The Inquisition Palace staircase in Birgu by Carapecchia (18th century): architecture and construction under the Order of St. John of Jerusalem

Quaderni di Storia della Costruzione 2

Scale e risalite nella Storia della Costruzione in età Moderna e Contemporanea

a cura di Valentina Burgassi, Francesco Novelli, Alessandro Spila
Construction History Group - Politecnico di Torino DAD

Il tema delle scale (e delle loro controparti contemporanee, quali scale mobili, ascensori, rampe), affrontato alle sue radici dall'indimenticato convegno internazionale che si svolse a Tours nel 1979 (edito in "L'escalier dans l'architecture de la Renaissance", Picard 1985), poi dal più recente "L'Escalier en Europe 1450-1800. Formes, Fonctions, Décors" (dir. Gady, 2016), vuole essere approfondito, secondo la logica del cantiere e delle tecniche, dall'età moderna a quella contemporanea, in questo secondo volume dei Quaderni di Storia della Costruzione edito dal Construction History Research Center del Politecnico di Torino.

Il volume in oggetto prende le sue mosse dalla due giornate di studi sul tema di "Scale e risalite nella Storia della Costruzione in età Moderna e Contemporanea" (Politecnico di Torino, 17-18 febbraio 2022) e qui mette a sistema ricerche che riguardano la costruzione delle scale attraverso un più ampio respiro a livello nazionale ed internazionale: dalla presentazione di singoli casi - eccezionali o anche ordinari - analizzati nella loro consistenza costruttiva, all'analisi di tipi costruttivi ripetuti, quali le scale palladiane o le "geometric staircases"; dal rapporto tra scale e risalite e l'uso di determinati materiali (la pietra, il ferro, il cemento armato, etc), alle conseguenze costruttive dell'impiego di determinate forme. Nel volume si portano inoltre all'attenzione sistemi storici di calcolo, verifica ed evoluzioni normative nel rapporto che questi hanno avuto con le pratiche del costruire. La "fine della scala" e la sua sostituzione, o il suo affiancamento con altri sistemi di risalita – con ciò che comporta in termini di macchinari e impianti, in una prospettiva storica - è un altro tema suscettibile di esplorazioni in questo volume.

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Quaderni di Storia della Costruzione è una collana di ricerche promosse dal Construction History Group PoliTo DAD con l'obiettivo di diffondere studi riguardanti la storia della costruzione in età moderna e contemporanea, fondata nel 2021.
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Scale a pozzo di palazzo Barberini, Roma
Fotografia di Marisa Tabarrini, 2022

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Implicazioni costruttive negli scaloni di rappresentanza in età moderna

The Inquisition Palace staircase in Birgu by Carapecchia (18th century): architecture and construction under the Order of St. John of Jerusalem

Valentina Burgassi
Politecnico di Torino, Dipartimento di Architettura e Design

The Inquisition Palace staircase

The use of cut stone is inextricably linked with construction techniques and sites of the early-modern Maltese architecture. This influenced the construction project planning and led architects, engineers, and *capi mastri* to deal with stereotomy studies and techniques. As recently pointed out, the 18th-century monumental staircases fall into a broader European debate. Nevertheless, they also show a remarkable tendency to constructive experimentation embedded in the well-established local tradition in Malta as well as inspired by the instructions provided by the technical treatises circulating in Europe and the Mediterranean.

The Inquisition palace staircase in Birgu[1] was built during the years 1733-34 by the architect Romano Fortunato Carapecchia[2], a renowned pupil of Carlo Fontana[3] (fig. 1). Carapecchia was commissioned by Grand Master Fray Ramón de Perellós y Rocafull[4] to work on several public works on the island of Malta and was appointed Architect of the Sacred Religion and Fountain expert (*fontaniere*). The Inquisitor Giovanni Francesco Stoppani[5] commissioned him to remodel his palace: on 19 April 1734, for his services, the «Most Illustrious Signor F[ortunato] Romano Carapecchi architect»[6] was paid 24 zecchini magistrali, the equivalent of 102 scudi, «for having drawn the staircase, and assisted several times in the execution of his design»[7] (fig. 2).

