENICO VECCHIA - PERUGIA

MAIN FACADE
DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- PARDI 1972, p. 192 e 228.

177	RUBBLE MASONRY WITH WALL FACING IN BICHROMATIC LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: --
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1235-1260
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL BICHROMATIC ROWS

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS**: from 0.2 to 0.5 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 10.3 to 13.5 cm; WIDTH from 20 to 40.2 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH PITCHING TOOLS	DIMENSION: 1 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: WHITE
DIMENSIONS: HEIGHT from 22.8 to 23.5 cm; WIDTH from 32 to 40 cm	
MANUFACTURE: SURFACE PROCESSING WITH PITCHING TOOLS	

CHURCH OF S. ERCOLANO - PERUGIA

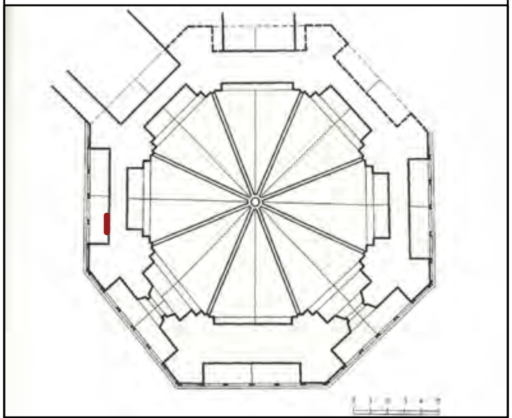
EAST FRONT
DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, p. 106-107;
- PARDI 2000, p. 240-242;
- TOESCA 1965, p. 700.

178	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: --
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 14TH CENTURY
MATERIALS: TRAVERTINO
LAYING: REGULAR IN PARALLEL ROWS



PARDI 2000, p. 241.

STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS**: from 0.2 to 1.3 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 9.8 to 28.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	DIMENSION: 1 mm
	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

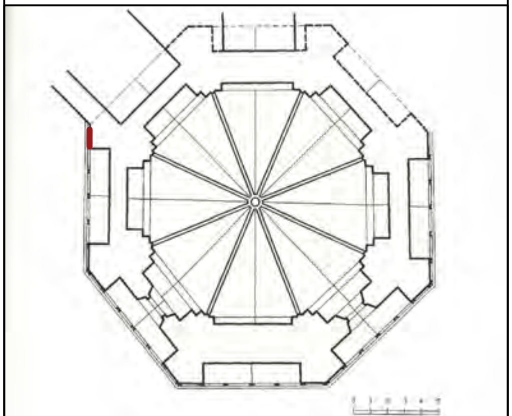
CHURCH OF S. ERCOLANO - PERUGIA

EAST FRONT
DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, p. 106-107;
- PARDI 2000, p. 240-242;
- TOESCA 1965, p. 700.

179	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: --	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 14TH CENTURY	
MATERIALS: TRAVERTINO	
LAYING: REGULAR IN PARALLEL ROWS	



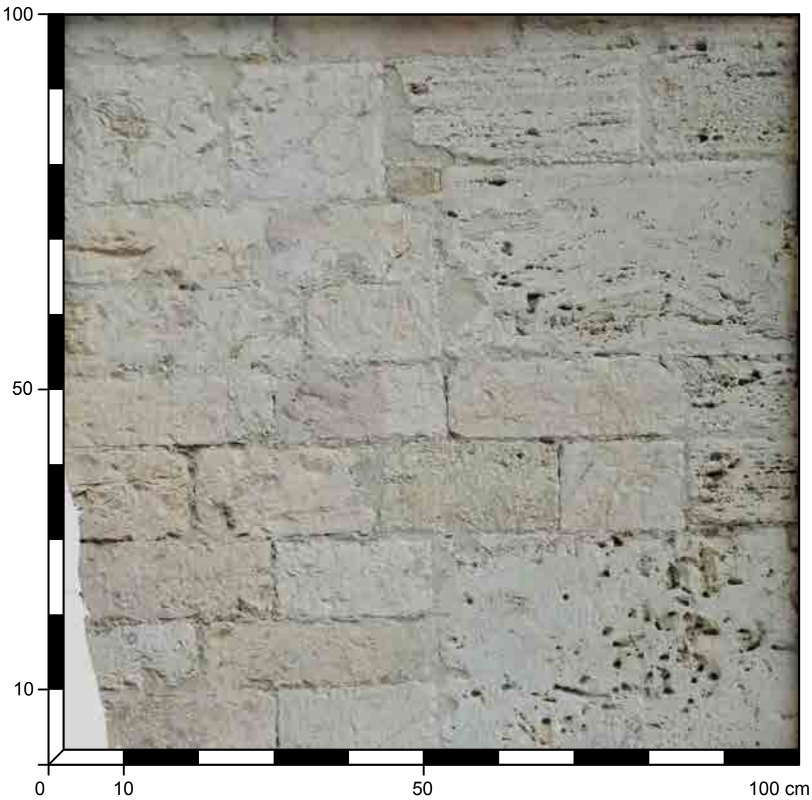
STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS**: from 0.2 to 1.3 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 9.8 to 28.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	DIMENSION: 1 mm
	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

CHURCH OF S. ERCOLANO - PERUGIA

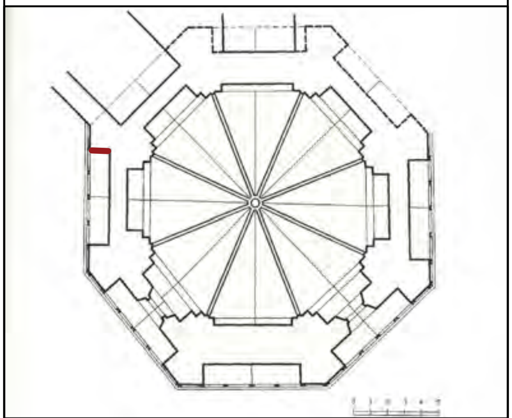
EAST FRONT
DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, p. 106-107;
- PARDI 2000, p. 240-242;
- TOESCA 1965, p. 700.



180	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: --	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 14TH CENTURY	
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA, TRAVERTINO	
LAYING: REGULAR IN PARALLEL ROWS	



PARDI 2000, p. 241.

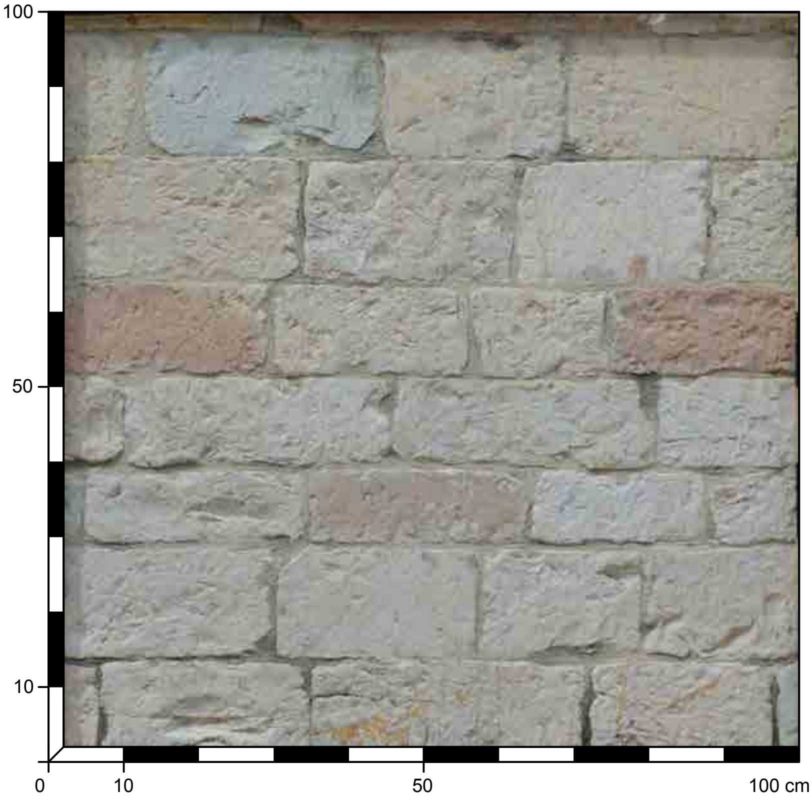
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS**: from 0.2 to 1.5 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 9.8 to 11.5 cm; WIDTH from 16.5 to 27 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	DIMENSION: 1 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: WHITE
DIMENSIONS: HEIGHT from 9.8 to 17.5 cm; WIDTH from 18 to 25.2 cm	
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	
LITHOTYPE: TRAVERTINE	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 9.8 to 28.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	

CHURCH OF S. FRANCESCO AL PRATO - PERUGIA

MAIN FACADE
DATE OF SURVEY 10 AGO 2016

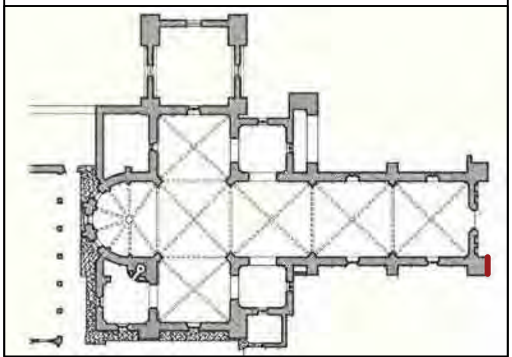
BIBLIOGRAPHICAL REFERENCES

- PARDI 2000, pp. 133-147.



181	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS

CONSERVATION: GOOD
MASONRY THICKNESS: --
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 12TH CENTURY
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA, CALCARI E MARNE A FUCOIDI
LAYING: REGULAR IN PARALLEL ROWS



PARDI 2000, p. 135.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS**: from 0.5 to 0.8 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 9.8 to 17.5 cm; WIDTH from 18.2 to 35.2 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	DIMENSION: 1 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: PINK	DIMENSION: <1 mm
SHAPE: BLOCKS	COLOR: WHITE
DIMENSIONS: HEIGHT from 9.8 to 17.5 cm; WIDTH from 20 to 39.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	
LITHOTYPE: TRAVERTINE	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
SHAPE: BLOCKS	
DIMENSIONS: HEIGHT from 15.5 to 18.5 cm; WIDTH from 20 to 38 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	

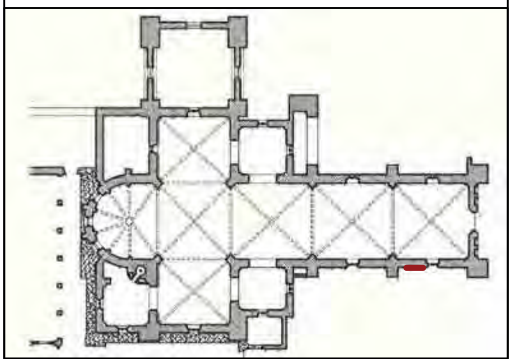
CHURCH OF S. FRANCESCO AL PRATO - PERUGIA

LEFT FRONT
DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- PARDI 2000, pp. 133-147.

182	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: GOOD	
MASONRY THICKNESS: --	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 12TH CENTURY	
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA, CALCARI E MARNE A FUCOIDI	
LAYING: REGULAR IN PARALLEL ROWS	



PARDI 2000, p. 135.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS**: from 0.5 to 0.8 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 9.8 to 17.5 cm; WIDTH from 18.2 to 35.2 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	DIMENSION: 1 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: PINK	DIMENSION: <1 mm
SHAPE: BLOCKS	COLOR: WHITE
DIMENSIONS: HEIGHT from 9.8 to 17.5 cm; WIDTH from 20 to 39.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	
LITHOTYPE: TRAVERTINE	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
SHAPE: BLOCKS	
DIMENSIONS: HEIGHT from 15.5 to 18.5 cm; WIDTH from 20 to 38 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	

CHURCH OF S. FRANCESCO AL PRATO - PERUGIA

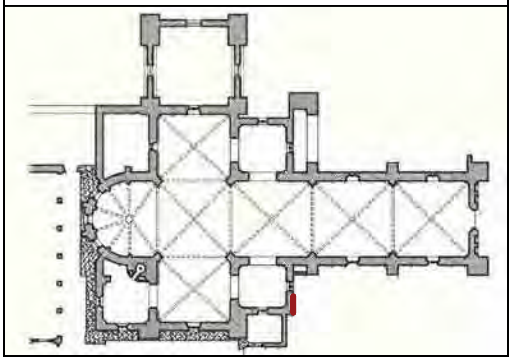
SS. CONCEZIONE ORATORY
DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- PARDI 2000, pp. 133-147.

183	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS AND SLABS

CONSERVATION: FAIRLY GOOD
MASONRY THICKNESS: --
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1464
MATERIALS: SCAGLIA ROSSA, TRAVERTNO
LAYING: BICHROMATIC NET



PARDI 2000, p. 135.

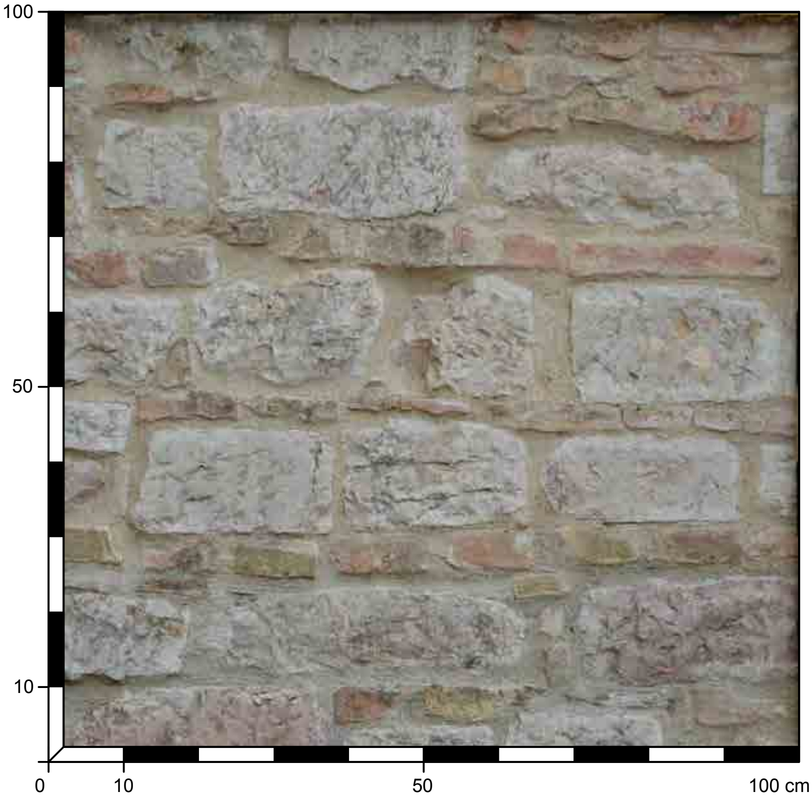
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS**: 0.2-0.3 cm
SHAPE: SLABS	**BINDER:** LIME
DIMENSIONS: HEIGHT35.5-36 cm; WIDTH 35.5-36 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH PITCHING TOOLS	DIMENSION: 1 mm
LITHOTYPE: TRAVERTINE	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: WHITE
DIMENSIONS: HEIGHT 17.4-17.6 cm; WIDTH 35 cm	
MANUFACTURE: SURFACE PROCESSING WITH PITCHING TOOLS	

CHURCH OF S. FRANCESCO AL PRATO - PERUGIA

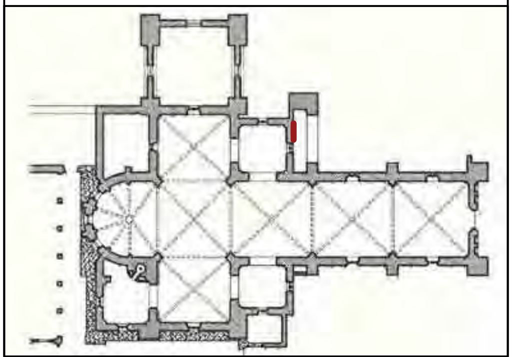
BELL TOWER
DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- PARDI 2000, pp. 133-147.



184	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS AND BRICKS
CONSERVATION: GOOD	
MASONRY THICKNESS: --	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1250 APPROXIMATELY	
MATERIALS: SCAGLIA BIANCA, BRICKS, SCAGLIA ROSSA	
LAYING: REGULAR IN PARALLEL ROWS	



PARDI 2000, p. 135.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS**: from 0.2 to 0.5 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 11.5 to 15.5 cm; WIDTH from 15 to 35.2 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	DIMENSION: 1 mm
LITHOTYPE: BRICKS	COLOR: WHITE
NATURE: CERAMIC MATERIAL	**AGGREGATE:** SAND
COLOR: OCHER AND RED	DIMENSION: <1 mm
DIMENSIONS: HEIGHT from 4.7 to 5.2 cm; WIDTH 28.2 (?) cm	COLOR: WHITE
LITHOTYPE: SCAGLIA ROSSA	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: PINK	
SHAPE: BLOCKS	
DIMENSIONS: HEIGHT from 10 to 15 cm; WIDTH from 20 to 45 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	

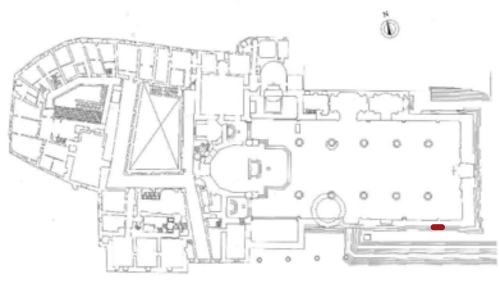
DUOMO S. LORENZO - PERUGIA

LEFT FRONT
DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 188-190;
- QUINTERIO, CANALI 2010, p. 237-239;
- VAGNI 2009, pp. 34-50;
- PARDI 1972, p. 170.

185	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: --	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1437-1507	
MATERIALS: ROSSO AMMONITICO	
LAYING: REGULAR IN PARALLEL ROWS	



VAGNI 2009, p. 268.

STONE ELEMENTS	MORTAR
LITHOTYPE: ROSSO AMMONITICO	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS**: 1 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT14.3-14.5 AND 18.7-19 cm; WIDTH from 22 to 44.1 cm	**AGGREGATE:** SAND
MANUFACTURE: SURFACE PROCESSING WITH PITCHING TOOLS	DIMENSION: <1 mm
	COLOR: WHITE

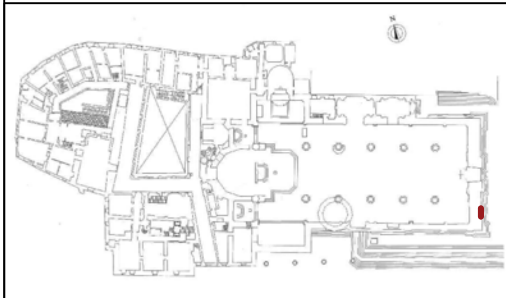
DUOMO S. LORENZO - PERUGIA

NUCLEUS OF THE MAIN FACADE
DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 188-190;
- QUINTERIO, CANALI 2010, p. 237-239;
- VAGNI 2009, pp. 34-50;
- PARDI 1972, p. 170.

186	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: GOOD	
MASONRY THICKNESS: --	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1437-1507	
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



VAGNI 2009, p. 268.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS**: from 2 to 2.5 cm
SHAPE: BLOCKS	**BINDER:** CEMENT
DIMENSIONS: HEIGHT from 10 to 14.3 cm; WIDTH from 18 to 39.5 cm	**AGGREGATE:** SAND
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	DIMENSION: <1 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
SHAPE: BLOCKS	
DIMENSIONS: HEIGHT from 10 to 14.3 cm; WIDTH from 18 to 39.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	

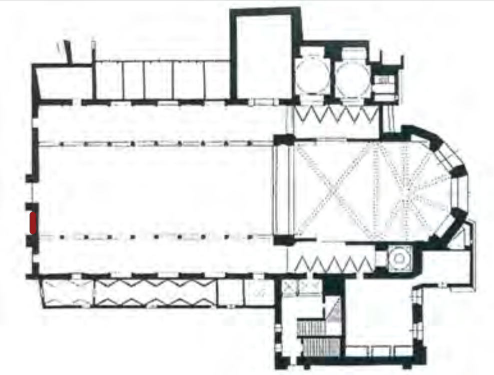
S. PIETRO CATHEDRAL - PERUGIA

MAIN FACADE
DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, p. 273-275;
- PARDI 1972, p. 229.

187	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: --	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: ANTE 14TH CENTURY	
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



QUINTERIO, CANALI 2010, p. 274.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS**: 04-1 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT 12.2-13.5 cm; WIDTH from 40.5 to 54.1 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	DIMENSION: 1-2 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: WHITE
DIMENSIONS: HEIGHT 11.4-16.5 cm; WIDTH from 13.5 to 60 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	

S. PIETRO CATHEDRAL - PERUGIA

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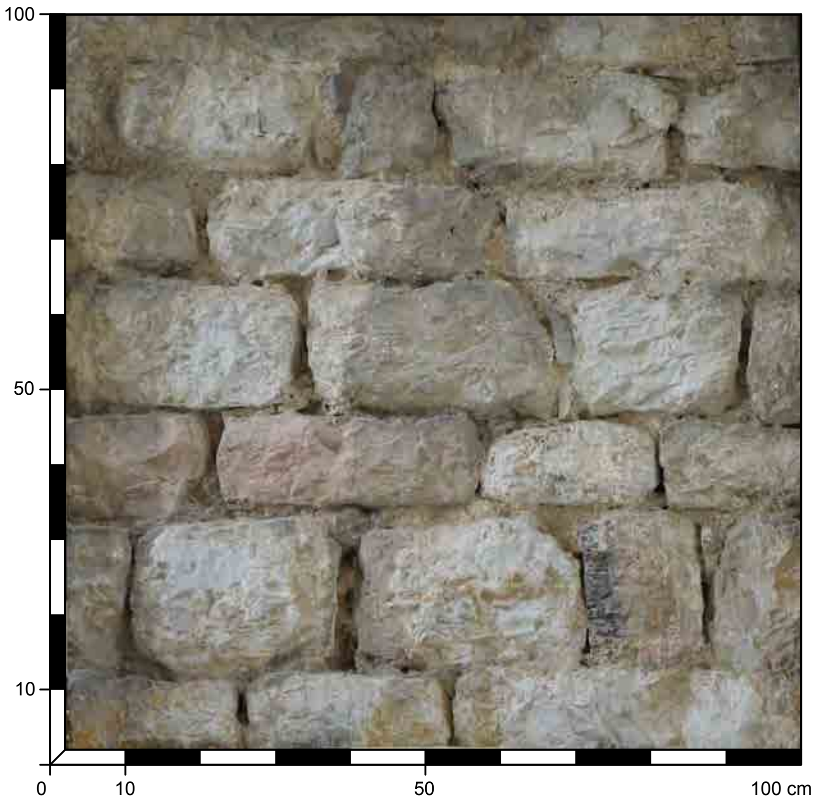
DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, p. 273-275;
- PARDI 1972, p. 229.



188	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS

CONSERVATION: GOOD
MASONRY THICKNESS: --
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: ANTE 1273
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS**: from 2 to 2.5 cm
SHAPE: BLOCKS	**BINDER:** CEMENT
DIMENSIONS: HEIGHT from 10 to 14.3 cm; WIDTH from 18 to 39.5 cm	**AGGREGATE:** SAND
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	DIMENSION: <1 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
SHAPE: BLOCKS	
DIMENSIONS: HEIGHT from 10 to 14.3 cm; WIDTH from 18 to 39.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	

CHURCH OF Ss. STEFANO E VALENTINO - PERUGIA

APSE

DATE OF SURVEY 10 AGO 2016

189	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

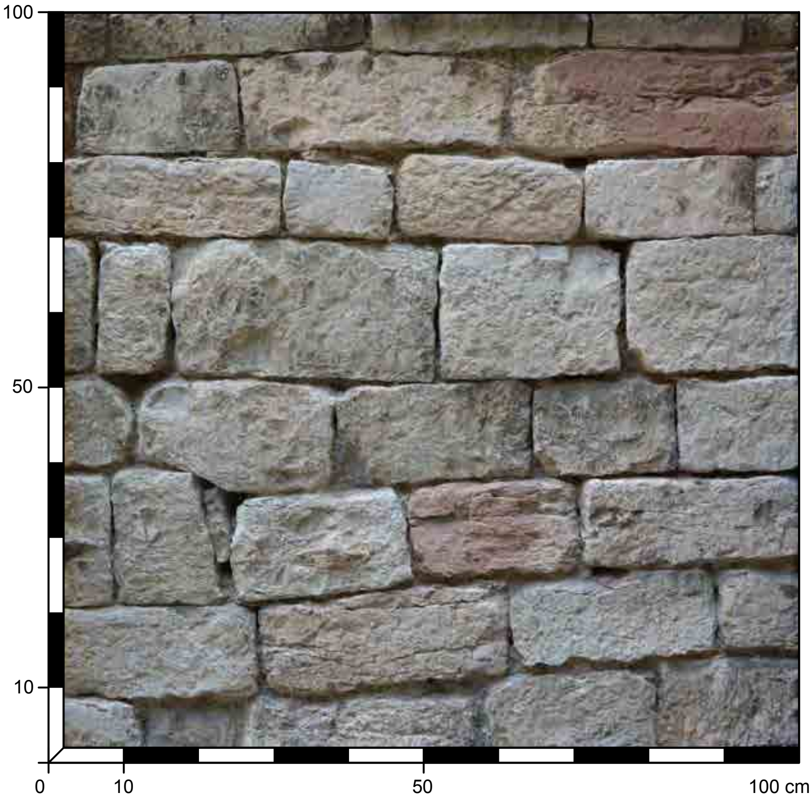
CONSERVATION: GOOD
MASONRY THICKNESS: --
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 12TH CENTURY
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS**: 04-0.8 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 10 to 20.5 cm; WIDTH from 16.2 to 40.8 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH PITCHING TOOLS	DIMENSION: 1-2 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: WHITE
DIMENSIONS: HEIGHT from 10.2 to 20.5 cm; WIDTH from 13.5 to 41.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	

CHURCH OF Ss. STEFANO E VALENTINO - PERUGIA

LEFT FRONT

DATE OF SURVEY 10 AGO 2016



190	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: GOOD	
MASONRY THICKNESS: --	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 12TH CENTURY	
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: REGULAR IN SEMI-PARALLEL ROWS	

STONE ELEMENTS	
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS**: from 0.4 to 0.8 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 12.4 to 14.3 cm; WIDTH from 22.1 to 39.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	DIMENSION: 1-2 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: BLOCKS	COLOR: WHITE
DIMENSIONS: HEIGHT from 10.8 to 19.3 cm; WIDTH from 9 to 42.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	

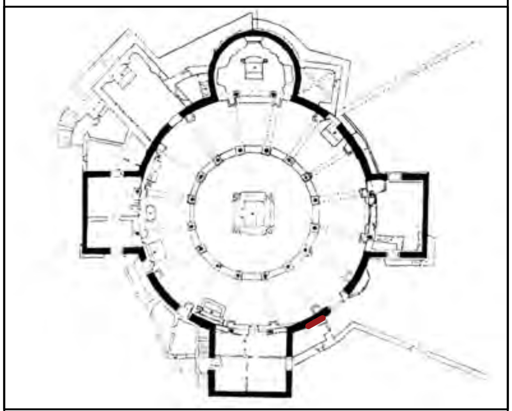
S. ANGELO TEMPLE - PERUGIA

EXTERNAL WALL FACING
DATE OF SURVEY 10 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 185;
- QUINTERIO, CANALI 2010, p. 227-228;
- PARDI 1972, p. 125.