The most urgent intervention in the Inquisitor's Palace was the reconstruction of the grand staircase, which was in a partial state of ruin. Previous work had been carried out to replace the wooden raft-

[1] Recent studies on the Inquisitor's palace and its genesis have been carried out by Kenneth Cassar. A special thanks is due to Kenneth for his kind assistance in this research. Reference is made to the fundamental texts: Cassar 2013, Zammit 2017. A very special thanks goes to Giuseppe Bonaccorso, Cláudia Garradas and Daniel Gullo (Malta Study Center).

[2] About Romano Fortunato Carapecchia (b. 1666 – d. 1738) see: Bonaccorso 2014, pp. 524-531; Camboni 2002, pp. 211-213; De Lucca 1999; Tonna De Lucca 1975.

[3] On the figure of Carlo Fontana, reference should be made to the bibliography in Fagiolo Bonaccorso 2009 and specially to Bonaccorso Moschini 2014.

Fig. 1. *The grand staircase, Inquisitor's Palace, Birgu* (Heritage Malta, photo credit by Duncan Cauchi).

[1.]

ers in the rooms on the noble floor. Heavy rainfall had damaged the masonry, leading to the collapse of one of the wall partitions and damaging the staircase. Maltese limestone, used in the Hospitallers' construction sites since their arrival on the island due to its abundant availability and ease of processing[8], presented some problems of resistance to atmospheric agents[9]. Stoppani seized the opportunity to renovate the palace according to a larger project involving the creation of a courtly environment with the reconstruction of the grand staircase and a new entrance via a secondary staircase, into the Auditor (*Uditore*) rooms, and the library through the passageway above the staircase (figg. 3-4). Carapecchia gave the grand staircase the character of symmetry and *decorum* corresponding to the body of the building[10]. This conferred monumentality to what the inquisitors before him had described as a «casaccia»[11], that is, ugly and unsuitable for its purpose.

Through the monumental entrance leads to the entrance hall along a longitudinal axis. Here, the space opens on to the grand staircase,

[4] Brother Ramón de Perellós y Rocafull (b. 1637 – d. 1720) was of Spanish origin and a member of the Langue of Aragon, Castile and Navarre. He was elected Grand Master on 5 February 1697 until his death on 10 January 1720. See Russo 2017, p. 520.

[5] Giovanni Francesco Stoppani (b. 1695 – d. 1774) was sent by Pope Clement XII to Malta as Inquisitor from 19 November 1730 to 1736.

[6] AIM, Mem. 5, c. 370v.

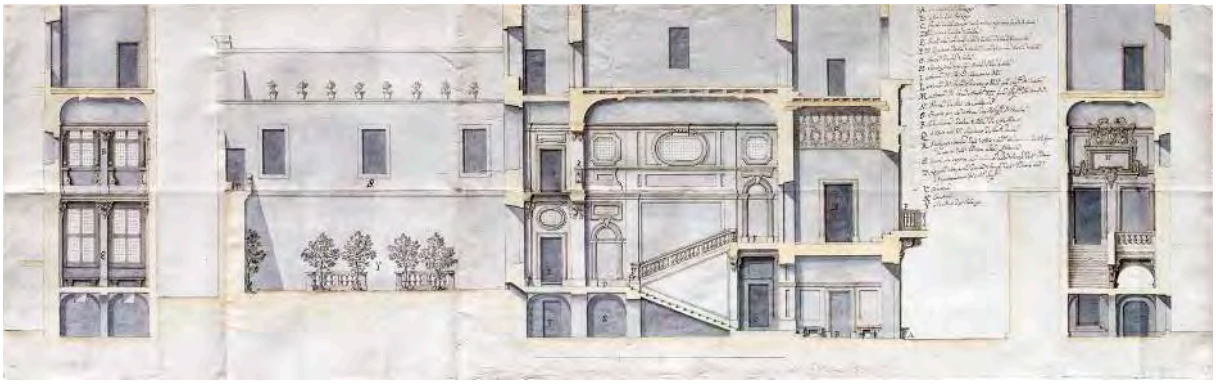
[7] Ivi.