191	RUBBLE MASONRY WITH WALL FACING IN IRREGULAR STONE ELEMENTS
CONSERVATION: GOOD	
MASONRY THICKNESS: 90 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 6TH CENTURY	
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA, TRAVERTINE SANDSTONE	
LAYING: IRREGULAR	



QUINTERIO, CANALI 2010, p. 227.

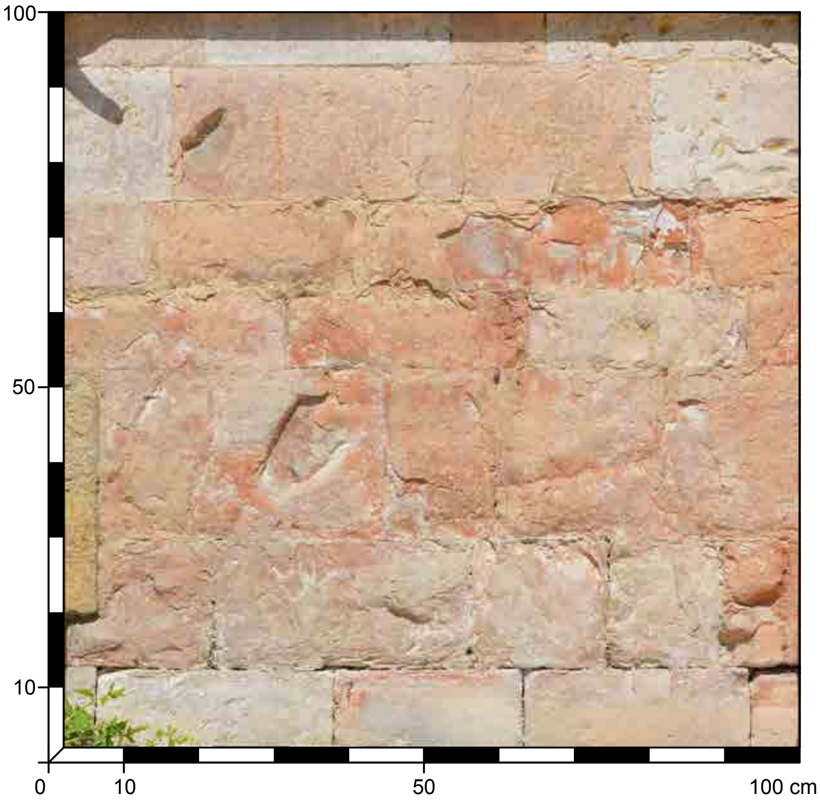
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS**: --
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 4 to 11.5 cm; WIDTH from 10 to 30.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: NO SURFACE PROCESSING	DIMENSION: 1 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: BLOCKS	COLOR: WHITE
DIMENSIONS: HEIGHT from 4.5 to 15 cm; WIDTH from 1 to 35.2 cm	
MANUFACTURE: NO SURFACE PROCESSING	
LITHOTYPE: TRAVERTINE	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
SHAPE: BLOCKS	
DIMENSIONS: HEIGHT from 6 to 13.5 cm; WIDTH from 12 to 38 cm	
MANUFACTURE: NO SURFACE PROCESSING	

CHURCH OF S. GIOVANNI PROFIAMMA - SAN GIOVANNI PROFIAMMA (PG)

MAIN FACADE (LEFT SIDE)
DATE OF SURVEY 07 AGO 2016

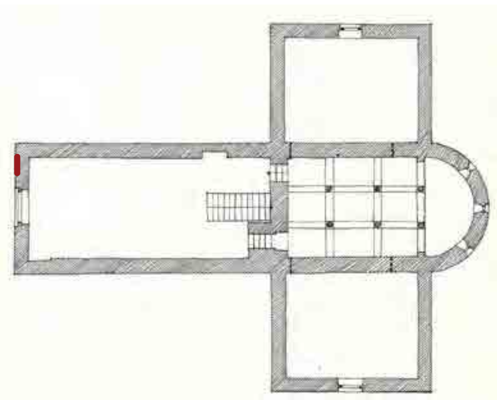
BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 74;
- PARDI 2000, pp. 400-410;
- MARTELLI 1966, p. 336.



192	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: MEDIOCRE
MASONRY THICKNESS: 100 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1150 - 1231
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS



PARDI 2000, p. 402.

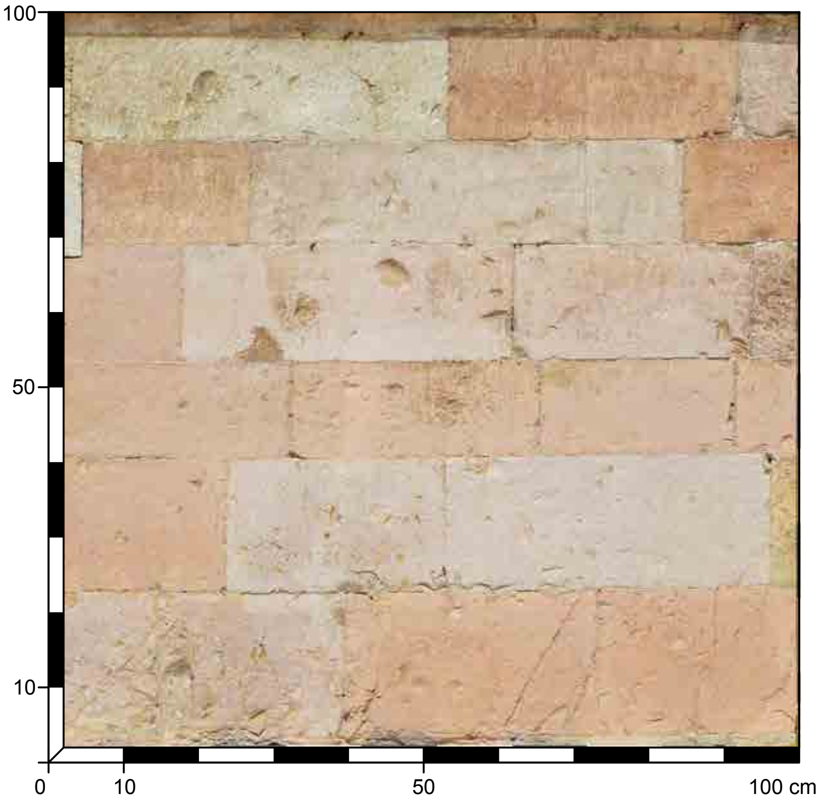
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** 0.1-0.2 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 10.2 to 32.2 cm; WIDTH from 15.6 to 40.8 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	DIMENSION: 1 mm
NATURE: CARBONATIC LIMESTONE ROCK	COLOR: WHITE, PINK
COLOR: WHITE	**AGGREGATE:** SAND
SHAPE: ASHLARS	DIMENSION: <1 mm
DIMENSIONS: HEIGHT from 10.2 to 22.6 cm; WIDTH from 17.4 to 37.5 cm	COLOR: WHITE

CHURCH OF S. GIOVANNI PROFIAMMA - SAN GIOVANNI PROFIAMMA (PG)

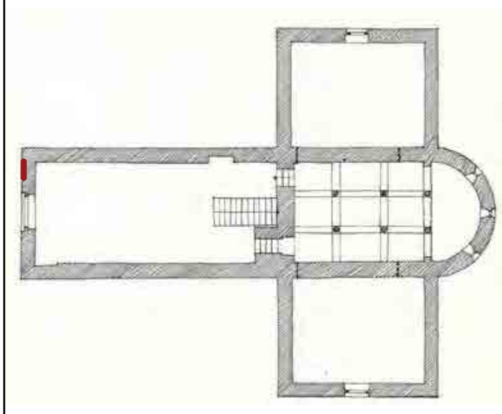
MAIN FACADE (LEFT SIDE)
DATE OF SURVEY 07 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 74;
- PARDI 2000, pp. 400-410;
- MARTELLI 1966, p. 336.



193	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 100 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1150 - 1231	
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA	
LAYING: REGULAR IN PARALLEL ROWS	



PARDI 2000, p. 402.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** 0.1 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 13.7 to 19.5 cm; WIDTH from 21 to 42.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	DIMENSION: 1 mm
NATURE: CARBONATIC LIMESTONE ROCK	COLOR: WHITE, PINK
COLOR: WHITE	**AGGREGATE:** SAND
SHAPE: ASHLARS	DIMENSION: <1 mm
DIMENSIONS: HEIGHT from 13.5 to 19.5 cm; WIDTH from 15.2 to 46.5 cm	COLOR: WHITE

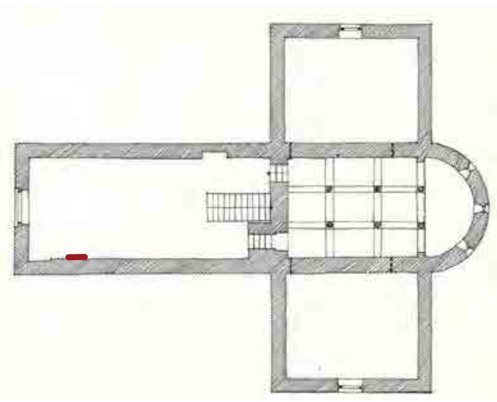
CHURCH OF S. GIOVANNI PROFIAMMA - SAN GIOVANNI PROFIAMMA (PG)

RIGHT FRONT
DATE OF SURVEY 07 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 74;
- PARDI 2000, pp. 400-410;
- MARTELLI 1966, p. 336.

194	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: FAIRLY GOOD	
MASONRY THICKNESS: 120 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: 1150 - 1231	
MATERIALS: SCAGLIA ROSSA, TRAVERTINE, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



PARDI 2000, p. 402.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 1.5 to 1.7 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 11.8 to 17.3 cm; WIDTH from 20.2 to 60 cm	**AGGREGATE:** SAND
SHAPE: SLABS	DIMENSION: <1 mm
DIMENSIONS: HEIGHT from 4.3 to 7.6 cm; WIDTH from 38.8 to 48.5 cm	COLOR: WHITE
LITHOTYPE: TRAVERTINE	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 29.8 to 59.8 cm; WIDTH from 35.2 to 106.4 cm	
LITHOTYPE: SCAGLIA BIANCA	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 11.4 to 15 cm; WIDTH from 18.8 to 28.4 cm	
SHAPE: SLABS	
DIMENSIONS: HEIGHT from 5.5 to 8 cm; WIDTH from 21.5 to 32.5 cm	

CHURCH OF S. GIOVANNI PROFIAMMA - SAN GIOVANNI PROFIAMMA (PG)

RIGHT FRONT

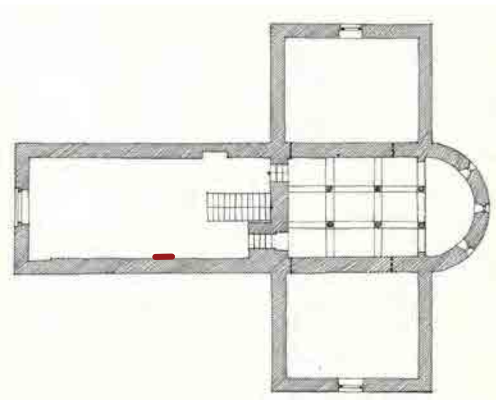
DATE OF SURVEY 07 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 74;
- PARDI 2000, pp. 400-410;
- MARTELLI 1966, p. 336.

195	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: FAIRLY GOOD
MASONRY THICKNESS: 120 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: 1150 - 1231
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS



PARDI 2000, p. 402.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 1.5 to 1.7 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 11.8 to 17.3 cm; WIDTH from 20.2 to 60 cm	**AGGREGATE:** SAND
SHAPE: SLABS	DIMENSION: <1 mm
DIMENSIONS: HEIGHT from 4.3 to 7.6 cm; WIDTH from 38.8 to 48.5 cm	COLOR: WHITE
LITHOTYPE: SCAGLIA BIANCA	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 11.4 to 15 cm; WIDTH from 18.8 to 28.4 cm	
SHAPE: SLABS	
DIMENSIONS: HEIGHT from 5.5 to 8 cm; WIDTH from 21.5 to 32.5 cm	

CHURCH OF S. GIOVANNI PROFIAMMA - SAN GIOVANNI PROFIAMMA (PG)

CRYPT
DATE OF SURVEY 07 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 74;
- PARDI 2000, pp. 400-410;
- MARTELLI 1966, p. 336.

196	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: FAIRLY GOOD	
MASONRY THICKNESS: --	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: 1150 - 1231	
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 0.8 to 1 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 10.2 to 16.4 cm; WIDTH from 15.2 to 28.8 cm	**AGGREGATE:** SAND
SHAPE: SLABS	DIMENSION: <1 mm
DIMENSIONS: HEIGHT from 5.5 to 8 cm; WIDTH from 22.5 to 32.5 cm	COLOR: WHITE
LITHOTYPE: SCAGLIA BIANCA	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 10.2 to 16.4 cm; WIDTH from 15.2 to 28.8 cm	
SHAPE: SLABS	
DIMENSIONS: HEIGHT from 5.5 to 8 cm; WIDTH from 22.5 to 32.5 cm	

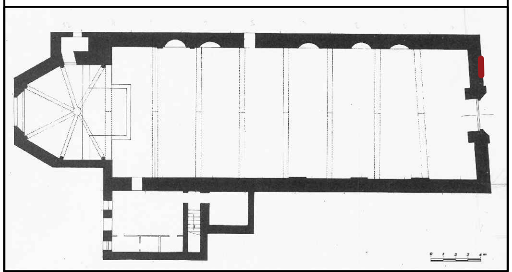
CHIESA DI S. FRANCESCO - SANGEMINI (TR)

PARAMENTO DELLA FACCIATA DELLA CHIESA
DATA DEL RILIEVO 18/03/2017

FONTI BIBLIOGRAFICHE DI RIFERIMENTO

• PRANDI 1976, pp. 260-270.

197	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 105 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1235 - 1241	
MATERIALS: TRAVERTINE	
LAYING: REGULAR IN PARALLEL ROWS	



PRANDI 1976, p. 269.

STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.2 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 15.4 to 23.2 cm; WIDTH from 18.5 to 37.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL AND PITCHING TOOLS	DIMENSION: 1-2 mm
	COLOR: PINK
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

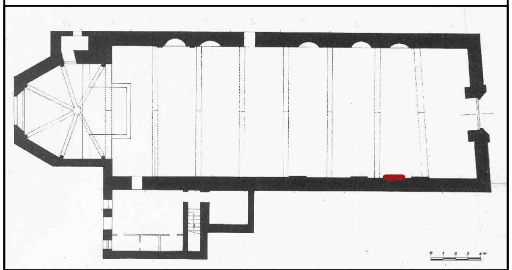
CHIESA DI S. FRANCESCO - SANGEMINI (TR)

PARAMENTO INTERNO DELLA MURATURA DEL FIANCO SINISTRO DELLA CHIESA
DATA DEL RILIEVO 18/03/2017

BIBLIOGRAPHICAL REFERENCES

- PRANDI 1976, pp. 260-270.

198	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 105 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: 1235 - 1241	
MATERIALS: SCAGLIA ROSSA	
LAYING: REGULAR IN PARALLEL ROWS	



PRANDI 1976, p. 269.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: LIGHT PINK	**MORTAR (BEDDING) THICKNESS:** 0.7-0.8 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 16.8 to 24.5 cm; WIDTH from 24.5 to 38.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL AND PITCHING TOOLS	DIMENSION: 2-6 mm
	COLOR: WHITE, PINK
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

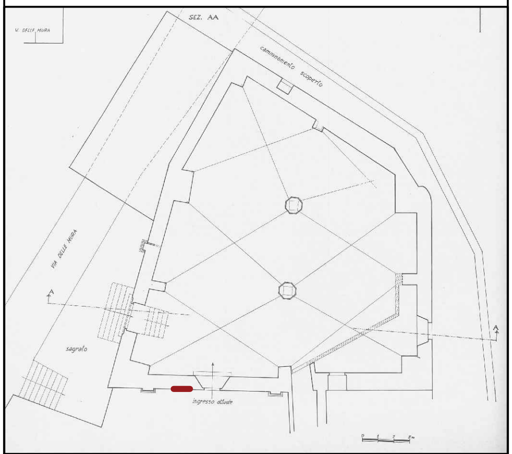
CHIESA DI S. GIOVANNI - SANGEMINI (TR)

PARAMENTO DELLA FACCIATA DELLA CHIESA
DATA DEL RILIEVO 18/03/2017

BIBLIOGRAPHICAL REFERENCES

- PRANDI 1976, pp. 259-263.

199	RUBBLE MASONRY WITH WALL FACING IN REUSE LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 95 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 12TH CENTURY	
MATERIALS: TRAVERTINE	
LAYING: REGULAR IN PARALLEL ROWS	



ELEMENTI LAPIDEI	MALTA
LITOTIPO: TRAVERTINO	**CONSISTENZA:** POCO COMPATTA
NATURA: ROCCIA SEDIMENTARIA CARBONATICA	**VAGLIATURA:** FINISSIMA
COLORE: BIANCO	**SPESSORE GIUNTI:** da 0,4 a 1 cm
FORMA: CONCI	**LEGANTE:** CALCE
DIMENSIONI: ALTEZZA da 24,3 a 41,5 cm; LARGHEZZA da 22,5 a 65,8 cm	**AGGREGATO:** FRAMMENTI DI PIETRA CALCAREA
LAVORAZIONE: SUPERFIC LISCIATA CON MARTELLINA	DIMENSIONE: 1-2 mm
	COLORE: ROSA
	AGGREGATO: SABBIA
	DIMENSIONE: <1 mm
	COLORE: BEIGE

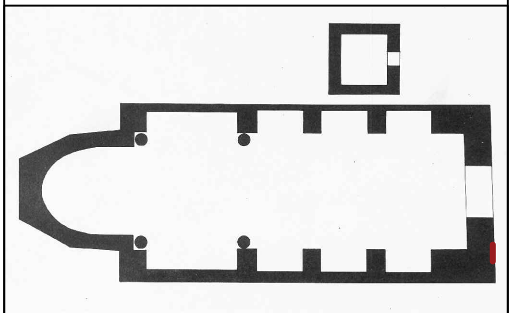
CHIESA DI SS. GIOVANNI BATTISTA E GEMINE- SANGEMINI (TR)

PARAMENTO DELLA MURATURA DI FACCIATA DELLA CHIESA (LATO SINISTRO)
DATA DEL RILIEVO 18/03/2017

BIBLIOGRAPHICAL REFERENCES

- PRANDI 1976, pp. 260-270.

200	RUBBLE MASONRY WITH WALL FACING IN REUSE LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 210 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 10TH CENTURY	
MATERIALS: TRAVERTINE	
LAYING: REGULAR IN PARALLEL ROWS	



PRANDI 1976, p. 269.

STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 2 to 7.5 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 34.1 to 65.2 cm; WIDTH from 36.5 to 107.2 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	DIMENSION: 1-2 mm
	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

CHIESA DI SS. GIOVANNI BATTISTA E GEMINE- SANGEMINI (TR)

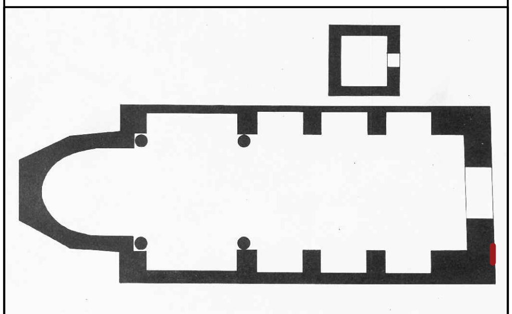
PARAMENTO DELLA MURATURA DI FACCIATA DELLA CHIESA (LATO SINISTRO)
DATA DEL RILIEVO 18/03/2017

BIBLIOGRAPHICAL REFERENCES

- PRANDI 1976, pp. 260-270.

201	RUBBLE MASONRY WITH WALL FACING IN REUSE LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 210 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 10TH CENTURY
MATERIALS: TRAVERTINE
LAYING: REGULAR IN PARALLEL ROWS



PRANDI 1976, p. 269.

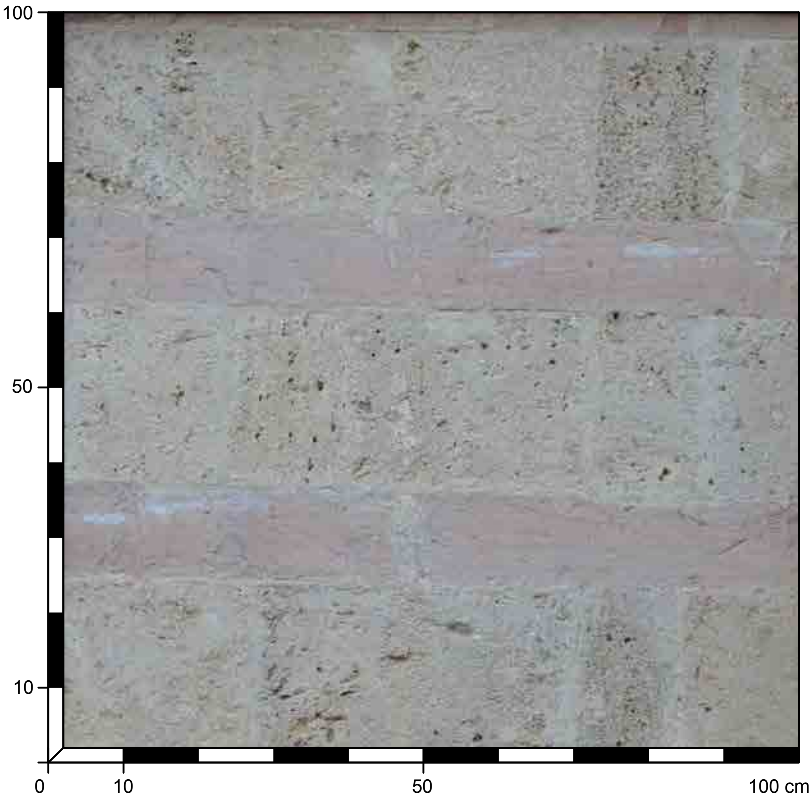
STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 2 to 7.5 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 34.1 to 65.2 cm; WIDTH from 36.5 to 107.2 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	DIMENSION: 1-2 mm
	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

CHIESA DI SS. GIOVANNI BATTISTA E GEMINE- SANGEMINI (TR)

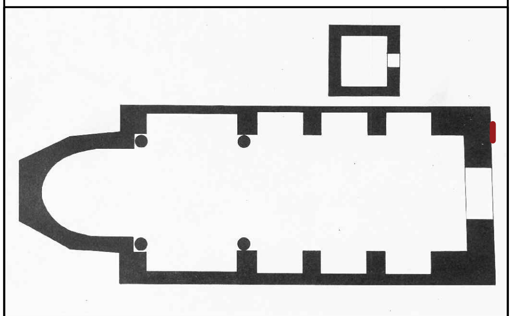
PARAMENTO DELLA MURATURA DI FACCIATA DELLA CHIESA (LATO DESTRO)
DATA DEL RILIEVO 18/03/2017

BIBLIOGRAPHICAL REFERENCES

- PRANDI 1976, pp. 260-270.



202	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 20-40 cm	
TYPE OF STRUCTURE: WALL FACING	
FACADE: EXTERIOR	
DATING: 14TH CENTURY	
MATERIALS: TRAVERTINE	
LAYING: REGULAR IN BI-CHROMATIC PARALLEL ROWS	



PRANDI 1976, p. 269.

STONE ELEMENTS	**MORTAR**
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.3 to 1 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT 23 cm; WIDTH from 17.5 to 45 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	DIMENSION: 1-5 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: PINK	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: WHITE
DIMENSIONS: HEIGHT 12.4 cm; WIDTH from 32.5 to 46.8 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER AND PITCHING TOOLS	

CHIESA DI SS. GIOVANNI BATTISTA E GEMINE- SANGEMINI (TR)

PARAMENTO DELLA MURATURA DI FACCIATA DELLA CHIESA (BASAMENTO LATO DESTRO)
DATA DEL RILIEVO 18/03/2017

BIBLIOGRAPHICAL REFERENCES

- PRANDI 1976, pp. 260-270.

203	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS AND SLABS

CONSERVATION: GOOD

MASONRY THICKNESS: 20-40 cm

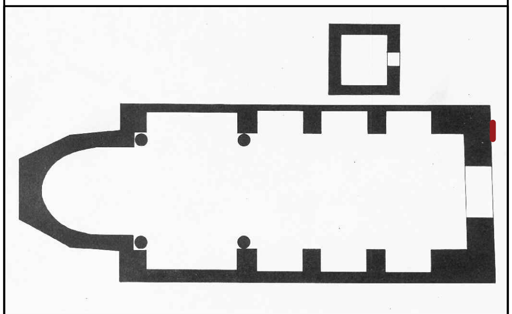
TYPE OF STRUCTURE: WALL FACING

FACADE: EXTERIOR

DATING: 14TH CENTURY

MATERIALS: TRAVERTINE, SCAGLIA BIANCA, ROSSO AMMONITICO

LAYING: IRREGULAR



PRANDI 1976, p. 269.

STONE ELEMENTS	**MORTAR**
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.4 to 0.7 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 12.2 to 32.5 cm; WIDTH from 22.5 to 58.4 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL AND PITCHING TOOLS	DIMENSION: 1 mm COLOR: WHITE
LITHOTYPE: SCAGLIA BIANCA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: WHITE	COLOR: WHITE
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 10.8 to 15.2 cm; WIDTH from 18.5 to 32 cm	
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	
LITHOTYPE: TRAVERTINE	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
SHAPE: SLABS	
DIMENSIONS: HEIGHT from 24.8 to 28 cm; WIDTH from 39.2 to 44.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	

CHIESA DI S. NICOLò - SANGEMINI (TR)

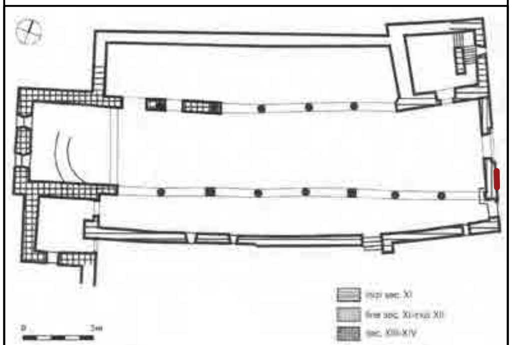
PARAMENTO DELLA MURATURA DI FACCIATA DELLA CHIESA (LATO DESTRO)
DATA DEL RILIEVO 18/03/2017

FONTI BIBLIOGRAFICHE DI RIFERIMENTO

- GIGLIOZZI 2013, p. 150;
- PARDI 1972, p. 44.

204	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS AND SLABS

CONSERVATION: GOOD
MASONRY THICKNESS: 75 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: END OF 11TH C. - BEGINNING OF 12TH C.
MATERIALS: TRAVERTINE, SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 174.

STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.7 - 0.8 cm
SHAPE: SLABS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 30.5 to 65.2 cm; WIDTH from 38 to 78.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	DIMENSION: 1-2 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: GREY
DIMENSIONS: HEIGHT from 12.2 to 21.5 cm; WIDTH from 20 to 32.4 cm	
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	

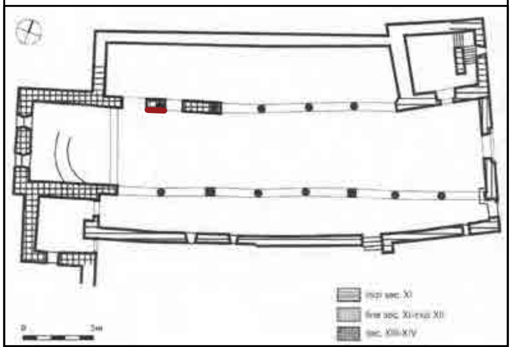
CHIESA DI S. NICOLò - SANGEMINI (TR)

PARAMENTO DELLA MURATURA DI FACCIATA DELLA CHIESA (LATO DESTRO)
DATA DEL RILIEVO 18/03/2017

FONTI BIBLIOGRAFICHE DI RIFERIMENTO

- GIGLIOZZI 2013, p. 150;
- PARDI 1972, p. 44.