[8] Burgassi 2022; see also Antista 2021.

[9] Pedley Hughes Clarke Galea 1978. See also Pedley 2002.

[10] Cassar 2013, p. 30.

[11] Ivi.



[2.]

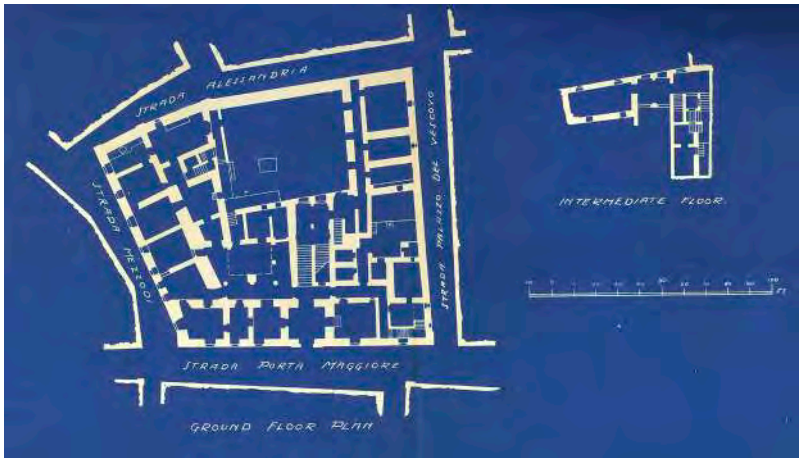
Fig. 2. *Project by Carapecchia for reshaping the palace and the construction of the grand staircase in the Inquisitor's Palace in Birgu*, 1734 (ACDF, Sanctum Officium, Stanza Storica II 1B, unfoliated, Archives of the Congregation for the Doctrine of the Faith, Vatican City - image Daniel Cilia) in Zammit 2017.

known in the documents as *scala maggiore*, which reaches the noble floor with great scenographic impact (fig. 5). The staircase has a simple structure: with an open case, it develops along parallel, straight ramps, without a wall septum. The two flights of stairs are connected by an intermediate landing, onto which a loggia opens up, brightly lit thanks to the large windows overlooking the inner courtyard. The upper part of the staircase, overlooked by another loggia, leads to the noble floor, where the ceremonial rooms are located, including the Chancellery and the Audience Chamber (fig. 6).