205	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 90 cm	
TYPE OF STRUCTURE: PILLAR	
FACADE: INTERIOR	
DATING: 13TH - 14TH CENTURY	
MATERIALS: TRAVERTINE	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 174.

STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 1 - 1.2 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 20.5 to 35.2 cm; WIDTH from 8.5 to 56.7 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH AXE	DIMENSION: 1-5 mm
	COLOR: WHITE, PINK
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

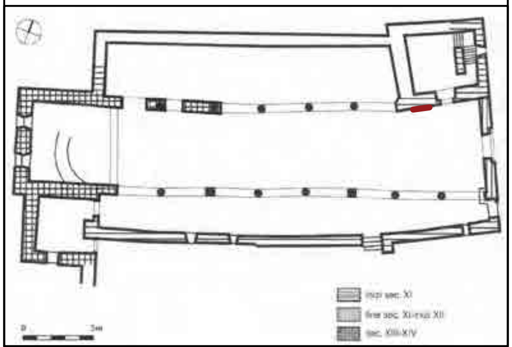
CHIESA DI S. NICOLò - SANGEMINI (TR)

PARAMENTO DELLA MURATURA DEL CAMPANILE
DATA DEL RILIEVO 18/03/2017

FONTI BIBLIOGRAFICHE DI RIFERIMENTO

- GIGLIOZZI 2013, p. 150;
- PARDI 1972, p. 44.

206	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: GOOD	
MASONRY THICKNESS: 100 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 11TH CENTURY	
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA, TRAVERTINE, BRICKS	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 174.

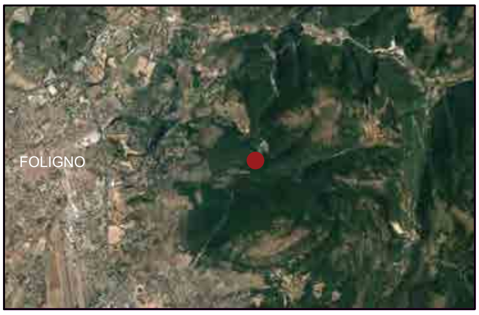
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 1 - 2 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 10.5 to 15 cm; WIDTH from 6.5 to 28 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	DIMENSION: 5-10 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: WHITE, PINK
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: BLOCKS	COLOR: GREY
DIMENSIONS: HEIGHT from 10 to 15 cm; WIDTH from 15.5 to 30.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	
LITHOTYPE: TRAVERTINE	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
SHAPE: SLABS	
DIMENSIONS: HEIGHT from 12.2 to 14.8 cm; WIDTH from 22.5 to 32 cm	
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	
TYPE: BRICKS	
NATURE: CERAMIC MATERIAL	
DIMENSIONS: HEIGHT 3.2 - 4 cm	

ABBEY OF S. CROCE IN SASSOVIVO - FOLIGNO (PG)

ROMANESQUE *AVANT-CORPS*
DATE OF SURVEY 14 AGO 2015

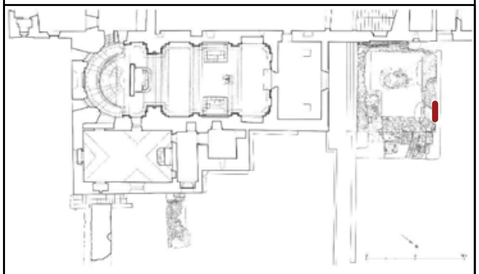
BIBLIOGRAPHICAL REFERENCES

- BARELLI, LORETI, PICUTI, TADDEI 2014.



207	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 150 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 12TH CENTURY
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS

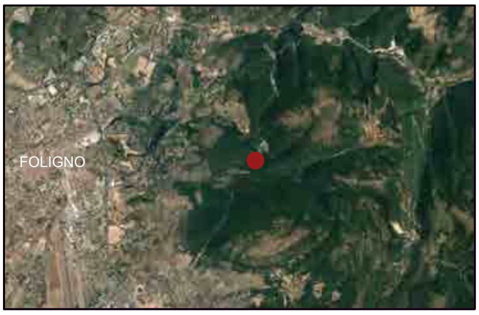


BARELLI, LORETI, PICUTI, TADDEI 2014, t. I

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.5 cm
QUARRY: SASSOVIVO AREA	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT 21-23 cm	DIMENSION: 5 mm
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	COLOR: WHITE, PINK, GREY
LITHOTYPE: SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: LIGHT PINK	COLOR: GREY
QUARRY: SASSOVIVO AREA	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT18-23 cm	
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	

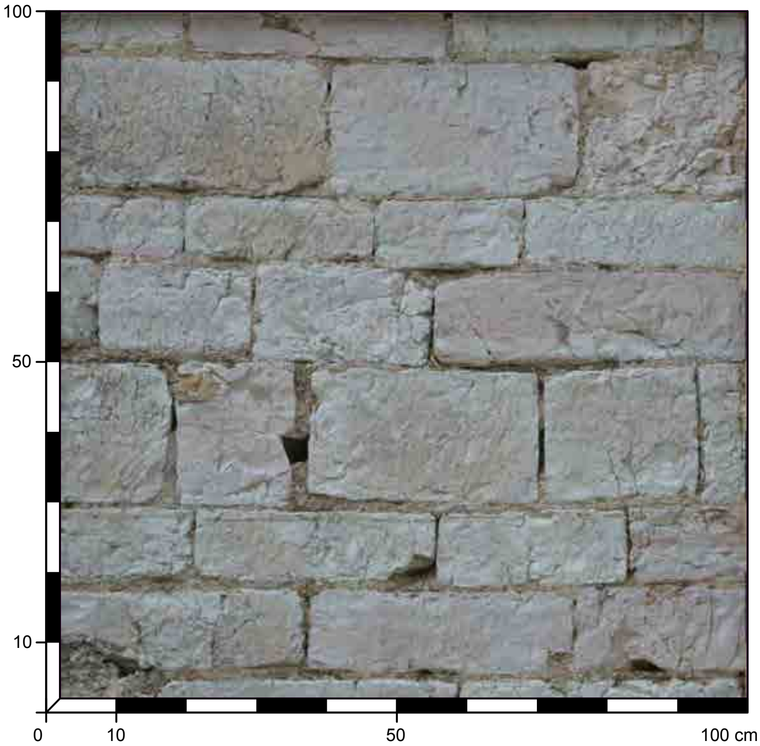
ABBEY OF S. CROCE IN SASSOVIVO - FOLIGNO (PG)

GOTHIC CHURCH
DATE OF SURVEY 07 FEB 2016



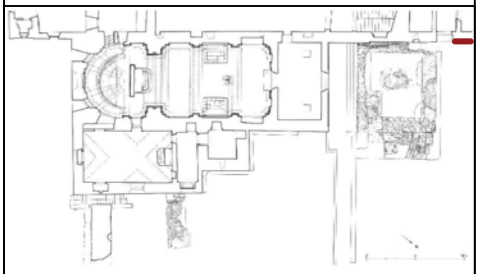
BIBLIOGRAPHICAL REFERENCES

- BARELLI, LORETI, PICUTI, TADDEI 2014.



208	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 100 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 13TH - 14TH CENTURY
MATERIALS: SCAGLIA ROSSA, DISCOLOURED SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS



BARELLI, LORETI, PICUTI, TADDEI 2014, t. I

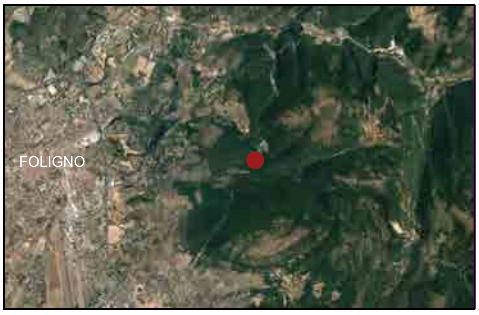
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM
COLOR: LIGHT PINK	**MORTAR (BEDDING) THICKNESS:** 0.5 - 1.2 cm
QUARRY: SASSOVIVO AREA	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT 9-10 /12 / 19 cm	DIMENSION: 5 - 10 mm
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	COLOR: WHITE, PINK
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: WHITE	COLOR: GREY
QUARRY: SASSOVIVO AREA	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT 9-10 /12 / 19 cm	
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	

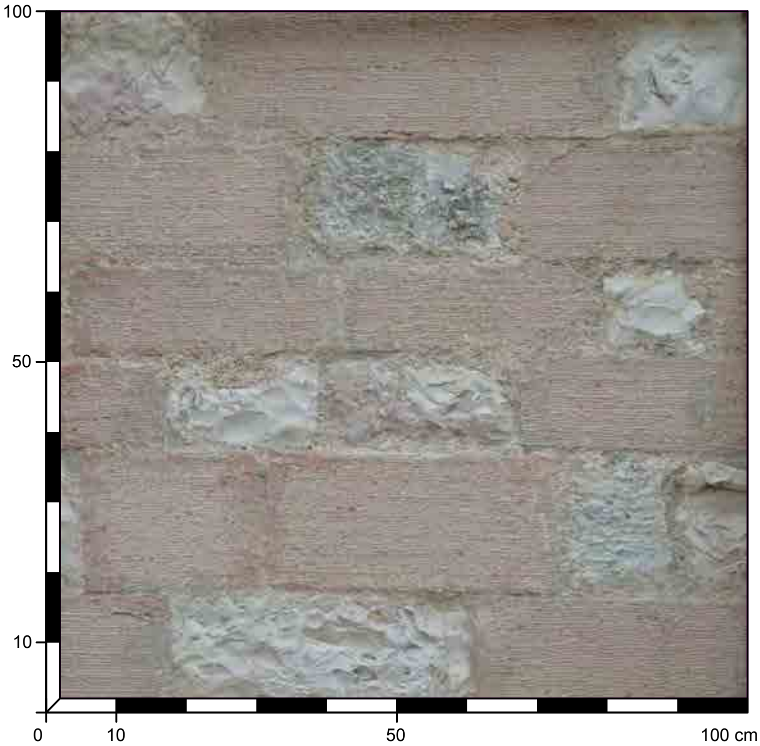
ABBEY OF S. CROCE IN SASSOVIVO - FOLIGNO (PG)

SOUTH-WEST WALL
DATE OF SURVEY 07 FEB 2016

BIBLIOGRAPHICAL REFERENCES

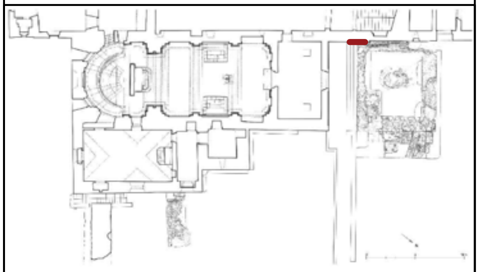
- BARELLI, LORETI, PICUTI, TADDEI 2014.





209	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 20 cm
TYPE OF STRUCTURE: WALL FACING
FACADE: EXTERIOR
DATING: 1966 - 1968
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS



BARELLI, LORETI, PICUTI, TADDEI 2014, t. I

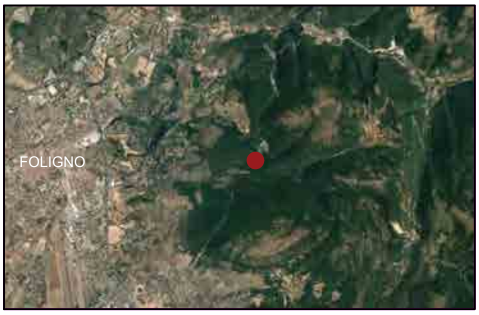
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: DARK PINK	**MORTAR (BEDDING) THICKNESS:** 0.5 cm
SHAPE: ASHLARS	**BINDER:** CEMENT
DIMENSIONS: HEIGHT 14 AND 18 cm; WIDTH from 24 to 58 cm	**AGGREGATE:** SAND
MANUFACTURE: SURFACE PROCESSING WITH INDUSTRIAL METHODS	DIMENSION: <1 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: GREY
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT 14 AND 18 cm; WIDTH from 15 to 42 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	

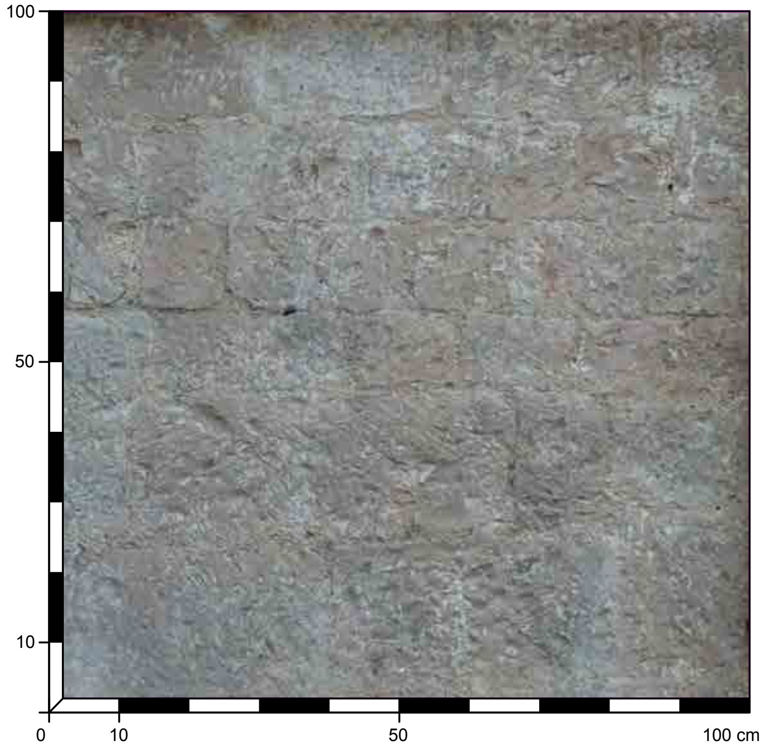
ABBEY OF S. CROCE IN SASSOVIVO - FOLIGNO (PG)

NORTH-WEST FRONT
DATE OF SURVEY 07 FEB 2016

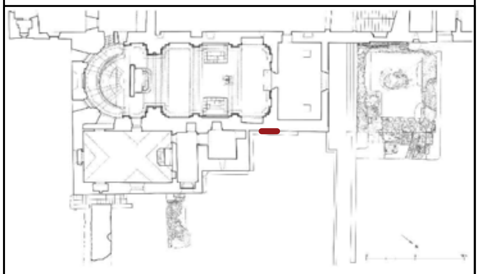
BIBLIOGRAPHICAL REFERENCES

- BARELLI, LORETI, PICUTI, TADDEI 2014.





210	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 140 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 12TH CENTURY	
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA	
LAYING: REGULAR IN PARALLEL ROWS	

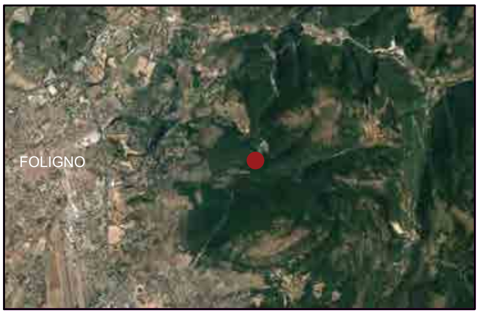


BARELLI, LORETI, PICUTI, TADDEI 2014, t. I

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM
COLOR: LIGHT PINK	**MORTAR (BEDDING) THICKNESS:** 0.5 cm
QUARRY: SASSOVIVO AREA	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT 10-20 cm	DIMENSION: 5 - 8 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND PITCHING TOOLS	COLOR: WHITE, PINK
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: WHITE	COLOR: GREY
QUARRY: SASSOVIVO AREA	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 9.2 to 15 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND PITCHING TOOLS	

ABBEY OF S. CROCE IN SASSOVIVO - FOLIGNO (PG)

BELL TOWER
DATE OF SURVEY 07 FEB 2016

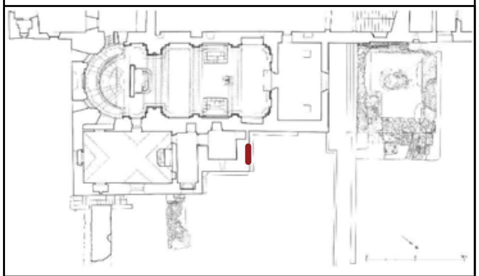


BIBLIOGRAPHICAL REFERENCES

- BARELLI, LORETI, PICUTI, TADDEI 2014.

211	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 120 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 14TH CENTURY (POST 1304)
MATERIALS: MAIOLICA, SCAGLIA BIANCA, SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS



BARELLI, LORETI, PICUTI, TADDEI 2014, t. I

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: LIGHT PINK	**MORTAR (BEDDING) THICKNESS:** 0.8 - 15 cm
QUARRY: SASSOVIVO AREA	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 16.6 to 24 cm; WIDTH from 14.3 to 36.7 cm	DIMENSION: 2-8 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	COLOR: WHITE, PINK
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: WHITE	COLOR: GREY
QUARRY: SASSOVIVO AREA	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 16.6 to 24 cm; WIDTH from 14.3 to 34.9 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	

CHURCH OF S. EMILIANO A CONGIUNTOLI - SCHEGGIA (PG)

RIGHT FRONT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 94-98.
- PARDI 1972.

212	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: GOOD	
MASONRY THICKNESS: 95 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: 13TH CENTURY	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN ROWS	

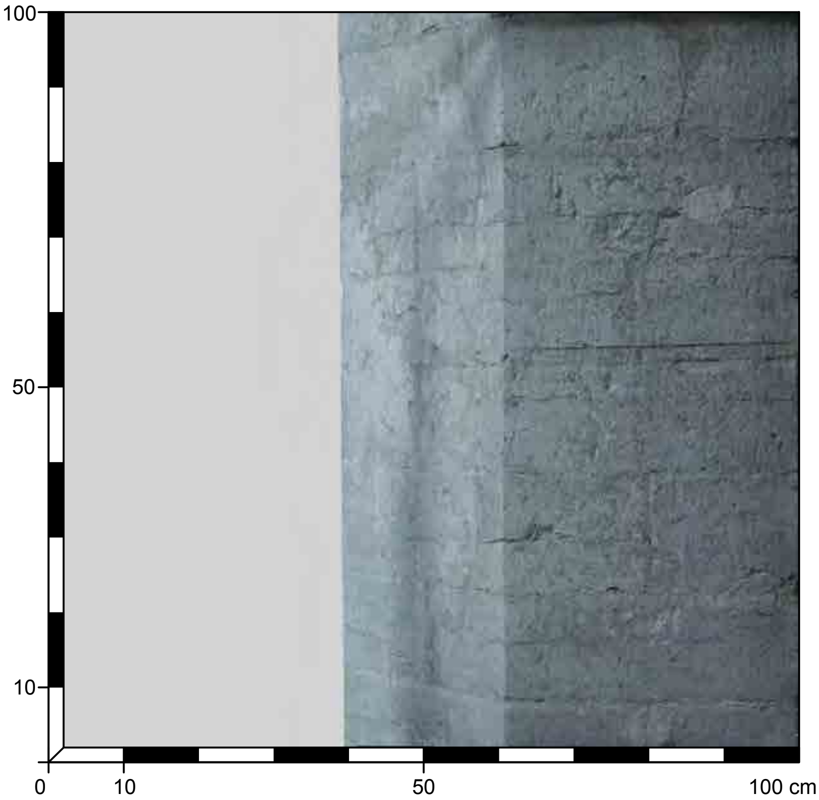
STONE ELEMENTS	**MORTAR (1)**
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 1.8 - 3 cm
QUARRY: CATRIA MOUNT	**BINDER:** LIME
SHAPE: BLOCKS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 5.7 to 20.5 cm; WIDTH from 8.8 to 60.5 cm	DIMENSION: 2-8 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	COLOR: WHITE, PINK
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY
	MORTAR (2)
	CONSISTENCY: FRIABLE
	SIFT: ROUGH
	MORTAR (BEDDING) THICKNESS: 1.8 - 3 cm
	BINDER: LIME
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

CHURCH OF S. EMILIANO A CONGIUNTOLI - SCHEGGIA (PG)

PILLAR
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 94-98.
- PARDI 1972.



213	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 105 cm	
TYPE OF STRUCTURE: PILLAR	
FACADE: INTERIOR	
DATING: 13TH CENTURY	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	

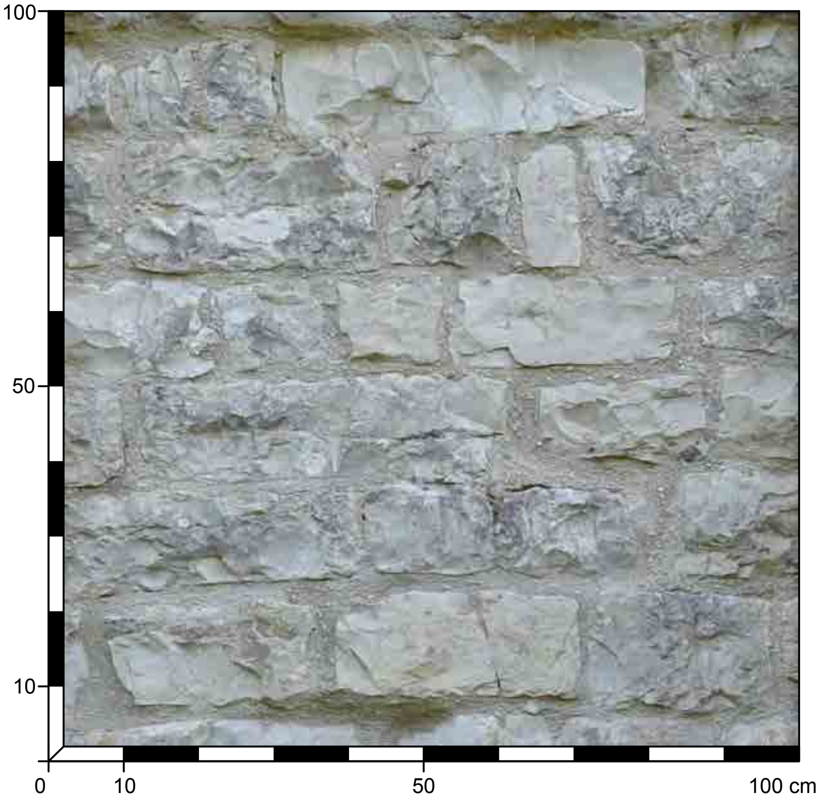
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 1.8 - 3 cm
QUARRY: CATRIA MOUNT	**BINDER:** LIME
SHAPE: ASHLARS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 14.4 to 21.5 cm	DIMENSION: 1-2 mm
MANUFACTURE: SURFACE PROCESSING WITH PITCHING TOOLS	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

CHURCH OF S. EMILIANO A CONGIUNTOLI - SCHEGGIA (PG)

LEFT FRONT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 94-98.
- PARDI 1972.



214	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: GOOD	
MASONRY THICKNESS: 105 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: 13TH CENTURY	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN ROWS	

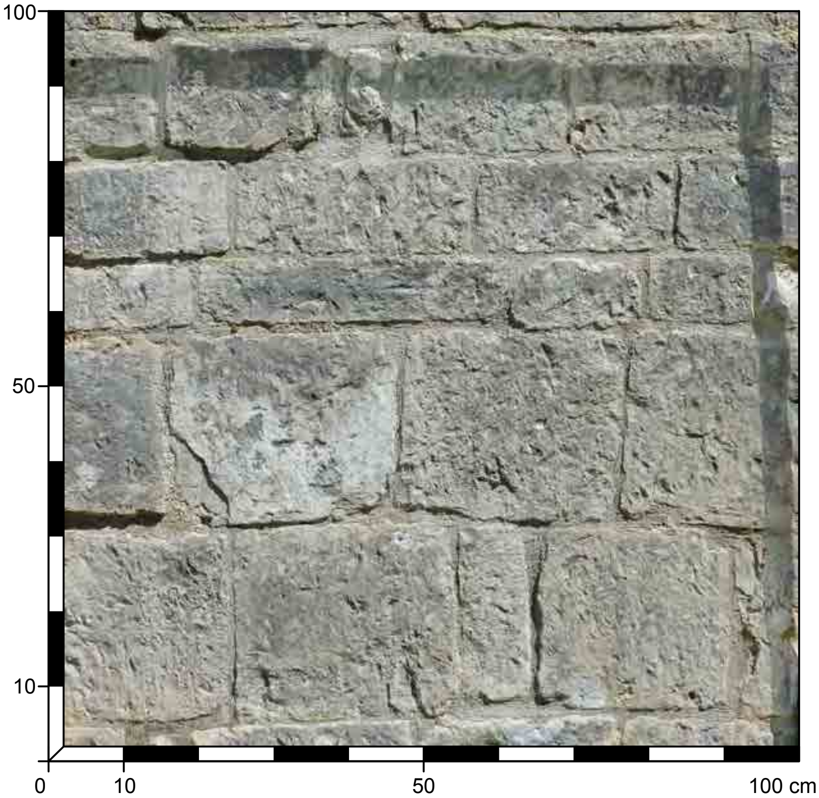
STONE ELEMENTS	**MORTAR**
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 1.8 - 3 cm
QUARRY: CATRIA MOUNT	**BINDER:** LIME
SHAPE: BLOCKS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 19.7 to 20.5 cm; WIDTH from 8.8 to 60.5 cm	DIMENSION: 2-10 mm
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

CHURCH OF S. MARIA DI SITRIA - SCHEGGIA (PG)

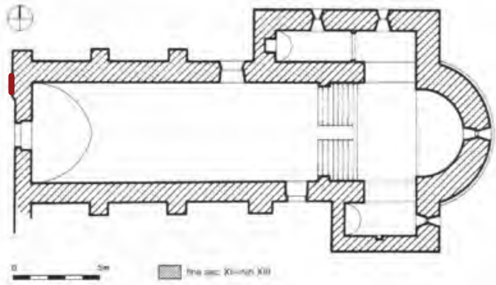
MAIN FACADE (LEFT SIDE)
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 78-79.
- PARDI 1972, p. 67-90.



215	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: GOOD	
MASONRY THICKNESS: 105 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: END OF 12TH C. - BEGINNING OF 13TH C.	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 86.

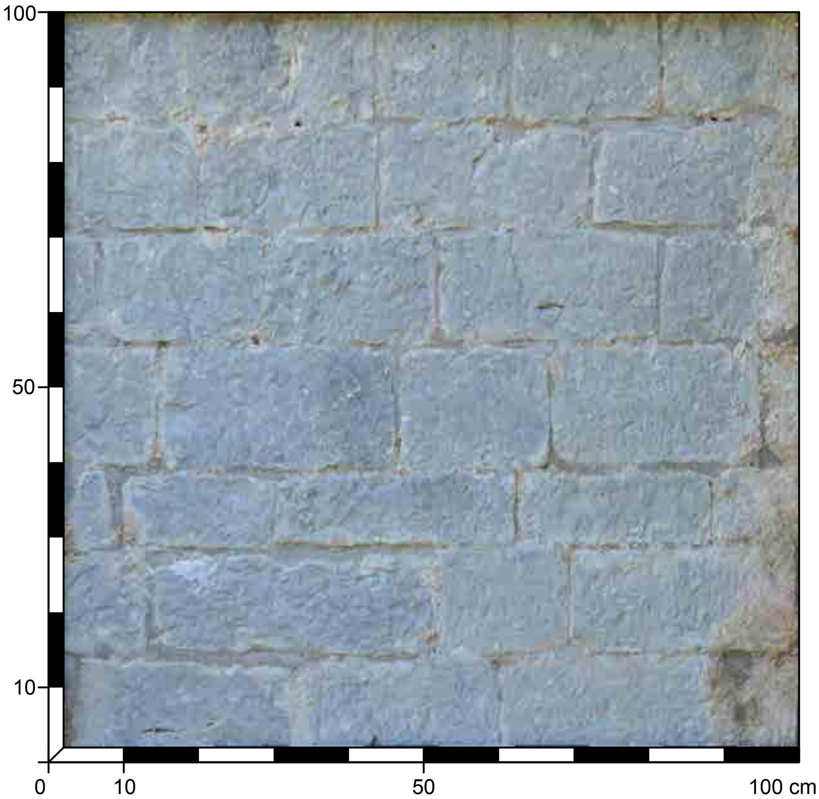
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.6 - 1 cm
QUARRY: CATRIA MOUNT	**BINDER:** LIME
SHAPE: BLOCKS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 7.5 to 26.8 cm; WIDTH from 13.2 to 40.5 cm	DIMENSION: 2-4 mm
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

CHURCH OF S. MARIA DI SITRIA - SCHEGGIA (PG)

MAIN FACADE (RIGHT SIDE)
DATE OF SURVEY 09 AGO 2016

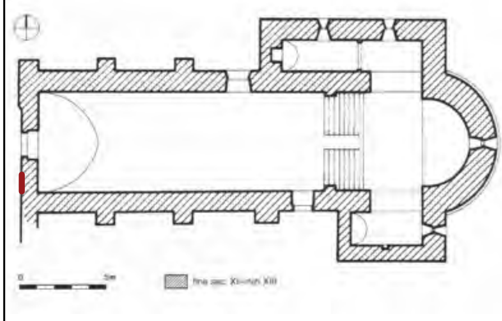
BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 78-79.
- PARDI 1972, p. 67-90.



216	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 105 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: END OF 12TH C. - BEGINNING OF 13TH C.
MATERIALS: SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 86.

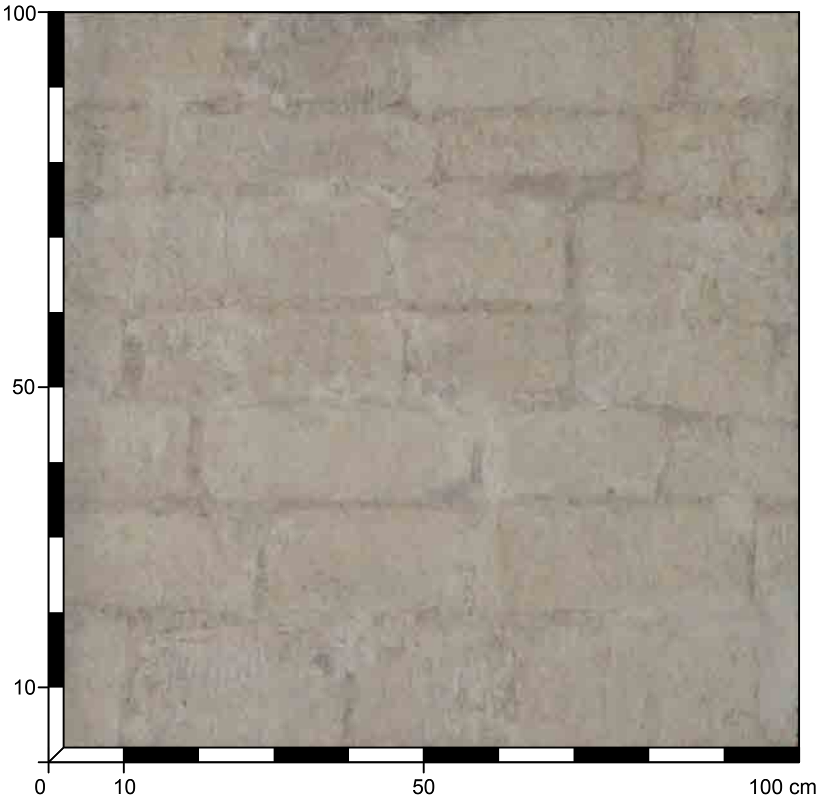
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.6 - 1 cm
QUARRY: CATRIA MOUNT	**BINDER:** LIME
SHAPE: ASHLARSS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 9.5 to 15.8 cm; WIDTH from 15 to 32.4 cm	DIMENSION: 2-10 mm
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	COLOR: WHITE, PINK, GREY
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

CHURCH OF S. MARIA DI SITRIA - SCHEGGIA (PG)

LEFT FRONT
DATE OF SURVEY 09 AGO 2016

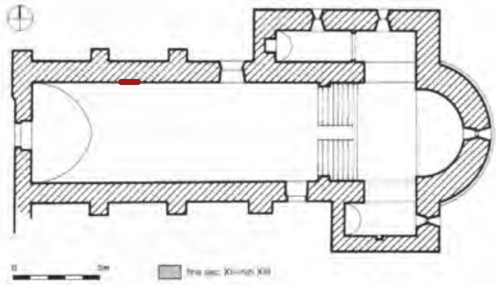
BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 78-79.
- PARDI 1972, p. 67-90.



217	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS

CONSERVATION: GOOD
MASONRY THICKNESS: 120 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: END OF 12TH C. - BEGINNING OF 13TH C.
MATERIALS: SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 86.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.6 - 1 cm
QUARRY: CATRIA MOUNT	**BINDER:** LIME
SHAPE: BLOCKS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 8 to 13.5 cm; WIDTH from 19.2 to 31.5 cm	DIMENSION: 2-10 mm
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	COLOR: WHITE, PINK, GREY
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

CHURCH OF S. MARIA DI SITRIA - SCHEGGIA (PG)

CRYPT
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 78-79.
- PARDI 1972, p. 67-90.

218	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ELEMENTS
CONSERVATION: GOOD	
MASONRY THICKNESS: 120 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: 11TH CENTURY	
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA	
LAYING: REGULAR IN ROWS	

GIGLIOZZI 2013, p. 86.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.5 - 3 cm
QUARRY: CATRIA MOUNT	**BINDER:** LIME
SHAPE: BLOCKS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 9 to 18.5 cm; WIDTH from 8.2 to 24.5 cm	DIMENSION: 2-4 mm
SHAPE: SLABS	COLOR: WHITE
DIMENSIONS: HEIGHT from 2 to 5.3 cm; WIDTH from11.5 to 40.5 cm	**AGGREGATE:** SAND
LITHOTYPE: SCAGLIA ROSSA	DIMENSION: <1 mm
NATURE: CARBONATIC LIMESTONE ROCK	COLOR: GREY
COLOR: WHITE	
QUARRY: CATRIA MOUNT	
SHAPE: BLOCKS	
DIMENSIONS: HEIGHT from 12.1 to 21.5 cm; WIDTH from 13.2 to 52.8 cm	

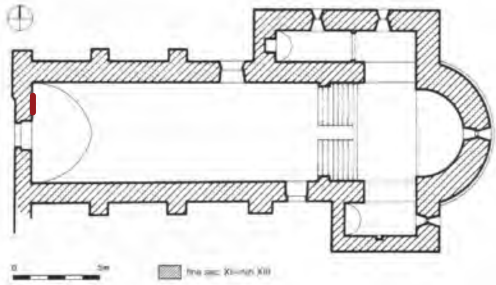
CHURCH OF S. MARIA DI SITRIA - SCHEGGIA (PG)

COUNTER FACADE
DATE OF SURVEY 09 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 78-79.
- PARDI 1972, p. 67-90.

219	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS
CONSERVATION: GOOD	
MASONRY THICKNESS: 120 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: END OF 12TH C. - BEGINNING OF 13TH C.	
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 86.

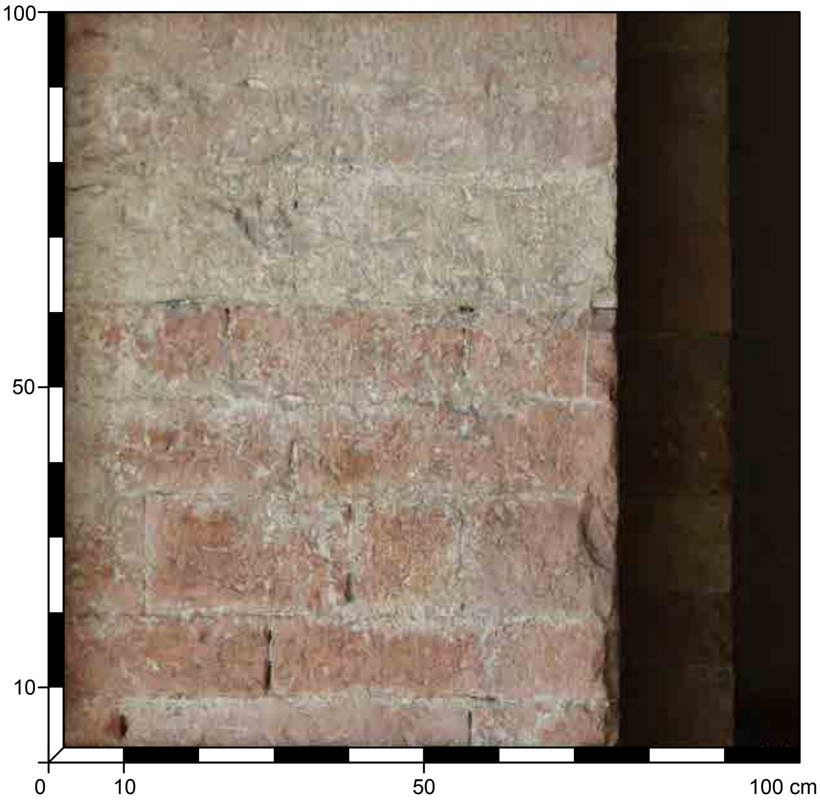
STONE ELEMENTS	**MORTAR (1)**
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.6 - 1 cm
QUARRY: CATRIA MOUNT	**BINDER:** LIME
SHAPE: BLOCKS	**AGGREGATE:** LIMESTONE FRAGMENTS
DIMENSIONS: HEIGHT from 11.2 to 15.4 cm; WIDTH from 16 to 34.5 cm	DIMENSION: 2-10 mm
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	COLOR: WHITE, PINK, GREY
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY
	MORTAR (2)
	CONSISTENCY: SOLID
	SIFT: MEDIUM-FINE
	MORTAR (BEDDING) THICKNESS: 0.6 - 1 cm
	BINDER: LIME
	AGGREGATE: LIMESTONE FRAGMENTS
	DIMENSION: 2-4 mm
	COLOR: WHITE
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

PALAZZO COMUNALE - SPELLO (PG)

CENTRAL PILLAR
DATE OF SURVEY 07 AGO 2016

FONTI BIBLIOGRAFICHE DI RIFERIMENTO

- TABARELLI 1978, p. 155.



220	RUBBLE MASONRY WITH WALL FACING IN LIMESTONEASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 143 cm	
TYPE OF STRUCTURE: PILLAR	
FACADE: EXTERIOR	
DATING: 1175	
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	

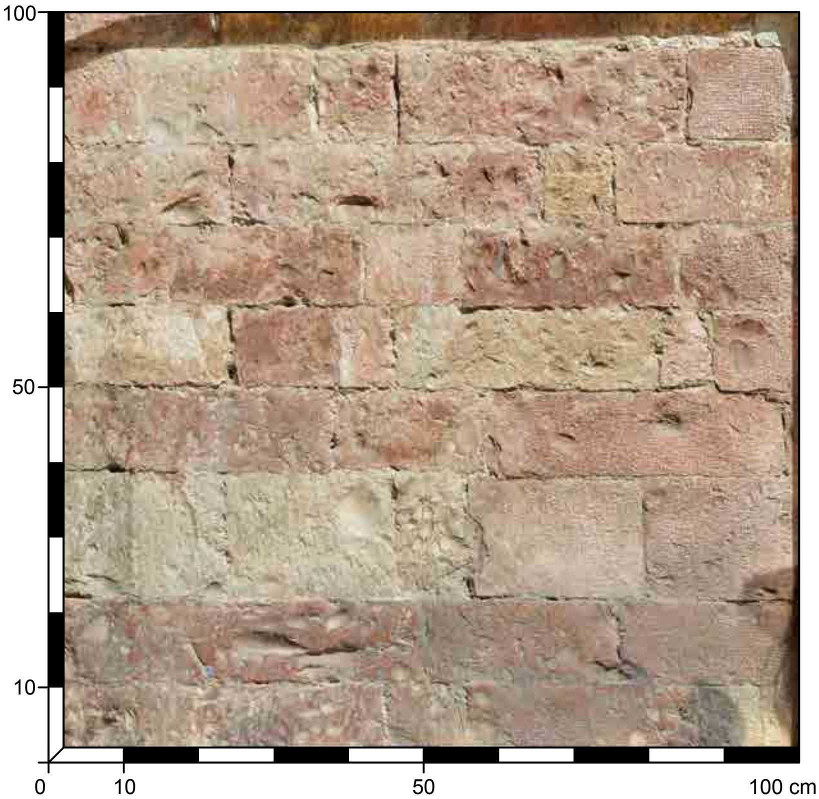
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 0.1 to 0.6 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 11.8 to 16 cm; WIDTH from 14.4 to 44.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITHFINE-TOOTH CHISEL	DIMENSION: 1 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE, PINK
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: WHITE
DIMENSIONS: HEIGHT from 15.9 to 18 cm; WIDTH from 9.8 to 37.5 cm	
MANUFACTURE: SURFACE PROCESSING WITHFINE-TOOTH CHISEL	

PALAZZO COMUNALE - SPELLO (PG)

RIGHT PILLAR
DATE OF SURVEY 07 AGO 2016

FONTI BIBLIOGRAFICHE DI RIFERIMENTO

- TABARELLI 1978, p. 155.



221	RUBBLE MASONRY WITH WALL FACING IN LIMESTONEASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 143 cm	
TYPE OF STRUCTURE: PILLAR	
FACADE: EXTERIOR	
DATING: 1175	
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	

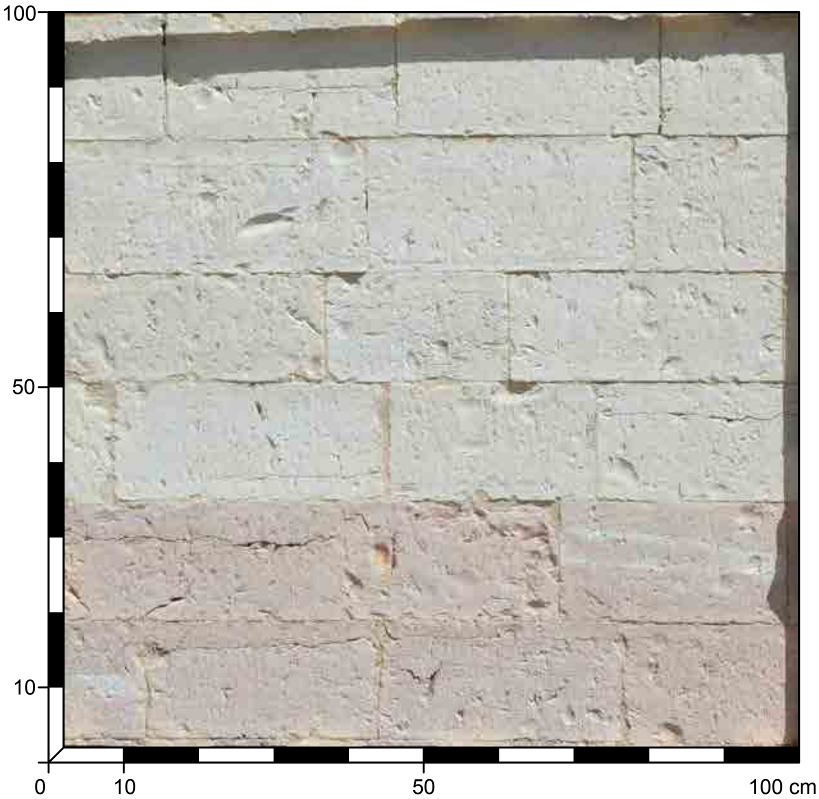
STONE ELEMENTS	**MORTAR**
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** from 0.1 to 0.6 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 11.8 to 16 cm; WIDTH from 14.4 to 44.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITHFINE-TOOTH CHISEL	DIMENSION: 1 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE, PINK
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: WHITE
DIMENSIONS: HEIGHT from 15.9 to 18 cm; WIDTH from 9.8 to 37.5 cm	
MANUFACTURE: SURFACE PROCESSING WITHFINE-TOOTH CHISEL	

CHURCH OF S. ANDREA - SPELLO (PG)

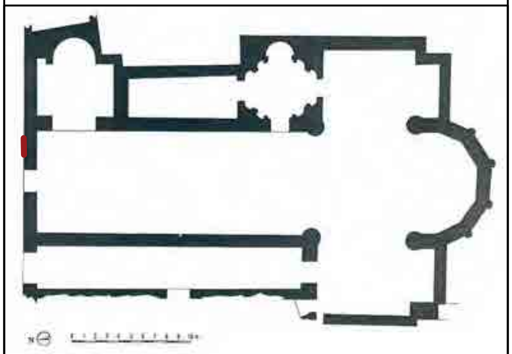
MAIN FACADE
DATE OF SURVEY 07 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- FAGOTTINI, TINI BRUNOZZI 1990, p. 40-41.



222	RUBBLE MASONRY WITH WALL FACING IN BICHROMATIC LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 90 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1258	
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL BICHROMATIC BOUNDLES OF ROWS	



STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** 0.2 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 11 to 16 cm; WIDTH from 24.4 to 40.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITHFINE-TOOTH CHISEL	DIMENSION: 1 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE, PINK
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: WHITE
DIMENSIONS: HEIGHT from 15.4 to 16.8 cm; WIDTH from 24.5 to 38.5 cm	
MANUFACTURE: SURFACE PROCESSING WITHFINE-TOOTH CHISEL	

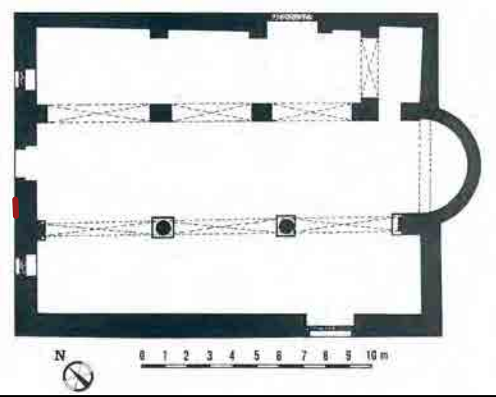
CHURCH OF DI S. CLAUDIO - SPELLO (PG)

MAIN FACADE
DATE OF SURVEY 07 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, p. 113;
- SENSI 1990, p. 62;
- PARDI 1972, p. 210.

223	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 95 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1258	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



FAGOTTINI, TINI BRUNOZZI 1990, p. 72

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** 0.2-0.5 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 10 to 15.5 cm; WIDTH from 24.4 to 40.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITHFINE-TOOTH CHISEL	DIMENSION: 1 mm
	COLOR: WHITE, PINK
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

CHURCH OF S. MARIA MAGGIORE - SPELLO (PG)

MAIN FACADE
DATE OF SURVEY 07 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- SENSI 1990, p. 11;
- PARDI 1972, p. 206.

224	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD

MASONRY THICKNESS: 150 cm

TYPE OF STRUCTURE: BEARING WALL

FACADE: EXTERIOR

DATING: 1209-1285

MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA

LAYING: REGULAR IN PARALLEL ROWS

FAGOTTINI, TINI BRUNOZZI 1990, p. 39

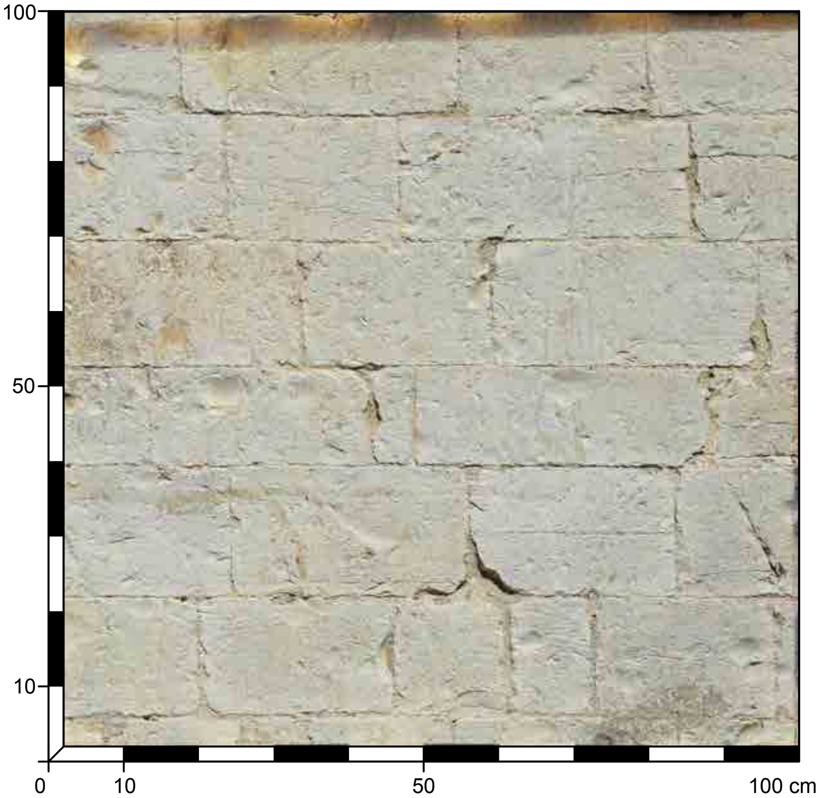
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** 0.2-0.3 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 12.2 to 17.5 cm; WIDTH from 20 to 43.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITHFINE-TOOTH CHISEL AND PITCHING TOOLS	DIMENSION: 1 mm COLOR: WHITE, PINK
LITHOTYPE: SCAGLIA ROSSA	**AGGREGATE:** SAND
NATURE: CARBONATIC LIMESTONE ROCK	DIMENSION: <1 mm
COLOR: PINK	COLOR: WHITE
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 12.2 to 15.5 cm; WIDTH from 18.8 to 32 cm	
MANUFACTURE: SURFACE PROCESSING WITHFINE-TOOTH CHISEL AND PITCHING TOOLS	

CHURCH OF S. MARTINO - SPELLO (PG)

MAIN FACADE
DATE OF SURVEY 07 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- SENSI 1990, p. 47.



225	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: >50 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 13TH CENTURY	
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA	
LAYING: REGULAR IN PARALLEL ROWS	

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.2-0.4 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 13.2 to 17.5 cm; WIDTH from 10 to 32 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	DIMENSION: 1-5 mm
	COLOR: WHITE, PINK
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

CHURCH OF S. SEVERINO - SPELLO (PG)

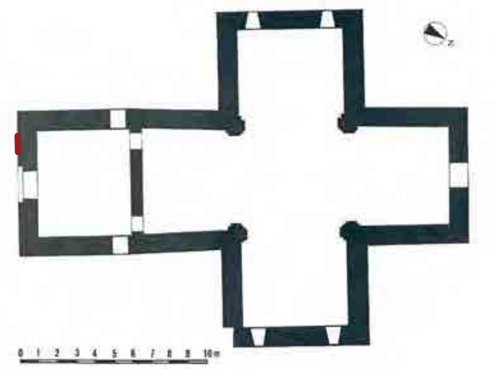
MAIN FACADE (LEFT SIDE)
DATE OF SURVEY 07 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- SENSI 1990, p. 45.

226	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 110 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 12TH CENTURY
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS



FAGOTTINI, TINI BRUNOZZI 1990, p. 64

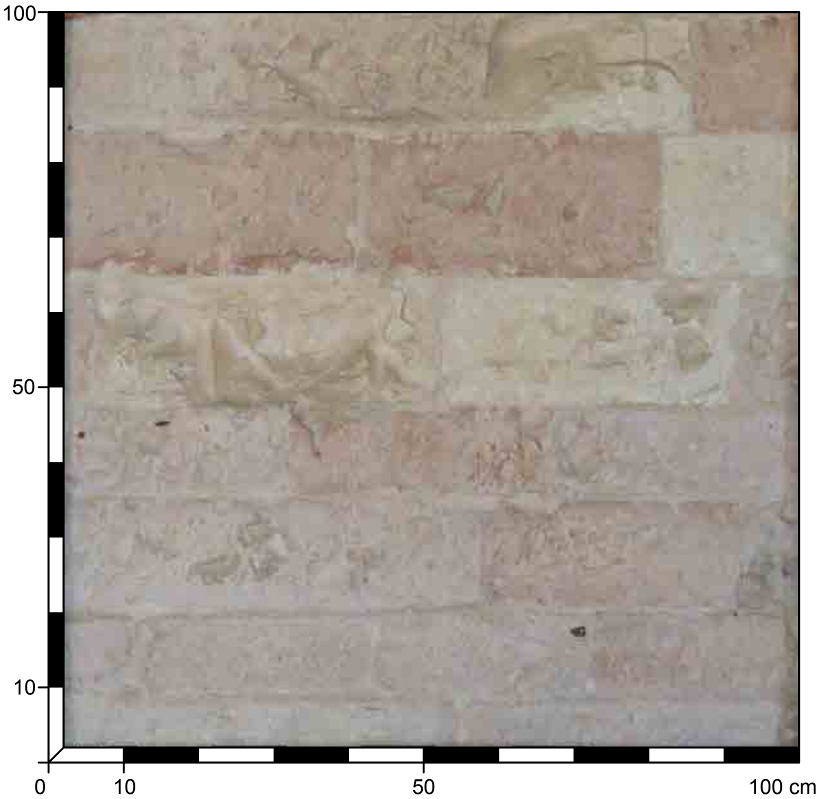
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** 0.2-0.4 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 11.1 to 20.5 cm; WIDTH from 21.5 to 46.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	DIMENSION: 1-5 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: WHITE, PINK
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: PINK	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: WHITE
DIMENSIONS: HEIGHT from 12 to 18.2 cm; WIDTH from 20 to 35.4 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	

CHURCH OF S. SEVERINO - SPELLO (PG)

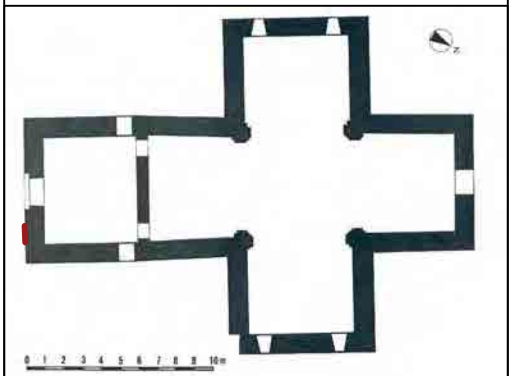
MAIN FACADE (RIGHT SIDE)
DATE OF SURVEY 07 AGO 2016

BIBLIOGRAPHICAL REFERENCES

- SENSI 1990, p. 45.