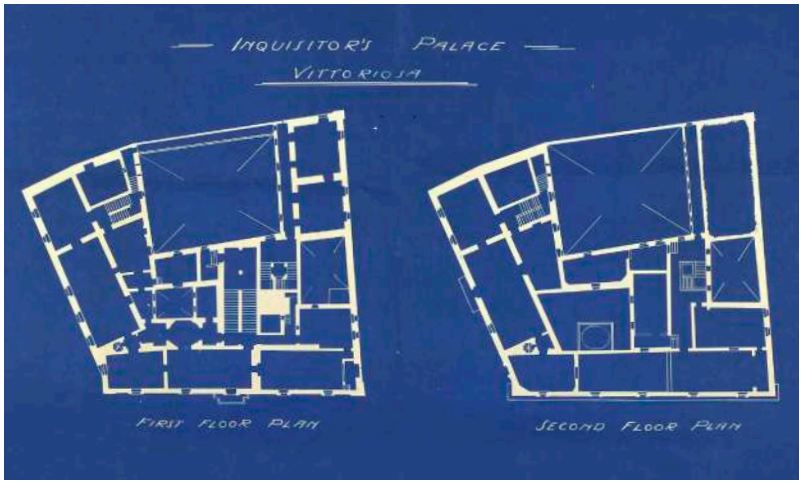
The building site

The grand staircase and the loggia on the landing are fundamental elements of the palace. Their reconstruction can partially be retraced thanks to the ledger of the Procurator Baldassarre Ciantar, who noted the expenses for the years 1733-34.
On 7th October 1733, the ledger notes the expenditure of «33 stone stairs»[12] for the provision of steps. This figure seems to match the number of steps on the grand staircase. The ledger further records that the staircase is equipped with balusters, which it names «24 small columns»[13], the laying of which master Saliba was paid for. Here, the balusters are not diagonal but straight (i.e. the use of diagonal solutions in the shaping of architectural elements), differently from other contemporary experiments in Malta. In these cases, it is possible to identify sophisticated stereotomic solutions following the Roman school. Caramuel's treatise[14] actually focuses on the topic of staircases and the oblique design of the architectural orders to be inserted along the flights: this solution was adopted in a considerable number of palaces in Sicily and spread throughout the Mediterranean area[15]. The slanted balusters theorised by Caramuel were, however, criticised by Ferdinando Galli Bibiena, who was more attracted to the discussion of perspective problems (fig. 7).
Originally, the door leading to the Chancellery in the upper body of the grand staircase was surmounted by arms but, with the suppression of the religious orders, many of these were destroyed and lost. According to the ledger, the 27th October 1733 saw the supply of materials for the arms to be placed above the loggia doors, with the request for «19 stones of S. Venera, for the arms, and furnish-

[12] AIM, Mem. 5, c. 357r.
[13] *Ibid.*
[14] Caramuel Lobkowicz 1678.
[15] Piazza 2013, particularly Garofalo 2013.



[3.]



[4.]

Figg. 3-4. *Plans for the Inquisitor's Palace in Birgu, 20th century* (PFL00070 1r and 2r. Inquisitor's Palace Vittoriosa," Palazzo Falson Historic House Museum, Mdina, HMML project number PFL 00070, accessed February 8, 2023, https://w3id.org/vhmml/readingRoom/view/132868. Image courtesy of Palazzo Falson, Malta, Mdina and the Malta Study Center at the Hill Museum & Manuscript Library. Published with permission of the owners. All rights reserved).

ing»[16]. It is interesting to note that the setting up of the arms «of the Supreme Pontiffs on the door of the hall in the main staircase»[17] was an important event in the history of the city. It was also an important event within the site, to such an extent that all workers were paid an extra day's work as a tip (fig. 8).

The continuity of the staircase was emphasised by the moulding along the perimeter wall of the lower body, which bends in conjunction with pilasters with tripartite volutes, featuring naturalistic motifs such as leaves. On 8 May 1734, the «five false windows, two inscriptions, and false door in the main staircase»[18] were inserted along the wall of the monumental staircase. Two symmetrical openings placed specularly on each side interrupt the continuity of the wall on the landing with the loggia.

The first pair of false windows are blank and framed by a moulded round arch, surmounted by a cartouche with an inscription commemorating two important inquisitors, Antonio Ruffo[19] and Giacomo Caracciolo[20]. The other two pairs of false windows are framed by moulding and surmounted by a moulded oval (figg. 9-10).

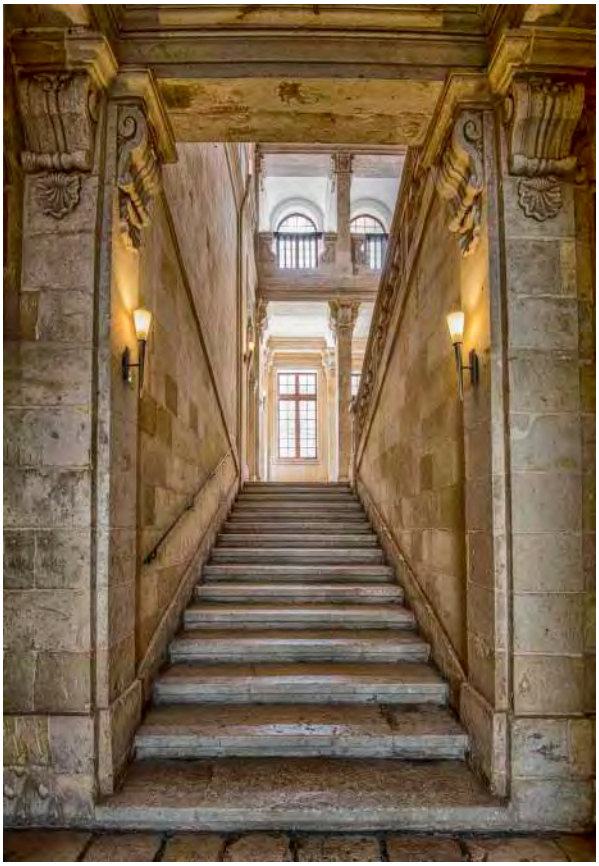
The loggia consists of two superimposed levels, both divided sym-

[16] AIM, Mem. 5, c. 359r.

[17] Ivi, c. 365r. 22th February 1734: «Regalo. Per l'ordine dell'Illustrissimo Reverendissimo Monsignor Inquisitore pagai a tutti li lavoratori della corrente settimana un giorno per ogn'uno nella conformità si pagano alla giornata, e questo per mancia, stantaché oggi furono poste l'armi dei sommi Pontefici su la porta della sala nella scala mag[gio]re. 8.6», that is: «Gift. By the order of the Most Illustrious Reverend Inquisitor, I paid all the workers of the current week one day for each one in accordance with the day's pay, and this for tip, since today the arms of the Supreme Pontiffs were placed on the door of the hall on the grand staircase. 8.6».

[18] AIM, Mem. 5, c. 372r.

[5.]



[6.]

Fig. 5. *The entrance of the grand staircase, Inquisitor's Palace, Birgu* (Heritage Malta, photo credit by Duncan Cauchi, 2022).

Fig. 6. *The landing loggia of the grand staircase, Inquisitor's Palace, Birgu* (Heritage Malta, photo credit by Duncan Cauchi, 2022).

metrically by a pillar. Its completion is recorded in 1734, with a request for no less than «275 loads of stones»[21] and «six *balate*»[22] (or cut stones) for the «upper pillars to support the two rooms on the gallery»[23]. Also requested were «four balls with their pedestals placed on the gallery stone corbels in the mentioned staircase»[24], which have now disappeared. The walls are articulated by pilasters and characterised by large windows, framed by moulded panels in the lower body, and by moulded arches in the upper body, completed on 8th May 1734 between the «200 large window glasses»[25] listed in the ledger.

The loggia's landing floor is of great value in terms of its shape and the materials used. The request was for «lakes of white pisto marble to be placed with lime on the loggia floor for shining»[26] with a final coat of boiled oil to make the floor more polished: «a quart of oil for the shining of its floor»[27] (fig. 11).

The passage overlooking the loggia with a very ingenious spatial solution was designed by Carapecchia to easily reach the Library via a secondary, smaller, square, well-shaped staircase or *scala a pozzo*, which starts on the ground floor and leads to the Auditor rooms (fig. 12). In the lower body of the grand staircase, at beginning of the smaller staircase, lintels made of monolithic stone blocks resting on stone corbels serve to reduce the space. Above the lintels, the roof slabs form a flat vault. Each type of slab was selected from

[19] Antonio Ruffo, Inquisitor in Malta from 1720 to 1728. See Russo 2017, p. 540; Bonnici 1998.
[20] Giacomo Caracciolo, Inquisitor in Malta from 1706 to 1710.
[21] AIM, Mem. 5, c. 362v.
[22] *Ibid.*
[23] *Ibid.*
[24] *Ibid.*
[25] AIM, Mem. 5, c. 372r.
[26] Ivi, c. 357r.
[27] *Ibid.*

Fig. 7. *The balausters of the grand staircase, Inquisitor's Palace, Birgu* (photo credit by Armando Antista, 2022).

[7.]

Fig. 8. *The upper body of the grand staircase surmounted by arms* (photo credit by the author, 2022).

[8.]

a specific quarry according to the kind of work required. The «balate di pietre»[28] is a term that was used in Sicilian building sites, revealing the connections in the Mediterranean area. The stone used for the roof slabs comes from the quarries of Santa Venera, a village in the centre of Malta. Here large blocks were available that were free of imperfections of any kind that would have compromised the resistance of the slabs subjected to heavy shear loads (figg. 13-14).