227	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 110 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 12TH CENTURY	
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA	
LAYING: REGULAR IN PARALLEL ROWS	



FAGOTTINI, TINI BRUNOZZI 1990, p. 64

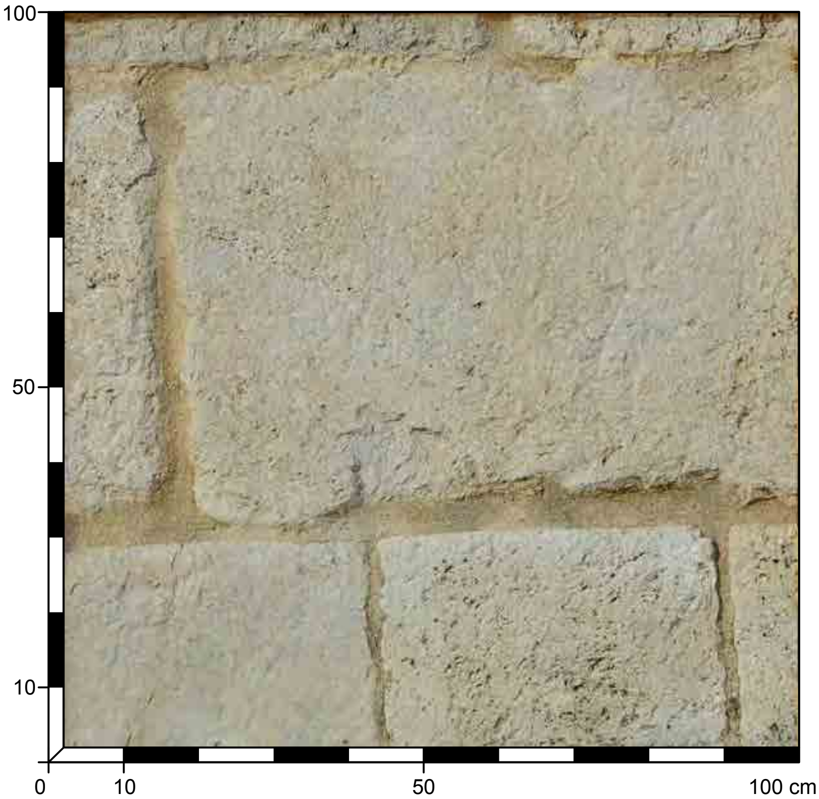
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: PINK	**MORTAR (BEDDING) THICKNESS:** 0.1-1.4 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 10.5 to 19.4 cm; WIDTH from 25 to 56.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	DIMENSION: 1 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: WHITE, PINK
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: PINK	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: WHITE
DIMENSIONS: HEIGHT from 10.2 to 19.5 cm; WIDTH from 28.8 to 49.4 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	

DUOMO - SPOLETO (PG)

BELL TOWER
DATE OF SURVEY 28 MAY 2016

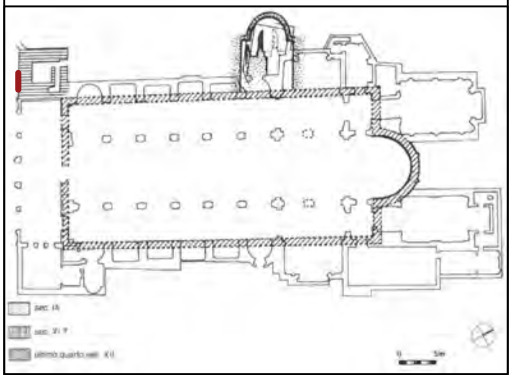
BIBLIOGRPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 122-123;
- PARDI 1972, p. 202.



228	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS

CONSERVATION: GOOD
MASONRY THICKNESS: 200 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 11TH CENTURY
MATERIALS: TRAVERTINE
LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 138.

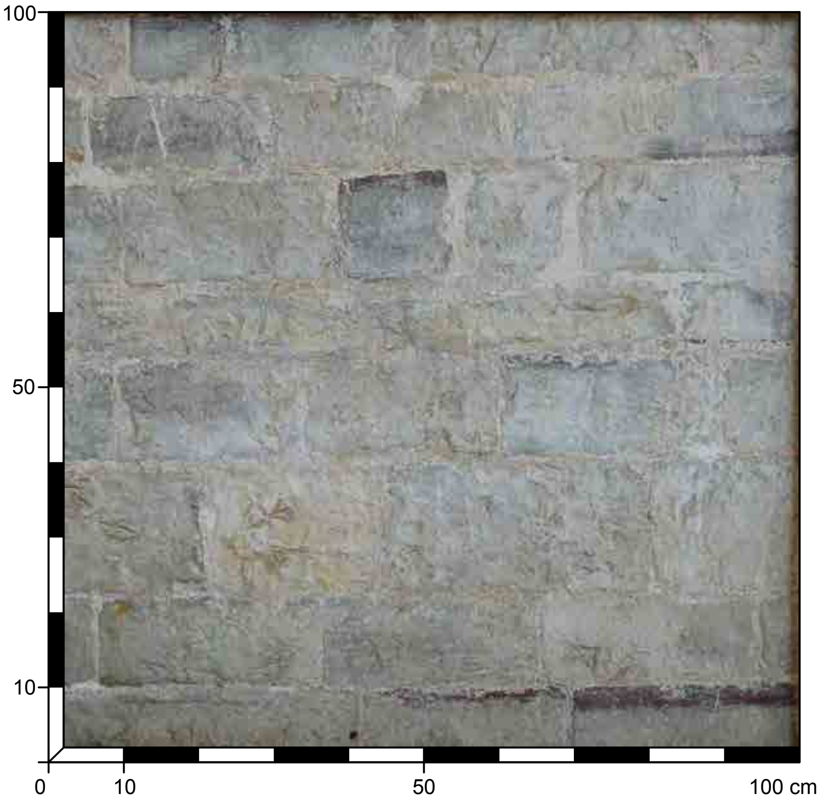
STONE ELEMENTS	MORTAR
LITHOTYPE: TRAVERTINE	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 2 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 20.5 to 60.2 cm; WIDTH from 38.8 to 106.4 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	DIMENSION: 1-2 mm
	COLOR: WHITE, GREY
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

DUOMO - SPOLETO (PG)

MAIN FACADE
DATE OF SURVEY 28 MAY 2016

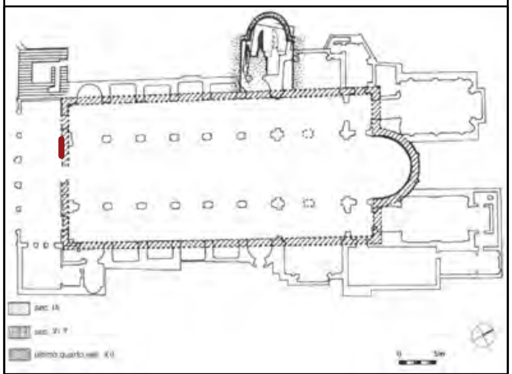
BIBLIOGRPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 122-123;
- PARDI 1972, p. 202.



229	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS AND ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 100 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1175-1200
MATERIALS: SCAGLIA BIANCA, DISCOLOURED SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 138.

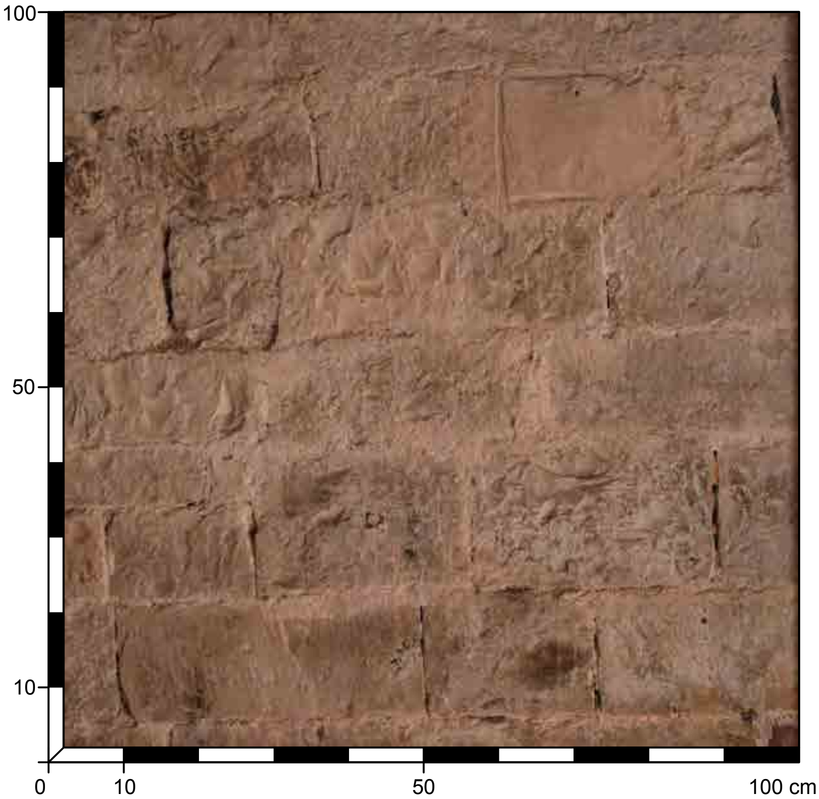
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.7 to 1.4 cm
SHAPE: BLOCKS AND ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 7.9 to 16 cm; WIDTH from 12.8 to 32.4 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	DIMENSION: 1-10 mm
LITHOTYPE: DISCOLOURED CAGLIA ROSSA	COLOR: WHITE, GREY
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: BLOCKS AND ASHLARS	COLOR: WHITE
DIMENSIONS: HEIGHT from 9.5 to 15.5 cm; WIDTH from 10.5 to 29.8 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	

DUOMO - SPOLETO (PG)

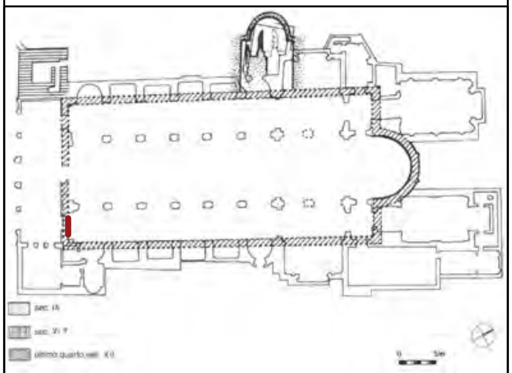
COUNTER FACADE
DATE OF SURVEY 28 MAY 2016

BIBLIOGRPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 122-123;
- PARDI 1972, p. 202.



230	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 100 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1175-1200	
MATERIALS: SCAGLIA ROSSA	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 138.

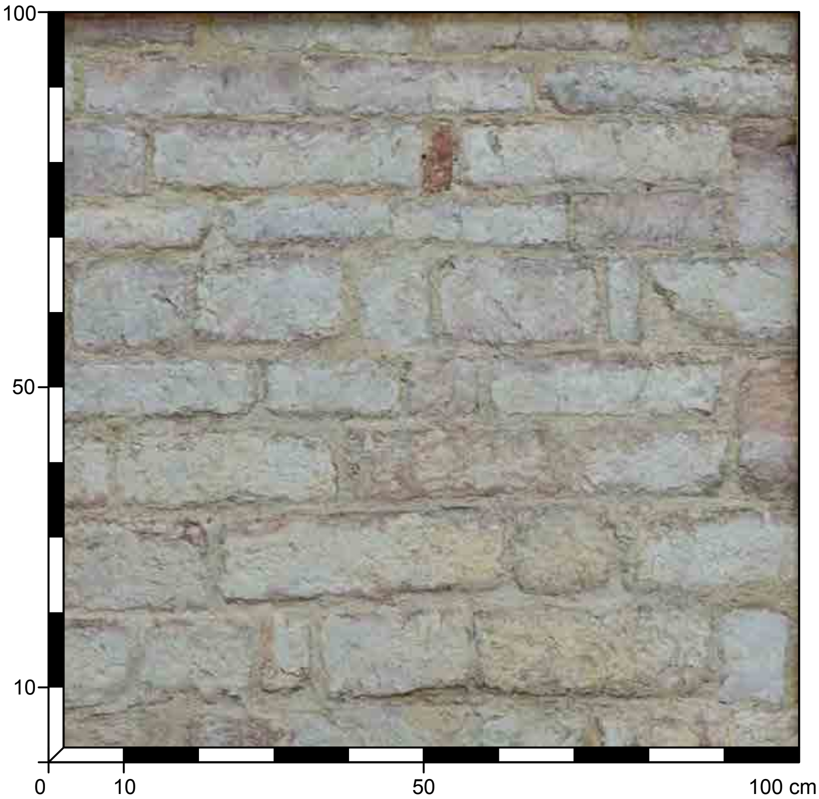
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** FRIABLE
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: DARK PINK	**MORTAR (BEDDING) THICKNESS:** from 0.7 to 1 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 12.5 to 21 cm; WIDTH from 21.5 to 50 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	DIMENSION: 1-10 mm
	COLOR: WHITE, GREY
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

CHURCH OF S. EUFEMIA - SPOLETO (PG)

MAIN FACADE (RIGHT SIDE)
DATE OF SURVEY 28 MAY /2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 127;
- PARDI 1972, pp. 40-42.



231	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS

CONSERVATION: GOOD

MASONRY THICKNESS: 85 cm

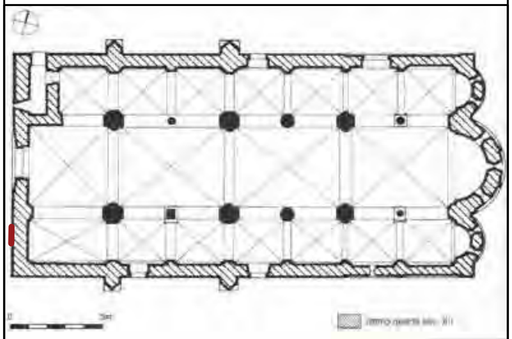
TYPE OF STRUCTURE: BEARING WALL

FACADE: EXTERIOR

DATING: 1175-1200

MATERIALS: SCAGLIA ROSSA, BRICKS

LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 135.

STONE ELEMENTS	MORTAR
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE AND PINK	**MORTAR (BEDDING) THICKNESS:** from 0.7 to 2 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 9 to 12.5 cm; WIDTH from 10 to 40.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	DIMENSION: 1-2 mm
TYPE: BRICKS	COLOR: WHITE, GREY
NATURE: CERAMIC MATERIAL	**AGGREGATE:** SAND
COLOR: RED	DIMENSION: <1 mm
DIMENSIONS: HEIGHT 3.6-4 cm	COLOR: GREY

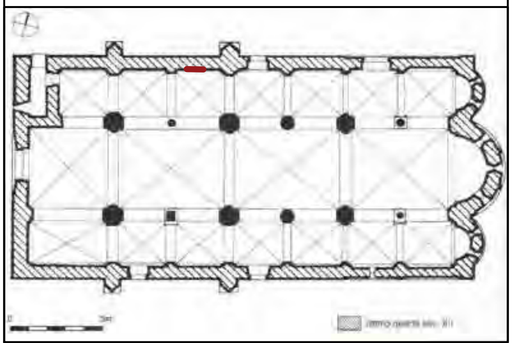
CHURCH OF S. EUFEMIA - SPOLETO (PG)

LEFT FRONT
DATE OF SURVEY 28 MAY /2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 127;
- PARDI 1972, pp. 40-42.

232	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 70 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: 1175-1200	
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 135.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE AND PINK	**MORTAR (BEDDING) THICKNESS:** from 1 to 1.5 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 6.5 to 15 cm; WIDTH from 5 to 35.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	DIMENSION: 1-2 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE, GREY
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: WHITE
DIMENSIONS: HEIGHT from 6.5 to 15 cm; WIDTH from 5 to 35.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	

CHURCH OF S. EUFEMIA - SPOLETO (PG)

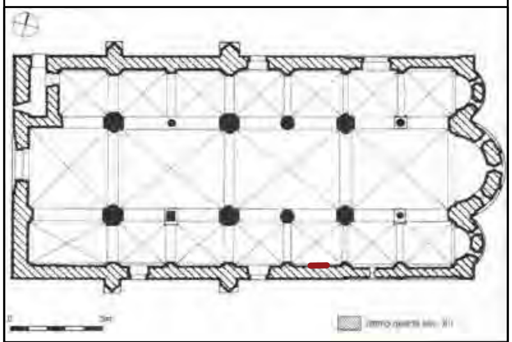
RIGHT FRONT
DATE OF SURVEY 28 MAY /2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 127;
- PARDI 1972, pp. 40-42.

233	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 70 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: 1175-1200
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 135.

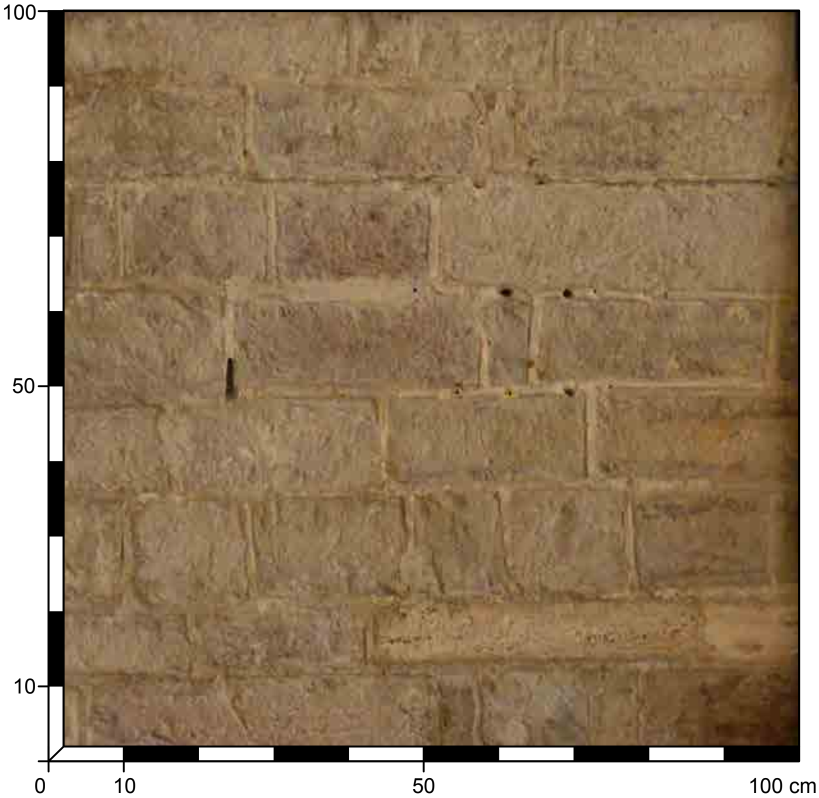
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE AND PINK	**MORTAR (BEDDING) THICKNESS:** from 1 to 1.5 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 6.5 to 15 cm; WIDTH from 5 to 35.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	DIMENSION: 1-2 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE, GREY
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: WHITE
DIMENSIONS: HEIGHT from 6.5 to 15 cm; WIDTH from 5 to 35.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	

CHURCH OF S. EUFEMIA - SPOLETO (PG)

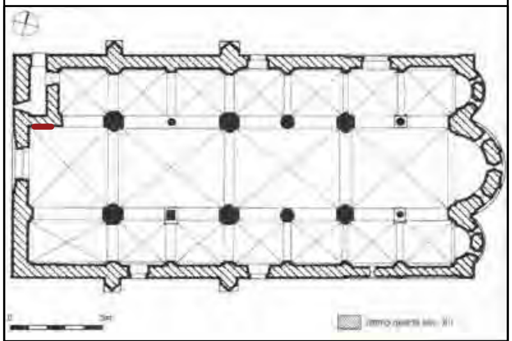
LEFT SIDE
DATE OF SURVEY 28 MAY /2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 127;
- PARDI 1972, pp. 40-42.



234	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS AND SLABS
CONSERVATION: GOOD	
MASONRY THICKNESS: 60 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: 1175-1200	
MATERIALS: SCAGLIA ROSSA, SCAGLIA BIANCA, TRAVERTINE	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 135.

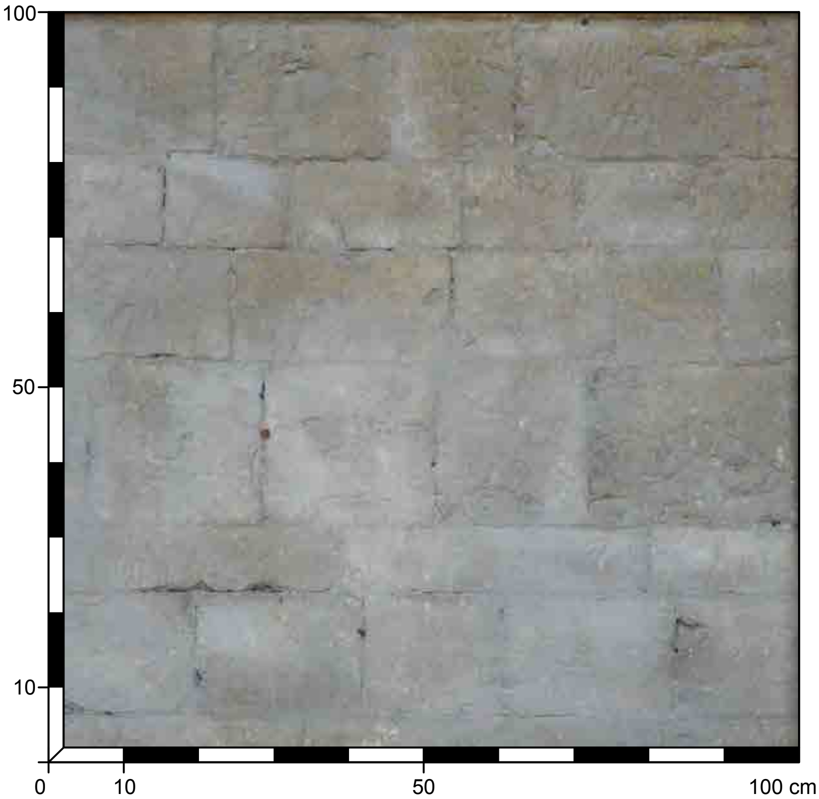
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA ROSSA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE AND PINK	**MORTAR (BEDDING) THICKNESS:** from 1 to 1.5 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 6.5 to 15 cm; WIDTH from 5 to 35.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	DIMENSION: 1-2 mm
LITHOTYPE: SCAGLIA BIANCA	COLOR: WHITE, GREY
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: WHITE
DIMENSIONS: HEIGHT from 6.5 to 15 cm; WIDTH from 5 to 35.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	
LITHOTYPE: TRAVERTINE	
NATURE: CARBONATIC LIMESTONE ROCK	
COLOR: WHITE	
SHAPE: ASHLARS	
DIMENSIONS: HEIGHT from 8 to 14.5 cm; WIDTH from 5 to 35.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	

CHURCH OF S. GREGORIO MAGGIORE - SPOLETO (PG)

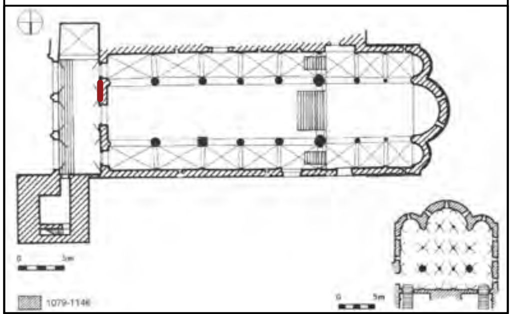
MAIN FACADE
DATE OF SURVEY 28 MAY 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 74;
- PARDI 1972, pp. 43.



235	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE SLABS AND ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 100 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1079-1149	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 133.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE AND PINK	**MORTAR (BEDDING) THICKNESS:** 0.5 cm
SHAPE: SLABS	**BINDER:** LIME
DIMENSIONS: HEIGHT 9 cm; WIDTH from 40 to 41.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
SHAPE: ASHLARS	DIMENSION: 1-2 mm
DIMENSIONS: HEIGHT 19.2 to 13.5 cm; WIDTH from 15 to 24.5 cm	COLOR: WHITE, GREY
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	**AGGREGATE:** SAND
	DIMENSION: <1 mm
	COLOR: GREY

CHURCH OF S. GREGORIO MAGGIORE - SPOLETO (PG)

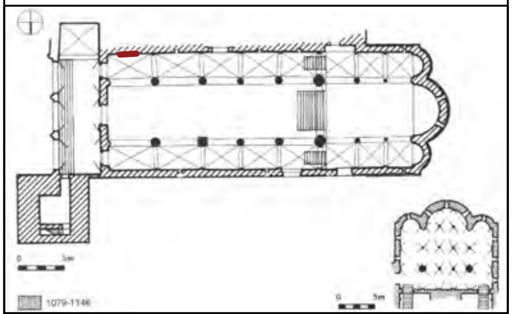
LEFT FRONT
DATE OF SURVEY 28 MAY 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 74;
- PARDI 1972, pp. 43.

236	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 100 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1079-1146
MATERIALS: SCAGLIA BIANCA
LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 133.

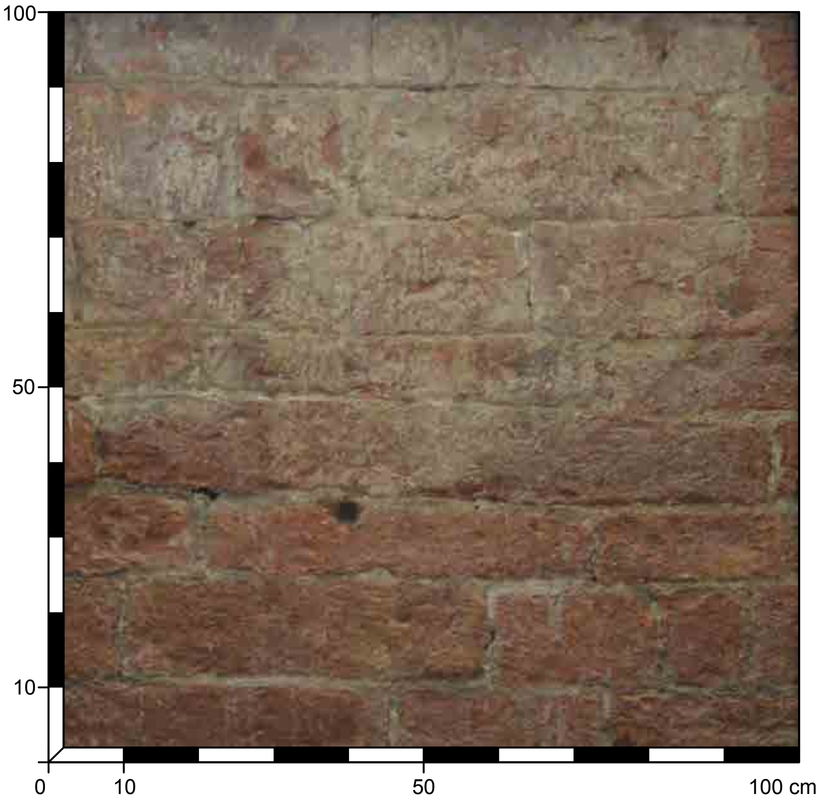
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.5-0.6 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT 13.2 to 27.5 cm; WIDTH from 20 to 50.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH TOOTH CHISEL	DIMENSION: 1-2 mm
	COLOR: WHITE, GREY
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

CHURCH OF S. GREGORIO MAGGIORE - SPOLETO (PG)

CRYPT
DATE OF SURVEY 28 MAY 2016

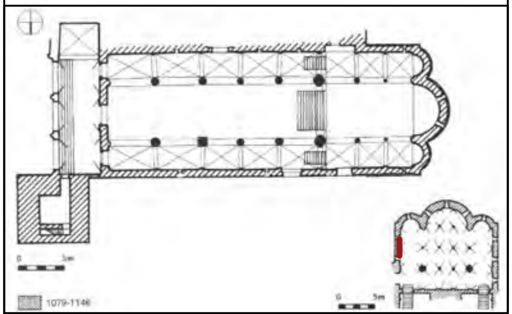
BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 74;
- PARDI 1972, pp. 43.