Stonework in modern Malta

The Maltese globigerina limestone, also known as globigerina limestone, was always used in the Hospitallers' buildings since their arrival on the island due to its great availability and ease of processing. The stone could be cut, polished, and sculpted into architectural elements that satisfied the most exacting requirements in terms of size, shape, finish and decorative details. Moreover, globigerina al-

[28] AIM, Mem. 5, c. 359r.

[9.]

[10.]

Figg. 9-10. *The false windows and the two symmetrical openings in the grand staircase* [photo by the author, 2022].

lowed any geometrical shape to be made. Joints between different elements could be fitted to perfection simply by filing the faces until they matched perfectly, so that there was no need to insert even a single thread between them[29]. However, the stone presented some problems of durability and resistance to atmospheric agents, including humidity[30]. Outside Malta, stones with similar characteristics to globigerina limestone can be found in Sicily and, more generally, in southern Italy or in Provence and North Africa.

Sicily and Malta were once part of a single geological block, which is why Maltese stone is similar to Sicilian stone and consists of tertiary limestone[31]. Other similarities in terms of characteristics, structure and geological age also exist with the Lecce stone of the Salento peninsula, although Maltese stone is a more intense yellow. The colour can vary from white to a soft yellow, with a medium-fine grain and sediments with little cement between them[32]. The extraction areas were located in south-central Malta and north-west Gozo[33]. Archival documents show that the main quarries in Malta were located at St Julian's and Santa Venera[34]. St Julian's is situated on the coast and the stones quarried there were most probably used for the convenience of transportation by boat. For this reason, this quarry was preferable to others[35]. Santa Venera is located in the centre of the island and the stones from its quarries were used because of their large size. Stones from Santa Venera had no imperfections which could decrease the strength of the ceiling slabs, which are subjected to strong structural pressure. The stones were transported on wagons in caravans from the "marina", i.e. the port area where boats arrived from the port of Messina and elsewhere. In 18th-Century construction, the cost indicated for transport was 12 large per load of stones[36].

It was thus indicated in the ledger how many «balate di pietre»[37] were to be transported. This term was already used in contemporary Sicilian construction to indicate the quantities of stones for paving. Moreover, the direct relationship between Sicily and Malta had already

[29] Renfrew 2004, p. 336. See also Baldassini Foresi Mazzei 2013.

[30] See Pedley 1978; Pedley Hughes Clarke Galea 2002.

[31] Riccobono 1999, p. 13.

[32] Baldassini Foresi Mazzei 2013, p. 122.

[33] Cassar Torpiano Zammit Micallef 2017, p. 224.

[34] Among the active construction sites, reference is made to the detailed account for the 18th-century transformation of the Inquisitor's palace in Mdina in AIM, Mem. 5. In the ledger of the Procurator Baldassarre Ciantar, the expenses of works in the years 1733-1734 by the architect Romano Carapecchia are mentioned.

[11.]

begun in the Middle Ages with the Norman conquest and had consolidated over time, since the Maltese archipelago had become part of the *Regnum Siciliae* in a series of successive stages, up to the donation by Emperor Charles V to the knights as a perpetual fiefdom. The most widespread building technique in Malta made use of an outer masonry shell set with ashlars and filled internally with raw material[38]. In buildings between the 16th and 17th century a minimum amount of binder was used with ashlars. Layers of ground stone were often interspersed with ashlars to ease sliding during construction[39]. To return to Carapecchia's grand staircase, the wide space in which the staircase is closed by a lowered pavilion-headed vault where the central decoration was inserted. The construction technique used for the vault probably consisted in wooden ribs and reeds and a layer of lime and plaster. This technology was mainly used in Malta on the upper floors of buildings, due to its lightness, and was widespread from the second half of the 17th century onwards. It was probably used again extensively after the 1693 earthquake, which in Malta as in Sicily evidenced the need for lightweight roofing. The intrados of the vault is formed by slabs resting on perimeter walls, as was often the case in Maltese construction of the period (fig. 15). News of the roofing comes in May 1734, when the painter Giovanni