237	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS

CONSERVATION: GOOD
MASONRY THICKNESS: 100 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: INTERIOR
DATING: 1079-1149
MATERIALS: SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS



GIGLIOZZI 2013, p. 133.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: ROSSA	**MORTAR (BEDDING) THICKNESS:** from 0.8 to 1.5 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGHT 9 cm; WIDTH from 40 to 41.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
SHAPE: ASHLARS	DIMENSION: 2-6 mm
DIMENSIONS: HEIGHT 13.5 to 23.7 cm; WIDTH from 12.2 to 50.5 cm	COLOR: WHITE, PINK
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	**AGGREGATE:** SAND
	DIMENSION: <1 mm
	COLOR: GREY

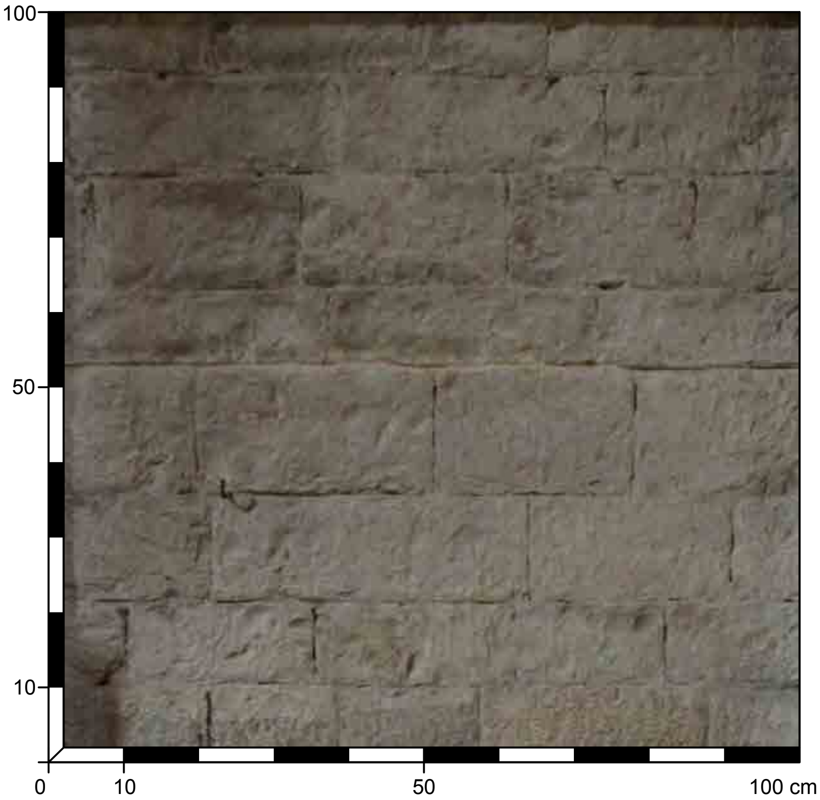
CHURCH OF S. GREGORIO MAGGIORE - SPOLETO (PG)

CRYPT

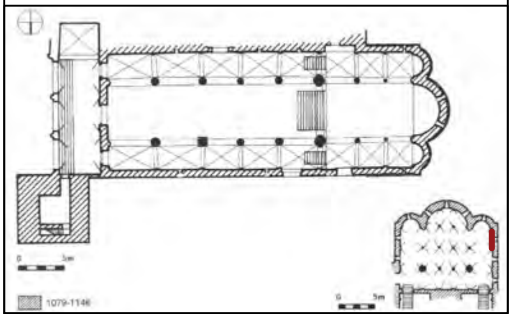
DATE OF SURVEY 28 MAY 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 74;
- PARDI 1972, pp. 43.



238	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 100 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: INTERIOR	
DATING: 1079-1149	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 133.

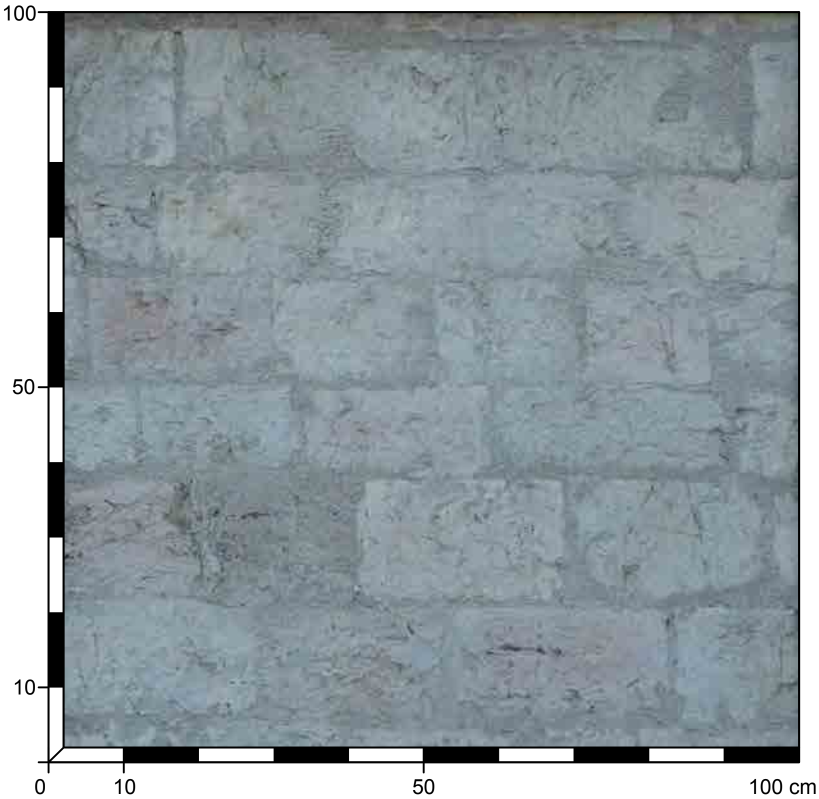
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE AND PINK	**MORTAR (BEDDING) THICKNESS:** 0.5-0.6 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT 9 cm; WIDTH from 40 to 41.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
SHAPE: ASHLARS	DIMENSION: 2-6 mm
DIMENSIONS: HEIGHT 13.2 to 23.5 cm; WIDTH from 20 to 50.5 cm	COLOR: WHITE, PINK
MANUFACTURE: SURFACE PROCESSING WITH FINE-TOOTH CHISEL	**AGGREGATE:** SAND
	DIMENSION: <1 mm
	COLOR: GREY

CHURCH OF S. NICOLO - SPOLETO (PG)

APSE
DATE OF SURVEY 28 MAY 2016

BIBLIOGRAPHICAL REFERENCES

- PARDI 1975, p. 164.



239	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE BLOCKS AND ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 105 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: POST 1304
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA
LAYING: REGULAR IN PARALLEL ROWS

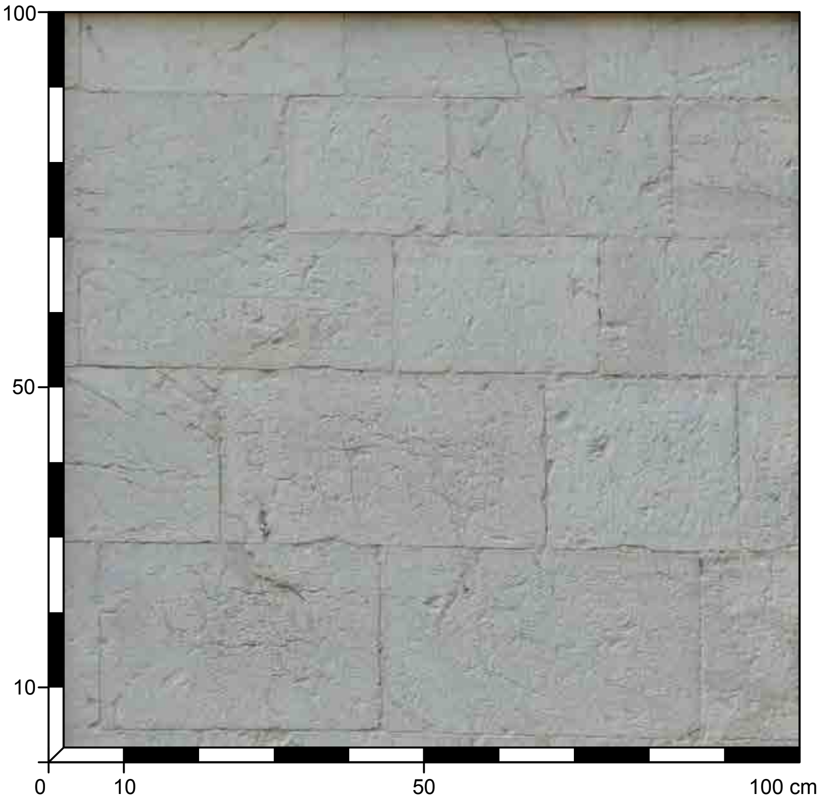
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.8 to 2 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT12.7 to 17.5 cm; WIDTH from 15.3 to 53.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	DIMENSION: 2-8 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: WHITE, GREY, PINK
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: LIGHT PINK	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: GREY
DIMENSIONS: HEIGHT from 12 to 17.5 cm; WIDTH from 12.5 to 38.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	

CHURCH OF S. NICOLO - SPOLETO (PG)

MAIN FACADE
DATE OF SURVEY 28 MAY 2016

BIBLIOGRAPHICAL REFERENCES

- PARDI 1975, p. 164.



240	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 80 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: POST 1304	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.1 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 17.8 to 24.5 cm; WIDTH from 21.6 to 43.2 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER AND PITCHING TOOLS	DIMENSION: 1 mm
	COLOR: WHITE, GREY
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

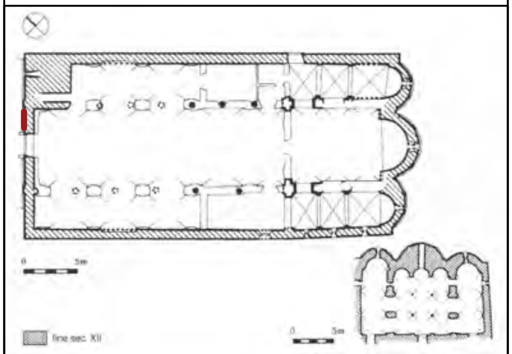
CHURCH OF S. PONZIANO - SPOLETO (PG)

MAIN FACADE
DATE OF SURVEY 28 MAY 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 105-113.

241	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 85 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: END OF 12TH CENTURY	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 135.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.1 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGH from 11 to 18.5 cm; WIDTH from 12.8 to 62.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	DIMENSION: 1 mm
	COLOR: WHITE, GREY
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

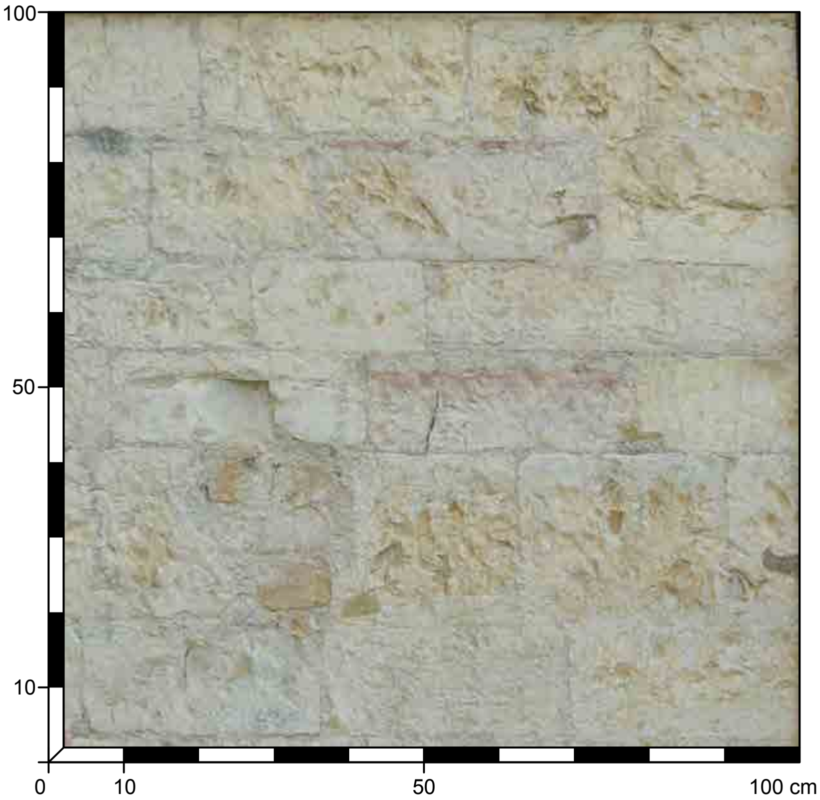
CHURCH OF S. PONZIANO - SPOLETO (PG)

BELL TOWER

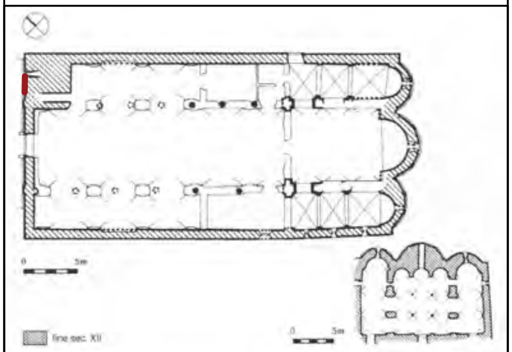
DATE OF SURVEY 28 MAY 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 105-113.



242	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 105 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: END OF 12TH CENTURY	
MATERIALS: DISCOLOURED SCAGLIA ROSSA, SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 135.

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** MEDIUM-FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** from 0.4 to 0.6 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGH from 11.5 to 23.5 cm; WIDTH from 18.2 to 50.4 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	DIMENSION: 2-4 mm
LITHOTYPE: DISCOLOURED SCAGLIA ROSSA	COLOR: WHITE, GREY
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: WHITE	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: GREY
DIMENSIONS: HEIGH from 11 to 20 cm; WIDTH from 15 to 52.5 cm	
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	

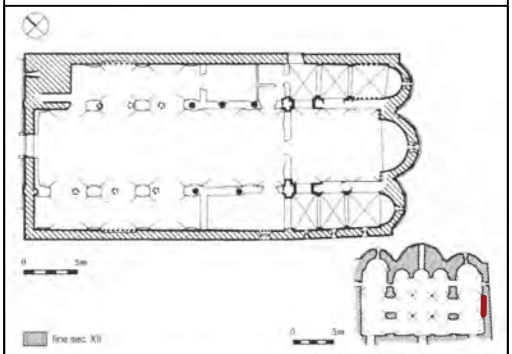
CHURCH OF S. PONZIANO - SPOLETO (PG)

CRYPT
DATE OF SURVEY 28 MAY 2016

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 105-113.

243	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ELEMENTS
CONSERVATION: GOOD	
MASONRY THICKNESS: 100 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: END OF 12TH CENTURY	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



GIGLIOZZI 2013, p. 135.

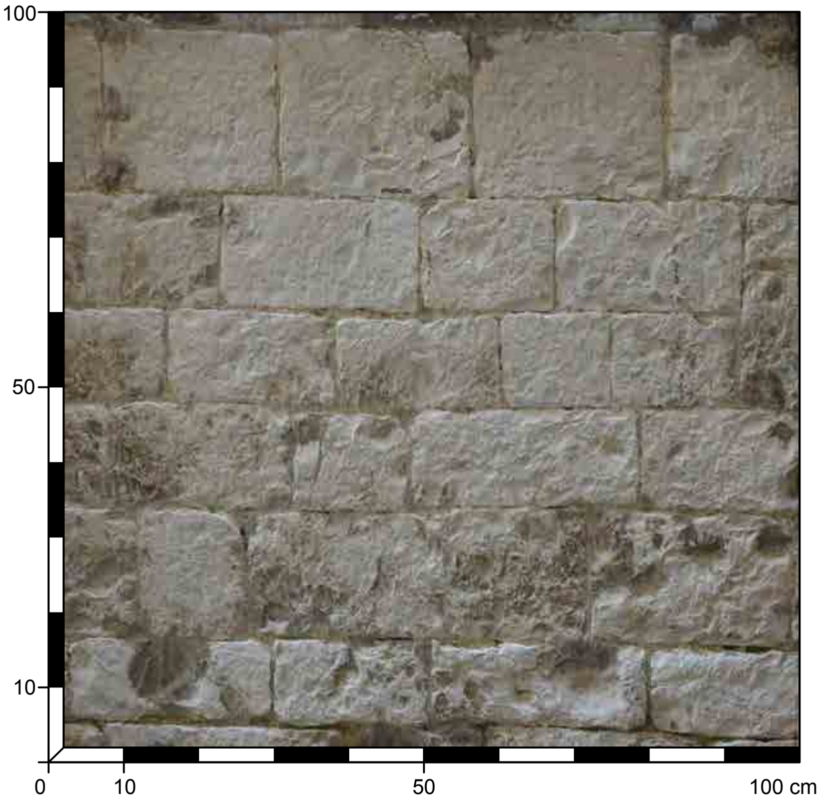
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.1 cm
SHAPE: BLOCKS	**BINDER:** LIME
DIMENSIONS: HEIGH from 7.2 to 15.8 cm; WIDTH from 15.2 to 51.4 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	DIMENSION: 1 mm
	COLOR: WHITE, GREY
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

CHURCH OF SS. GIOVANNI E PAOLO - SPOLETO (PG)

MAIN FACADE
DATE OF SURVEY 28 MAY 2016

BIBLIOGRAPHICAL REFERENCES

- MARTELLI 1966, p. 341.



244	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 75 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1174	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	

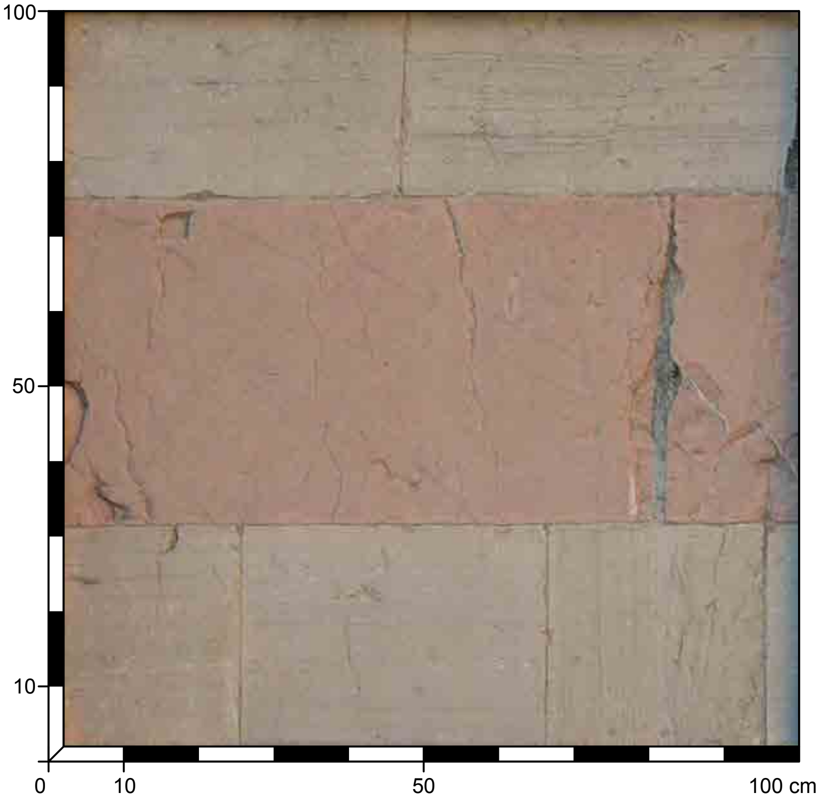
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.4-0.5 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGH from 10.2 to 21.8 cm; WIDTH from 13.8 to 48.1 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL AND BUSH HAMMER	DIMENSION: 2-5 mm
	COLOR: WHITE, GREY
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: GREY

SS. ANNUNZIATA CATHEDRAL - TODI (PG)

BELL TOWER
DATE OF SURVEY 18 AGO 2017

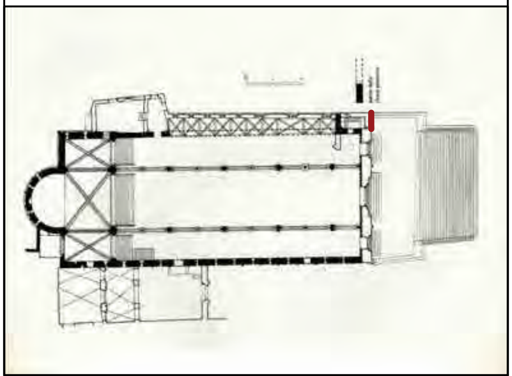
BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 124-131;
- PARDI 1975, p. 200.



245	RUBBLE MASONRY WITH WALL FACING IN BICHROMATIC LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 85 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1282-1315
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA
LAYING: REGULAR IN BICHROMATIC PARALLEL ROWS



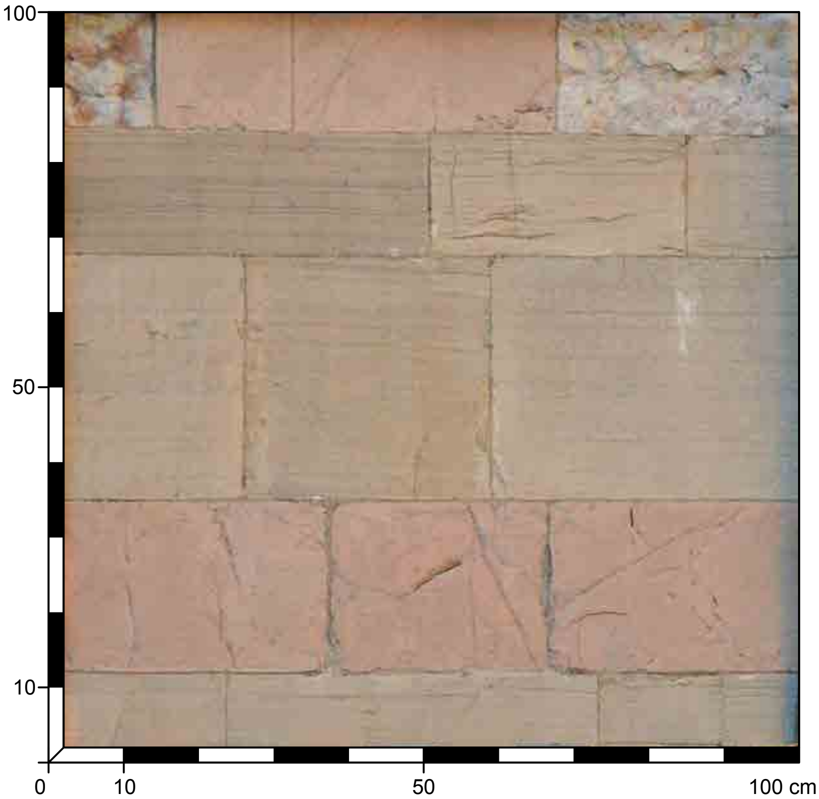
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.2 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 31.6 to 44.4 cm; WIDTH from 38.2 to 82.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH PITCHING TOOLS	DIMENSION: 1-2 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: WHITE, GREY, PINK
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: PINK	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: WHITE
DIMENSIONS: HEIGHT from 40.5 to 43.7 cm; WIDTH from 40.5 to 91 cm	
MANUFACTURE: SURFACE PROCESSING WITH PITCHING TOOLS	

SS. ANNUNZIATA CATHEDRAL - TODI (PG)

MAIN FACADE
DATE OF SURVEY 18 AGO 2017

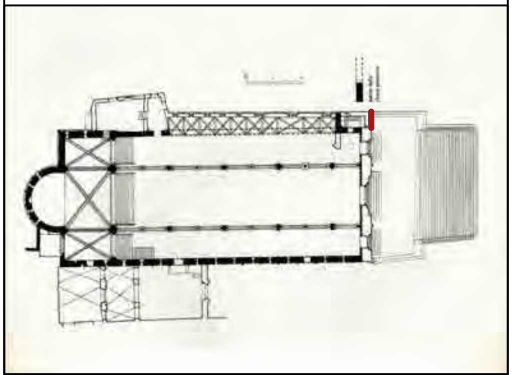
BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 124-131;
- PARDI 1975, p. 200.



246	RUBBLE MASONRY WITH WALL FACING IN BICHROMATIC LIMESTONE ASHLARS

CONSERVATION: GOOD
MASONRY THICKNESS: 200 cm
TYPE OF STRUCTURE: BEARING WALL
FACADE: EXTERIOR
DATING: 1282-1315
MATERIALS: SCAGLIA BIANCA, SCAGLIA ROSSA
LAYING: REGULAR IN BICHROMATIC PARALLEL ROWS



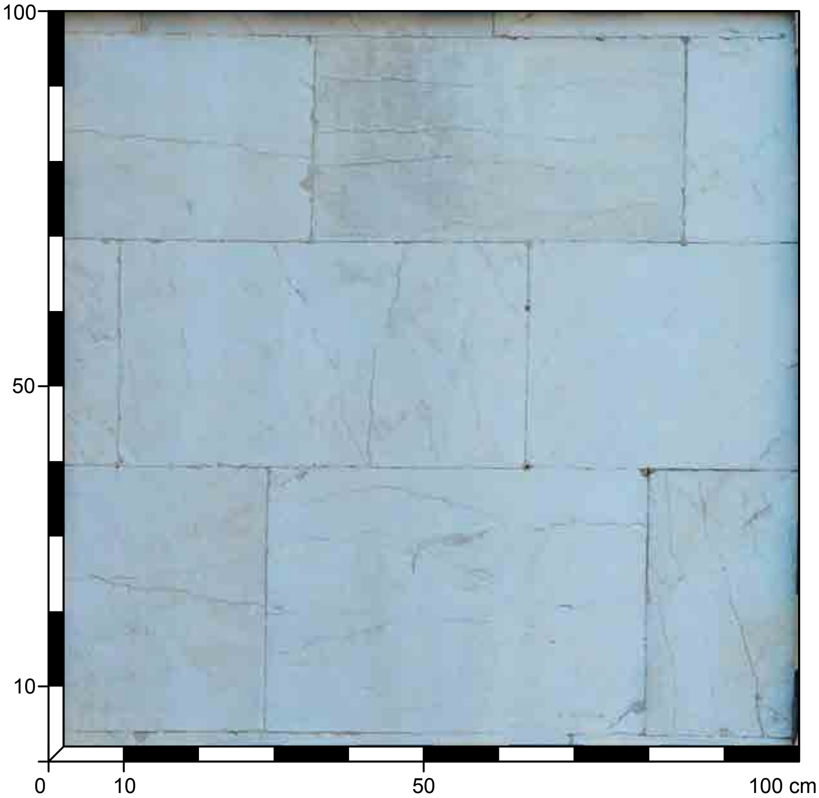
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.2 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 15 to 32.5 cm; WIDTH from 29.2 to 58 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH PITCHING TOOLS	DIMENSION: 1-2 mm
LITHOTYPE: SCAGLIA ROSSA	COLOR: WHITE, GREY, PINK
NATURE: CARBONATIC LIMESTONE ROCK	**AGGREGATE:** SAND
COLOR: PINK	DIMENSION: <1 mm
SHAPE: ASHLARS	COLOR: WHITE
DIMENSIONS: HEIGHT from 18.5 to 25cm; WIDTH from 30.5 to 42.8 cm	
MANUFACTURE: SURFACE PROCESSING WITH PITCHING TOOLS	

SS. ANNUNZIATA CATHEDRAL - TODI (PG)

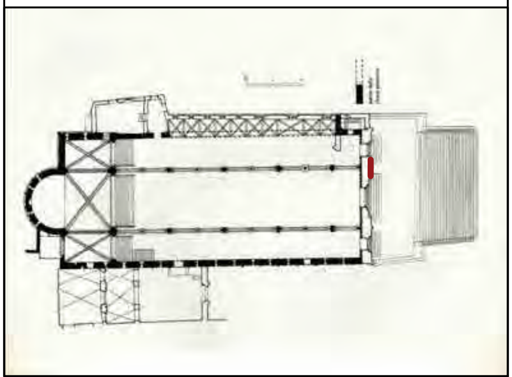
MAIN FACADE
DATE OF SURVEY 18 AGO 2017

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 124-131;
- PARDI 1975, p. 200.