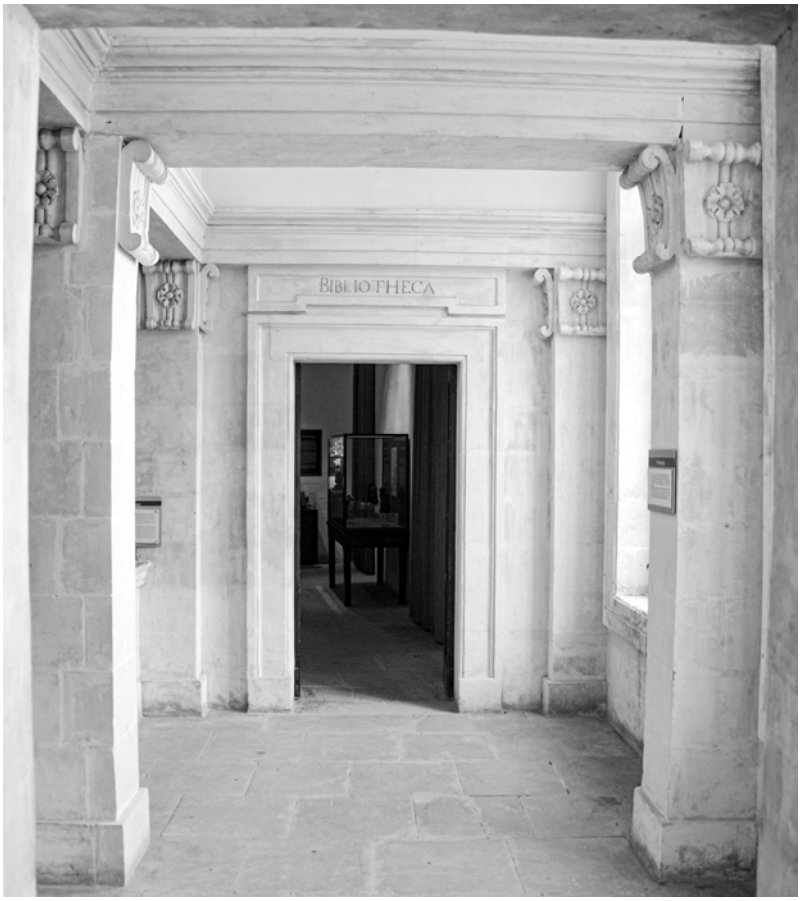
[35] ASCM, m. 126, fasc. 2507, 1, 30, c. 1r: «[...] In Malta la calce ordinaria si fa con pietre cavate alla costa del mare, vicino à il Giuliano, ancorché non siano della qualità più dura, che si potrebbe trovare nell'isola, mà la commodità del suo trasporto con barche gli fà avere la preferenza ad altra», that is «In Malta, ordinary lime is produced from stones quarried off the coast of the sea near the Julian, even if they are not of the hardest quality that could be found on the island. But the convenience of transporting it by boat makes it preferable to others».

[36] AIM, Mem. 5, c. 357v.

[37] Ivi, c. 359r.

[38] N. Marconi 2011, p. 110.

[39] Hughes 1953, pp. 195-199.



[12.]

Figg. 11-12. *The passage overlooking the loggia and the access to the Library* [photo by the author, 2022].

Antonio was paid for «having given the plaster [...] and made the arms of the Holy Office»[40]. In the registers account, there is also a request for the provision of «crew cloth»[41] for the decoration of the vault, sewn by master Lorenzo Borg[42], to be supplied together with «10 best tin nails to nail the said cloth to the ceiling»[43].
Recycled wooden materials, including ladders, beams, and scaffolding poles, were used for the installation of elements at the top of the vault, or for the painting of the frescoes. As in other construction projects, these elements were often loans for use by the Order, as a form of circular use among the island's construction sites. This is the case of «two ladders from Siggiahui»[44] i.e. brought from the Inquisitor's summer palace in Girgenti, for the painter's inspection of the frescoes, or again a «portable ladder for the lantern with four large window glasses, and its irons placed in the main staircase»[45] for the installation of a lamp to illuminate the room.