247	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 200 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1282-1315	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



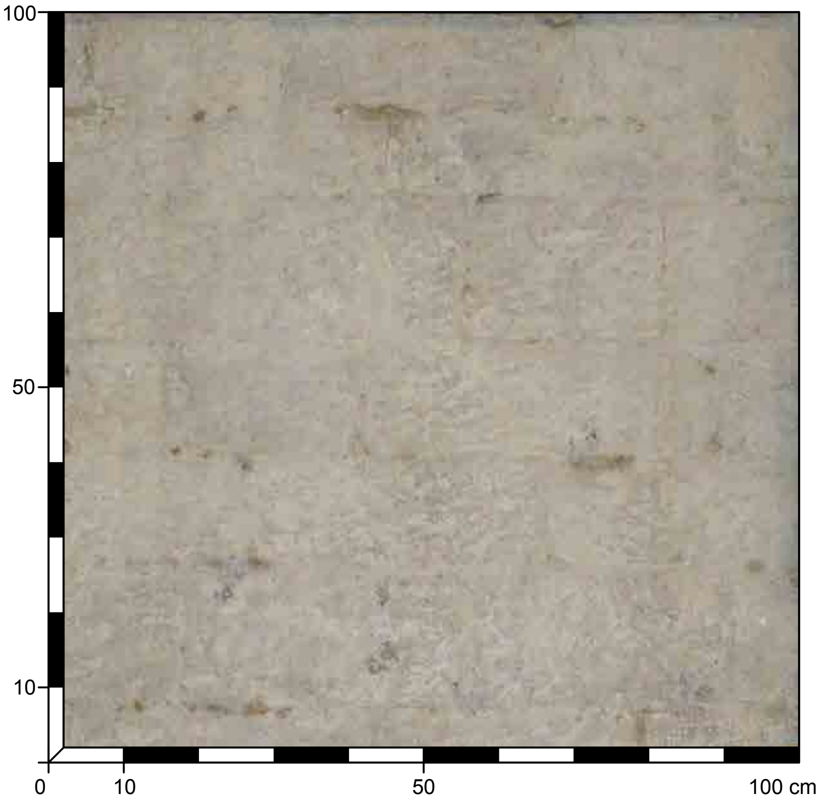
STONE ELEMENTS	**MORTAR**
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.2 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 20.9 to 35.5 cm; WIDTH from 45.8 to 79 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH BUSH HAMMER	DIMENSION: 1-2 mm
	COLOR: WHITE, GREY, PINK
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

SS. ANNUNZIATA CATHEDRAL - TODI (PG)

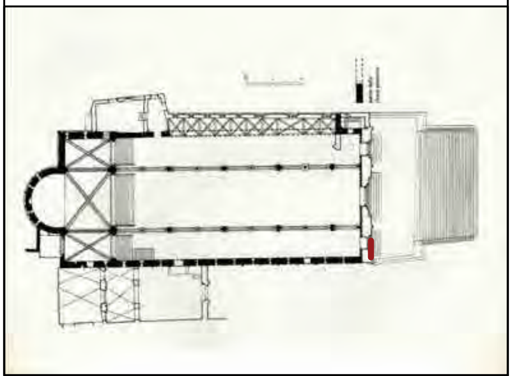
BELL TOWER
DATE OF SURVEY 18 AGO 2017

BIBLIOGRAPHICAL REFERENCES

- GIGLIOZZI 2013, pp. 124-131;
- PARDI 1975, p. 200.



248	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: GOOD	
MASONRY THICKNESS: 200 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1282-1315	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.2-0.8 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 18.2 to 25 cm; WIDTH from 30 to 42.8 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	DIMENSION: 1-2 mm
	COLOR: WHITE, GREY, PINK
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

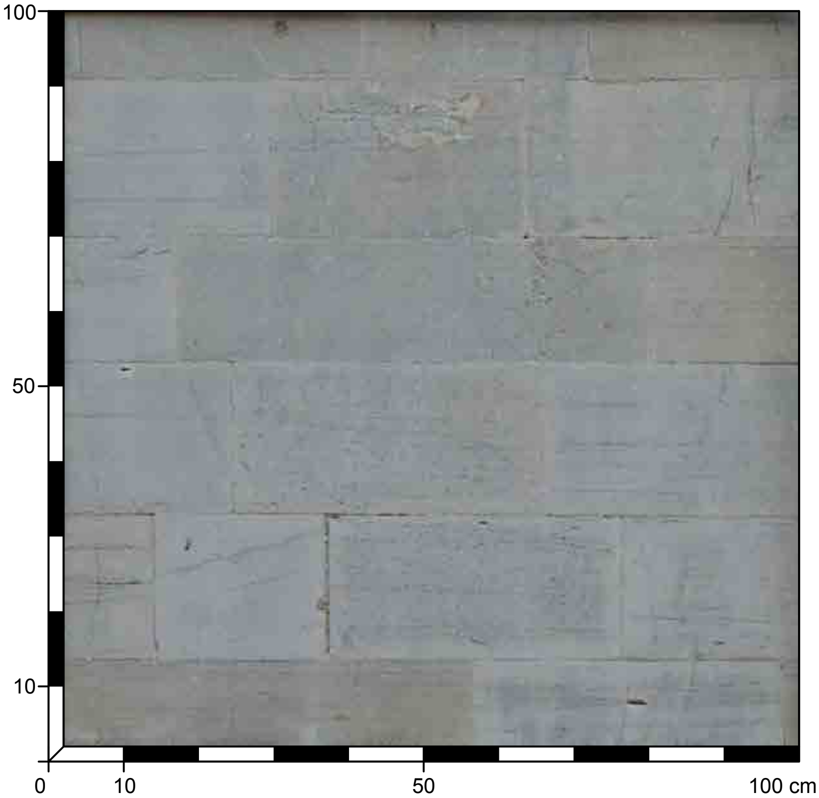
S. FORTUNATO TEMPLE - TODI (PG)

RIGHT FRONT

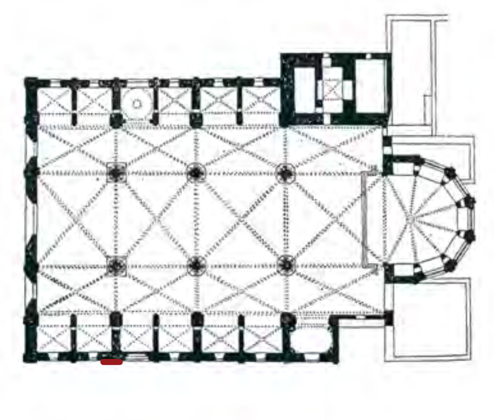
DATE OF SURVEY 18 MAR 2017

BIBLIOGRAPHICAL REFERENCES

- QUINTERIO, CANALI 2010, pp. 193.
- *Todi*, 1996, pp. 87-90;
- PARDI 1975, pp. 217-222.
- DE ANGELIS D'OSSAT 1982, pp. 150-160.



249	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE SLABS
CONSERVATION: GOOD	
MASONRY THICKNESS: 110 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 14TH CENTURY	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	



QUINTERIO, CANALI 2010, pp. 193.

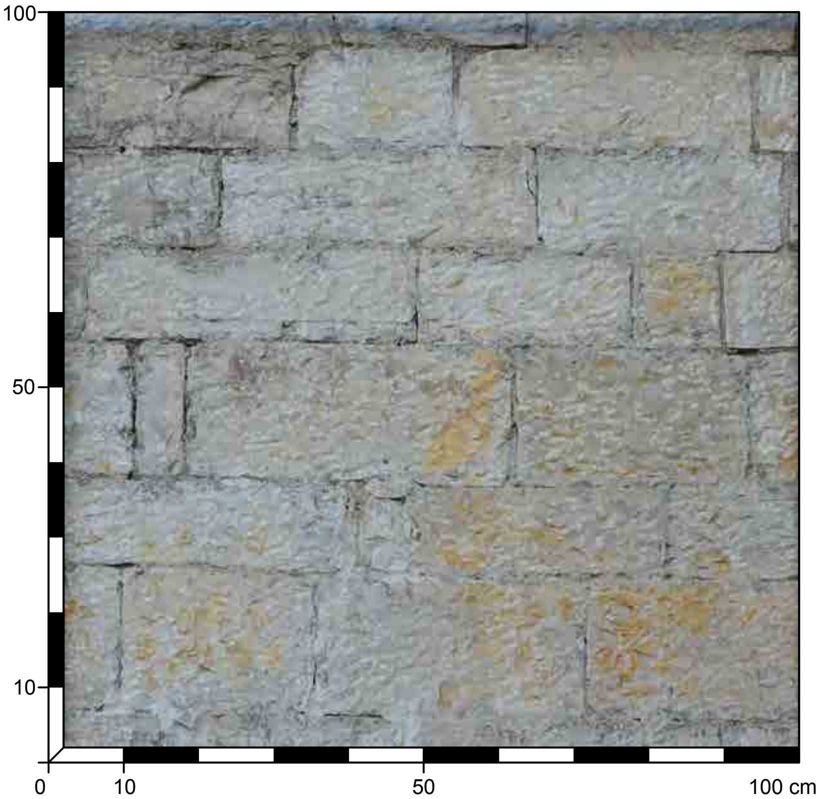
STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** FINE
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS: 0.1-**0.2 cm
SHAPE: SLABS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 16.4 to 20.6 cm; WIDTH from 22.4 to 65.2 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH PITCHING TOOLS	DIMENSION: 1-2 mm
	COLOR: WHITE, GREY
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

CHURCH OF S. ILARIO - TODI (PG)

LEFT FRONT
DATE OF SURVEY 18 MAR 2017

BIBLIOGRAPHICAL REFERENCES

- PARDI 1975, p. 218.



250	RUBBLE MASONRY WITH WALL FACING IN LIMESTONE ASHLARS
CONSERVATION: FAIRLY GOOD	
MASONRY THICKNESS: >50 cm	
TYPE OF STRUCTURE: BEARING WALL	
FACADE: EXTERIOR	
DATING: 1249	
MATERIALS: SCAGLIA BIANCA	
LAYING: REGULAR IN PARALLEL ROWS	

STONE ELEMENTS	MORTAR
LITHOTYPE: SCAGLIA BIANCA	**CONSISTENCY:** SOLID
NATURE: CARBONATIC LIMESTONE ROCK	**SIFT:** ROUGH
COLOR: WHITE	**MORTAR (BEDDING) THICKNESS:** 0.8-1 cm
SHAPE: ASHLARS	**BINDER:** LIME
DIMENSIONS: HEIGHT from 11.4 to 20 cm; WIDTH from 6 to 43.5 cm	**AGGREGATE:** LIMESTONE FRAGMENTS
MANUFACTURE: SURFACE PROCESSING WITH POINT CHISEL	DIMENSION:4-8 mm
	COLOR: WHITE, GREY
	AGGREGATE: SAND
	DIMENSION: <1 mm
	COLOR: WHITE

MORTARS DATA SHEETS

SASSOVIVO SPECIMENS - CROSS SECTIONS AND THIN SECTION
2015-2016 excavation campaigns

All the specimens belong to the excavation area built in front of the church.
During the first phase it was necessary to deepen the optical microscopic reading of 4 samples of the aforementioned group. The selection was made following reflections and considerations of an archaeological historical nature.
After that the analysis continued making thin sections of the specimens.

Sampling: Arch. Maddalena Paolillo and Arch. Eleonora Scopinaro
Cross section analyses: arch. Elisabetta Giorgi, Laboratory of Materials' analyses, Sapienza University of Rome and Arch. Eleonora Scopinaro
Thin section analyses: prof. Angela Baldanza Department of Physics and Geology, University of Perugia and Arch. Eleonora Scopinaro

SP. LAB08 – USM 03

Location: beginning of the break on the wall of the Romanesque façade, which is parallel to the façade of the church

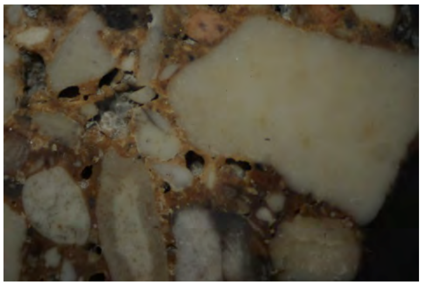
Sampling



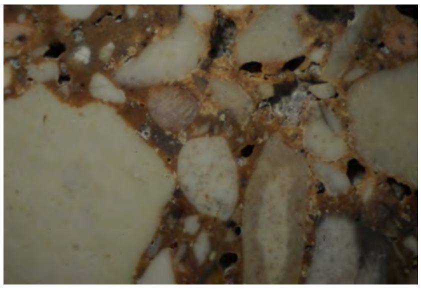
Description: it crumbles easily, density of medium-high aggregates of rather small size, beige colour

Cross section









Description: sp. 08 observed in optical microscopy on a glossy section is constituted by: lime, white and pink *scaglia* from light pink to darker pink (almost red), fragments of debris white limestone and flint (red, grey and white). The matrix structure is not compact with micro-fractures because of the conservation process. The presence of sand is rare.
The granulometry is variable.

SP. LAB09 – USM 43

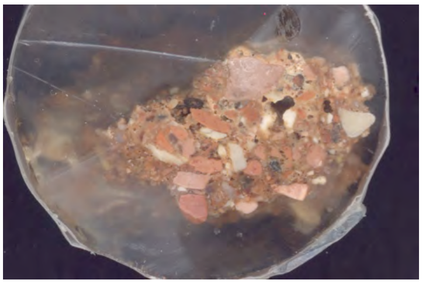
Location: nucleus of the main façade of the Romanesque church

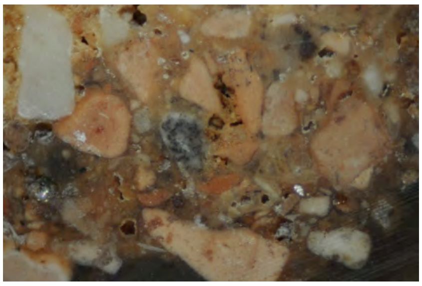
Sampling

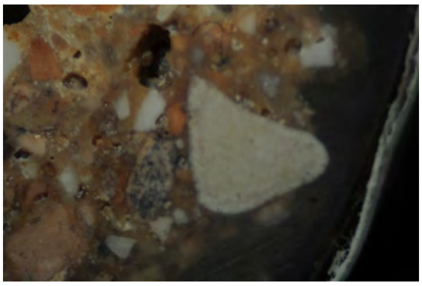


Description: when the mortar is removed it is moist and disintegrates easily. Medium high density of included small (likely presence of *cocciopesto*), reddish brown.

Cross section

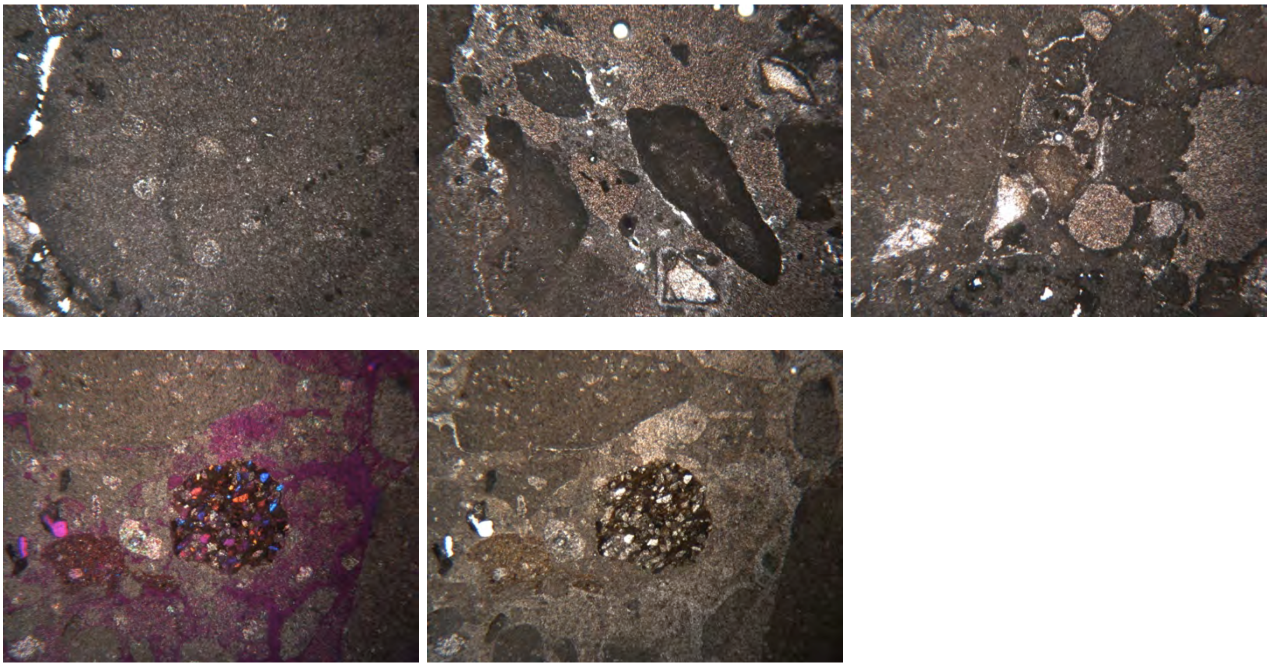






Description: sp. 09 observed in optical microscopy is constituted by: lime, detritic Scaglia Rossa (Cretaceous and Tertiary), white limestone, white and grey flint, caries due to poor state of conservation. Rare presence of sand. Fragment not calcareous (very dark sandstone?) are rare.

Thin section



Description: All the components already seen in cross section are confirmed. Is also confirmed the presence of a fragment of sandstone.

SP. LAB10 – USM 22

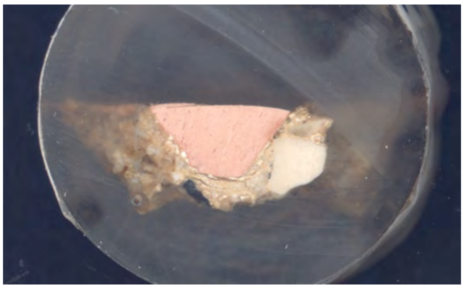
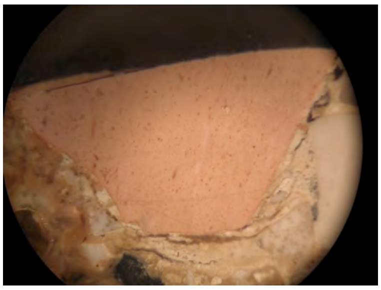
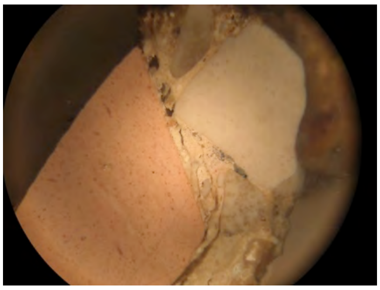
Location: interior of a tomb

Sampling



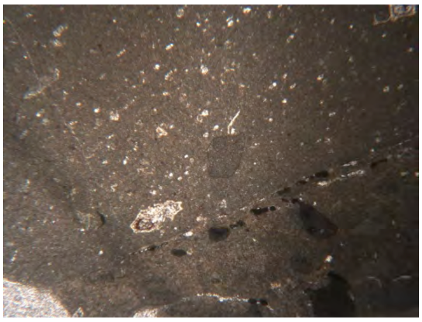
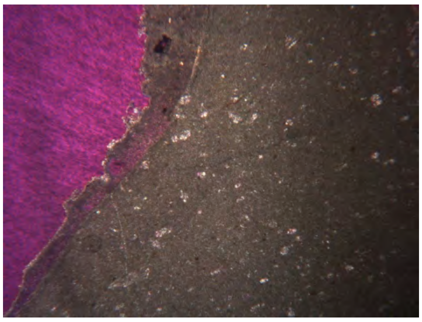
Description: solid.

Cross section

Description: sp. 10 is constituted by a large fragment of red scale (Cretaceous), one of white scale and a fragment of grey-white flint.
There are also carbon frustules.

Thin section

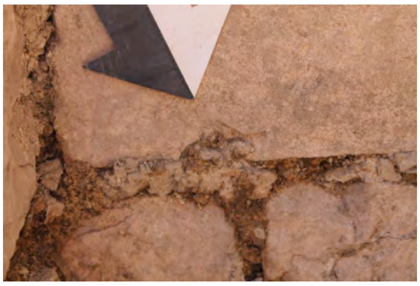




Description: the observations already made are confirmed.
Maximum cohesion between binder and limestone fragments.

SP. LAB11 – USM 33

Location: wall facing of the wall that stands on the flank of the Romanesque *avant-corps*.

Sampling

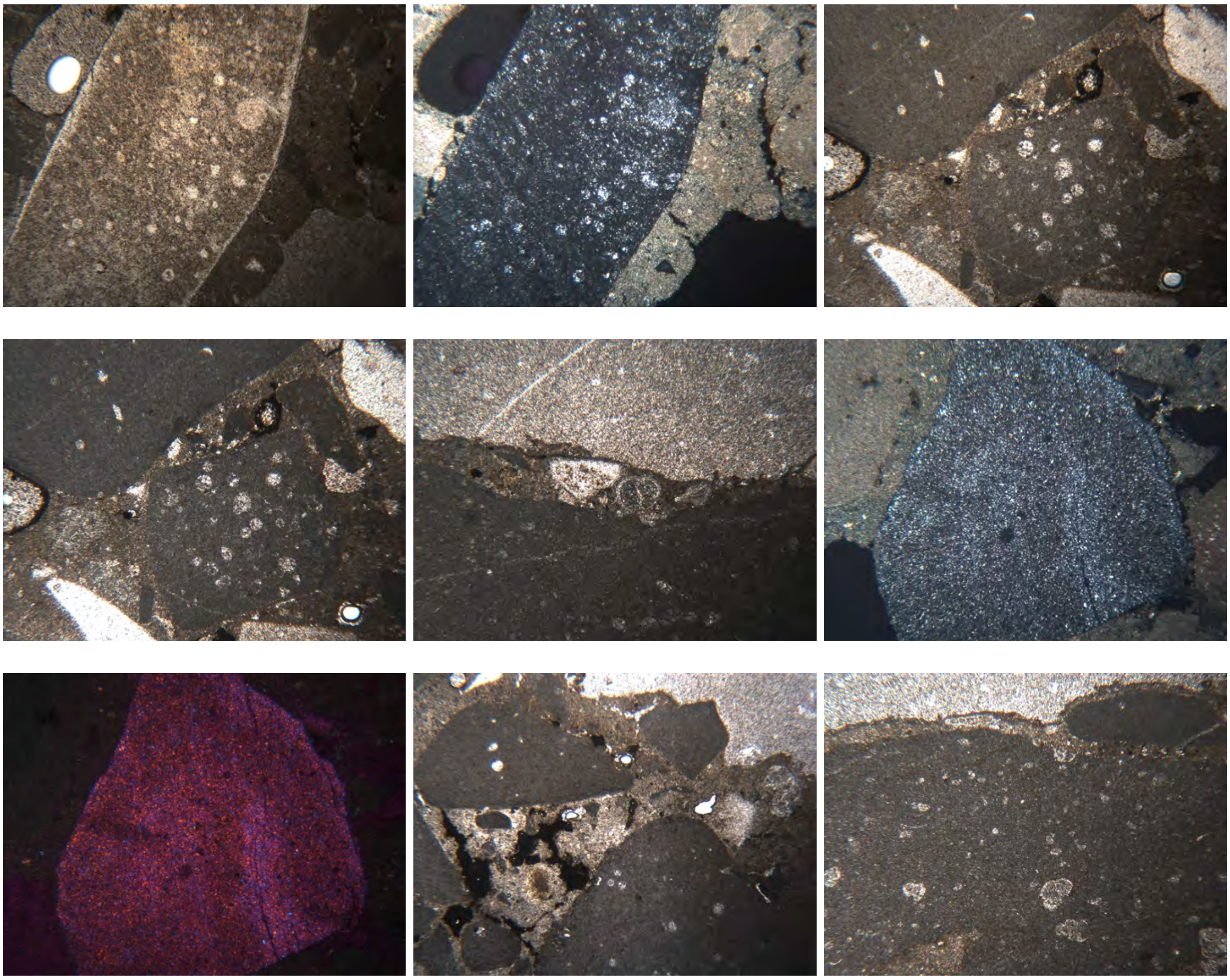

note: indication on the first picture is not correct. This is actually the underlying mortar joint.

Description: solid

Cross section

Description: sp. 11 is made up of lime, elements of white limestone (majolica and Scaglia) and grey flint and hazel. The mortar is characterized by the total absence of Scaglia Rossa and by the presence of dark organic remains.

Thin section



Description: the observations already made are confirmed. There is also the presence of Scaglia Rossa fragments and many organic remains.

SP. LAB12 – USM 33

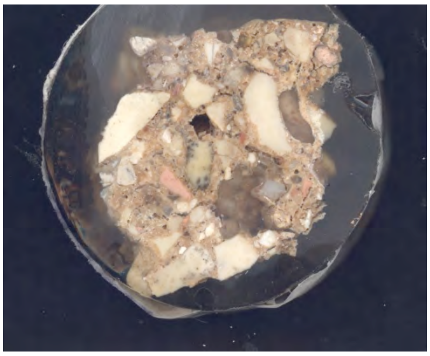
Location: wall facing of the wall that stands on the flank of the Romanesque *avant-corps*.

Sampling

Description: --

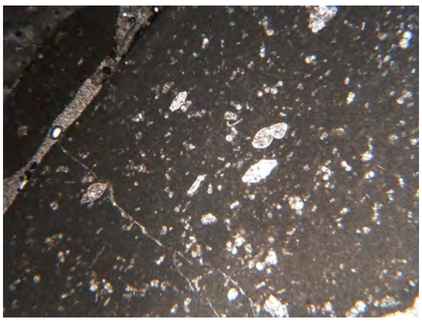
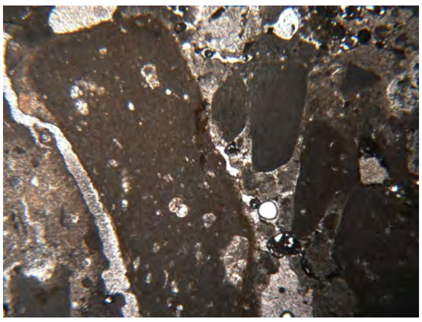
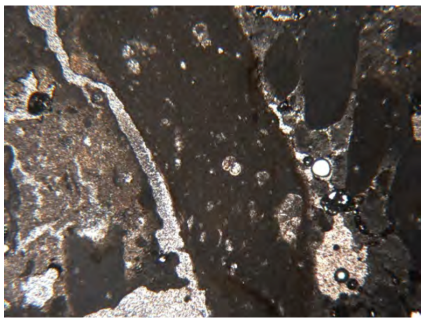
Cross section

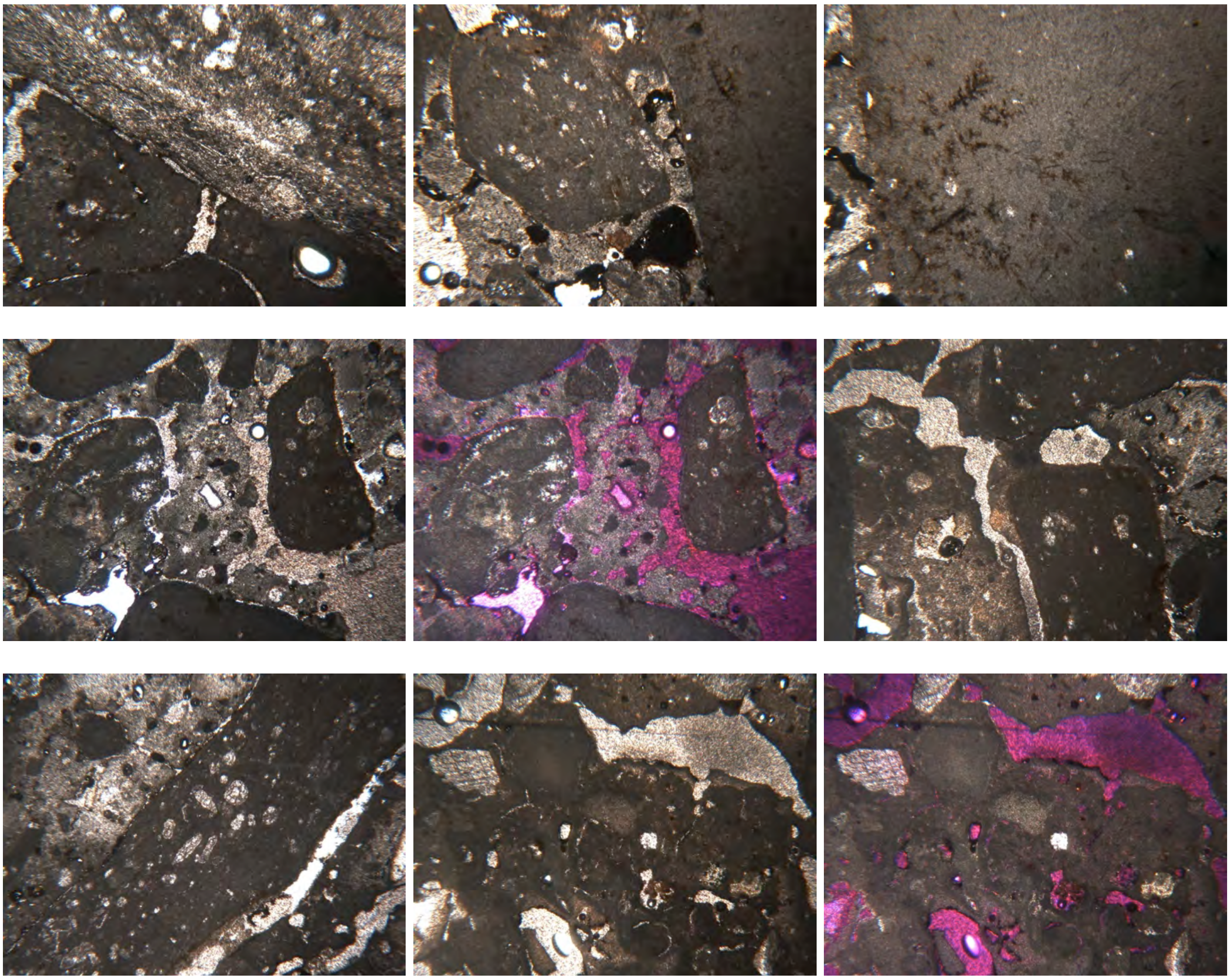


Description: sp. 12 is made of: lime, white limestone (almost all majolica), fragments of red scale of the tertiary sector, flint and many organic remains.

note: the aim is to compare it with sp.10 and sp.11.
Samples 11 and 12 have the same components and granulometry. They also seem to contain the same organic remains.

Thin section

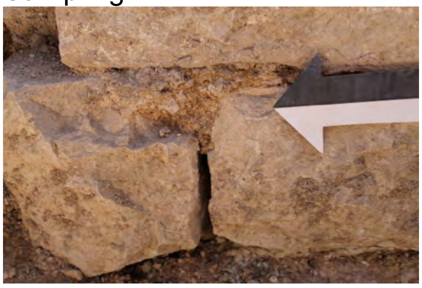
  



SP. LAB13 – USM 55

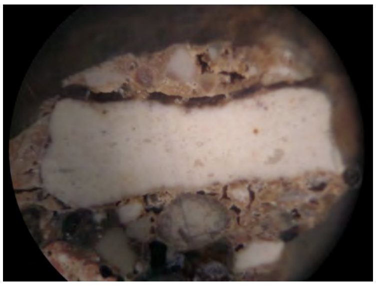
Location: mortar joint. Probably Romanesque wall facing.

Sampling



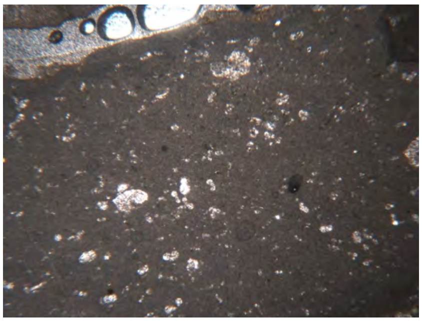
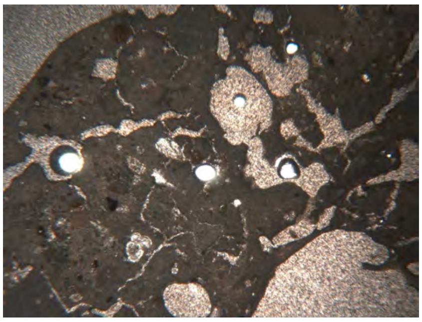
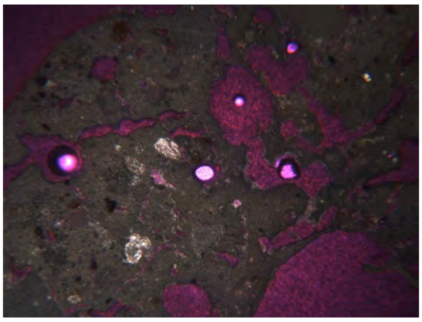
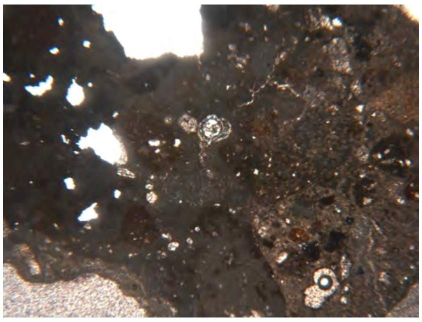
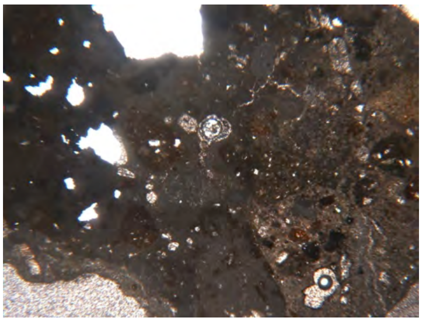
Descrizione: crambles
nota: one of the lowest joints.

Cross section



Description: sp. 13 is made of: lime, a large fragment of bleached Scaglia Rossa, red fragments (perhaps bricks), white flint.
Presence of plant remains.

Thin section

Description: it is possible to confirm the previous observations about the components. The bleached Scaglia Rossa belongs to the Upper Cretaceous.
The presence of brick fragments is also confirmed.

SP. LAB14 – USM 04

Location: interior wall facing of a tomb

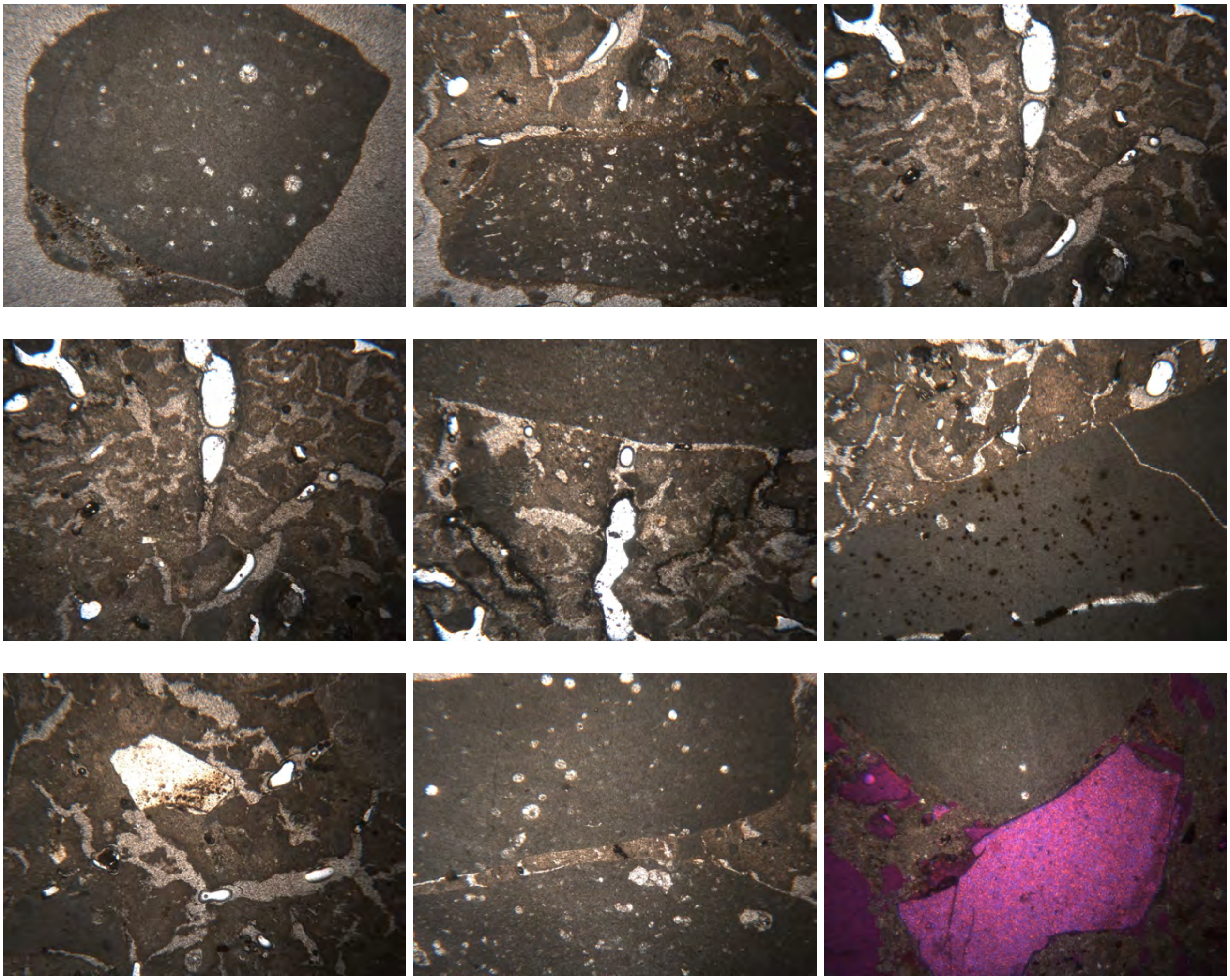
Sampling

Description: friable

Cross section

Description: sp. 14 is made up of: lime, Scaglia Rossa (Tertiary), Scaglia Bianca and organic remains.

Thin section



Descrizione: it is possible to add fragments of majolica and flint to the previous description.
The mortar has well-cohesive areas and areas with micro-fractures and detachments between the parts. Plant remains.

SP. LAB15 – USM 04

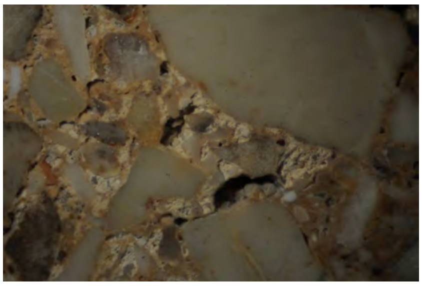
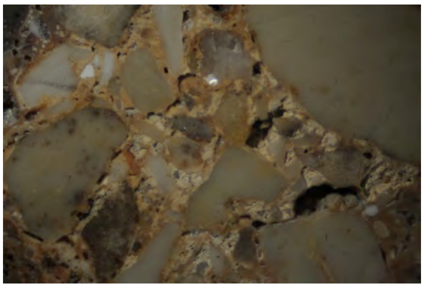
Location: mortar joint of the right flank of the *avant-corps.*

Sampling



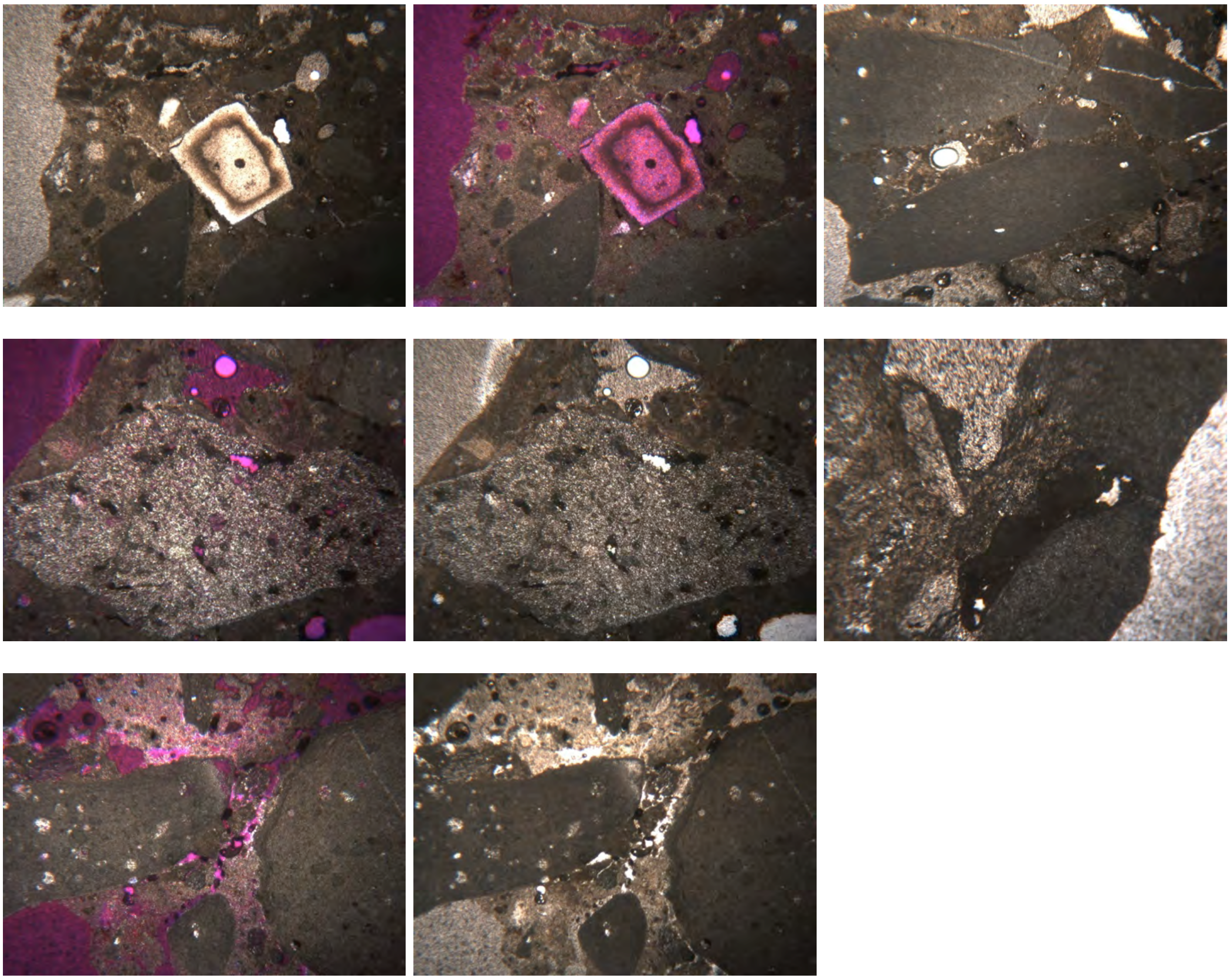
Description: solid, high density of aggregates.

Cross section

Descrizione: sp. 15 is made of: lime and white and light brown limestone. Presence of sand. The sieving is finer than samples 08 and 09.
Majolica, Calcari e Marne a Fucoidi, Scaglia Rossa, white and grey flint and vegetable remains.

Thin section



Description: it is possible to confirm all the previous observations. It is also possible to identify a fragment of zoned flint and other very small aggregates.

note: some parts of mortar are well cohesive and the binder turns yellow-pink; other areas have a very high porosity and the binder is whitish and dusty.
Organic remains.

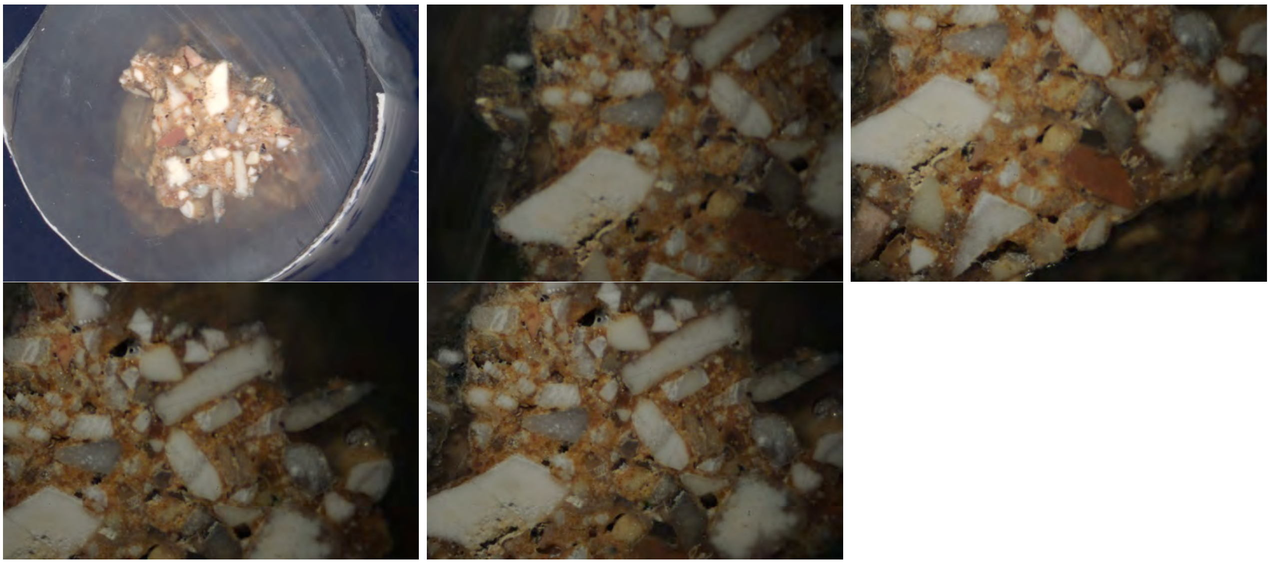
SP. LAB16 – USM 03

Location: *avant-corps* main façade.

Sampling

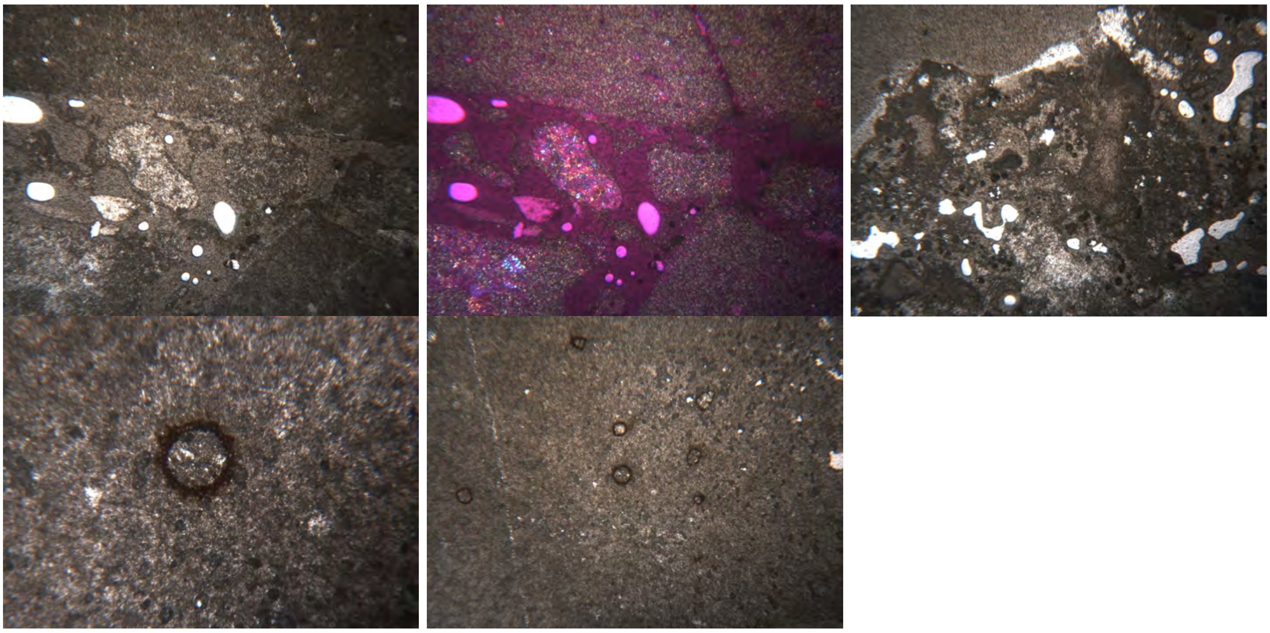
Description: high granulometry

Cross section



Description: sample 16 is made of: lime, white limestone, Scaglia Rossa (rare). The sieving is good and similar to a finishing mortar.

Thin section



SP. LAB17

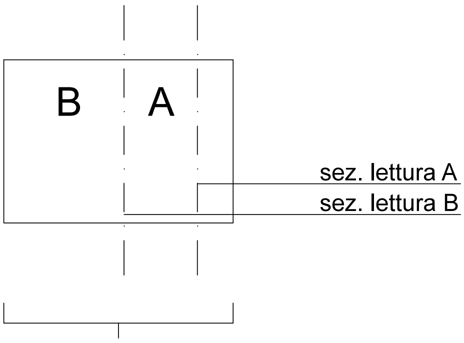
Location: closing wall of the furnace

Sampling

Descrizione: la malta si presenta dura e poco compatta. La vagliatura sembra essere molto grossolana e sono presenti calcari bianchi e rosati.

Cross section

In this case we cut the sample twice in order to read two different surfaces. Section A is representative of the outermost part of the mortar joint, while section B is showing to the innermost part.



campione LAB 17

A

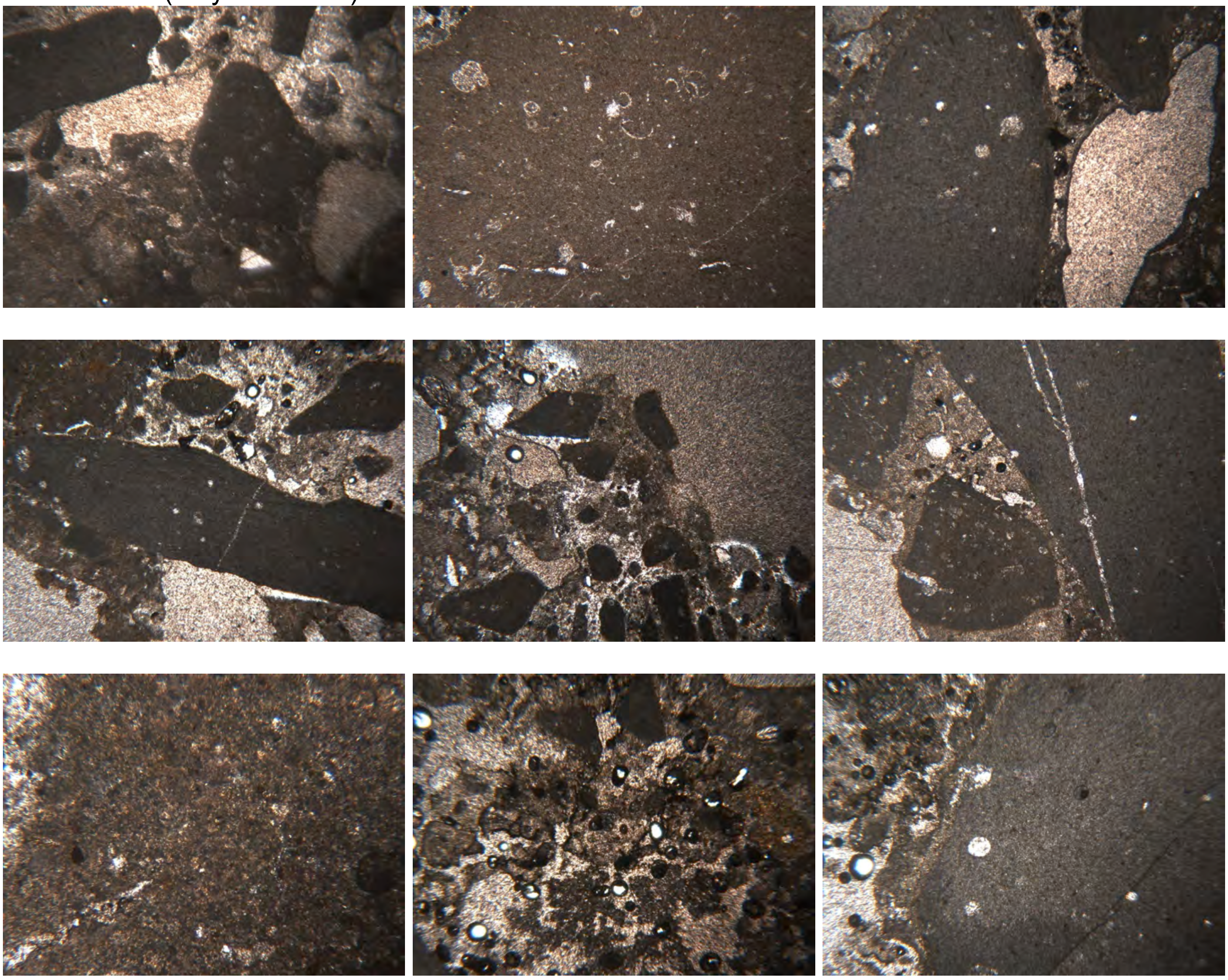
B

Description:

A. Section A of sp. 17 is made up of: lime, white and grey flint, two fragments of Scaglia Rossa (Cretaceous), majolica and traces of carbonaceous material (probable presence of plants). The sieving is good and similar to a finishing mortar. The mortar has many cracks.

B. Section B of sp. 17 is made of by: lime, white and pink limestone. The sieving is rough and comparable with a mortar for basement. There are also reuse material probably from demolitions and the mortar has many cracks.

Thin section (only section A)



Descrizione:

A. It is possible to confirm the previous observations.
Around the flint and the other aggregates we can see a yellow border.

The mortar has been sieved roughlyin the inner part and finer towards the outside. Overall, the sample seems created following the disposal of the furnace, with erratic materials coming, most likely, from the furnace itself.

General considerations:

sp. 16 and sp. 8 are made up with the same materials in different processing (16 has larger pieces and 8 has smaller pieces). They came from the same wall 08=nucleus and 16=finishing and they probably belong to the same building site.

Sp. 15 and sp. 9 can not be compared with each other or with others. They belong to distinct phases.

Sp. 12 and sp. 13 could be part of the same construction phase.

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