Carapecchia's project: influences from the Roman tradition

The Speech of Knight Fontana, also known as Discorso del *Cavalier Fontana*[46], was certainly known by Carapecchia. Here, the importance of space in the palace is emphasised with by the presence of the loggia:

[40] AIM, Mem. 5, c. 372r.
[41] Ivi, c. 368r.
[42] Ivi, c. 369r.
[43] *Ibid.*
[44] Ivi, c. 358r. About the Inquisitor Visconti (1624-1627) see Russo, p. 538.
[45] AIM, Mem. 5, c. 354.
[46] Fontana 1694.

[13.]

Figg. 13-14. *Constructive details with the lintels made of monolithic stone blocks* [photo by Armando Antista, 2022].

«in quelle straordinarie altezze del primo, e secondo piano saranno disposti mezzanini, e stanze di sufficiente altezza, in modo, che la Fabrica da aggiungersi havrà sei piani con il terreno, e trè piani di Logge maestre corrispondenti alli piani del Palazzo», that is «in those extraordinary heights of the first and second floors, mezzanines and rooms of sufficient height will be arranged, so that the building to be added will have six floors with the ground, and three floors of main loggias corresponding to the floors of the Palace»[47].

The grand staircase built by Carapecchia in the Maltese palace reveals the Roman training of the architect, who was a pupil of Carlo Fontana[48]. The simple scheme of two parallel ramps inserted in a single full-height space is, moreover, one of the most widely used staircase types in 17th- and 18th-century architecture. This typology of staircase presents no particular technical issues since it consists of two parallel flights enclosed within a solid wall envelope. The only issue is lighting up the staircase, which is solved by the windows overlooking the courtyard and connecting the internal and the external space. There is no lack of precedents for two-light loggias with two sources of light connected to the landing, separated by a pillar with four capitals on each of its four faces. One of the first prototype could be identified in the Farnese Palace, with the hanging *antiquarium* to illuminate the room[49], as well as in the Roman palazzo dei Conservatori[50], and among many other later developments. Even if the project for the Tolomei College in Siena by Carlo Fontana never took place, it had great resonance in the Roman academic

[47] Ivi, p. 11.
[48] Fagiolo 2014.
[49] Please refer to Claudia Conforti's introduction in this volume.
[50] Antonucci 2016.

[14.]

circles and had a significant influence on the different architectural forms and styles. Probably supported by a group of scholars who also assisted him during the inspections in Siena, Fontana produced a plan for the Collegio composed of five project plans, now preserved at the British Library in London. Three drawings focus on the floors and the façade, and one depicts a cross-section of the staircase. The two flights of stairs on the outer edge of the courtyard, connecting them with the gardens in front, can be clearly identified[51].

The same prototype proposed by Carlo Fontana was often used in the Academicians' plans: in the first-class academic competition of 1681, the architect Filippo Barigioni[52] proposed a symmetrical double staircase with two parallel flights and loggias divided by the central pillar. It is relevant that Carapecchia participated and won the first prize in the same competition for the category of second class. The impression is that the architect disassembled the model by reversing the loggia, placing it on the opposite side of the landing and multiplying it over two superimposed levels, in order to obtain a source of light from the wall that would otherwise have been blind due to the need to create a new passage.

The archiepiscopal palace in Ferrara designed by the Roman architect Tommaso Mattei[53] is interesting because of its link with Cardinal Tommaso Ruffo, inquisitor in Malta from 1694 to 1698 and later bishop of Ferrara (from 1735 to 1738), who also commissioned the Inquisitor Palace in Birgu[54]. It is pointed out that Mattei and Carapec-

[51] Mussari 2016.

[52] Roma, Archivio Storico dell'Accademia di San Luca, nn. 41-42. Reference to Marconi Cipriani Valeriani 1981, p. 168. On the 1681 competition see also Smith 1993, pp. 133-140; 289-290 and about the figure of Barigioni see Santese 1983.

[53] Ticconi 2017.

[54] The family of Ruffo di Calabria, who commissioned the building in Ferrara, was also a visible presence in the Order of the Knights of Malta.

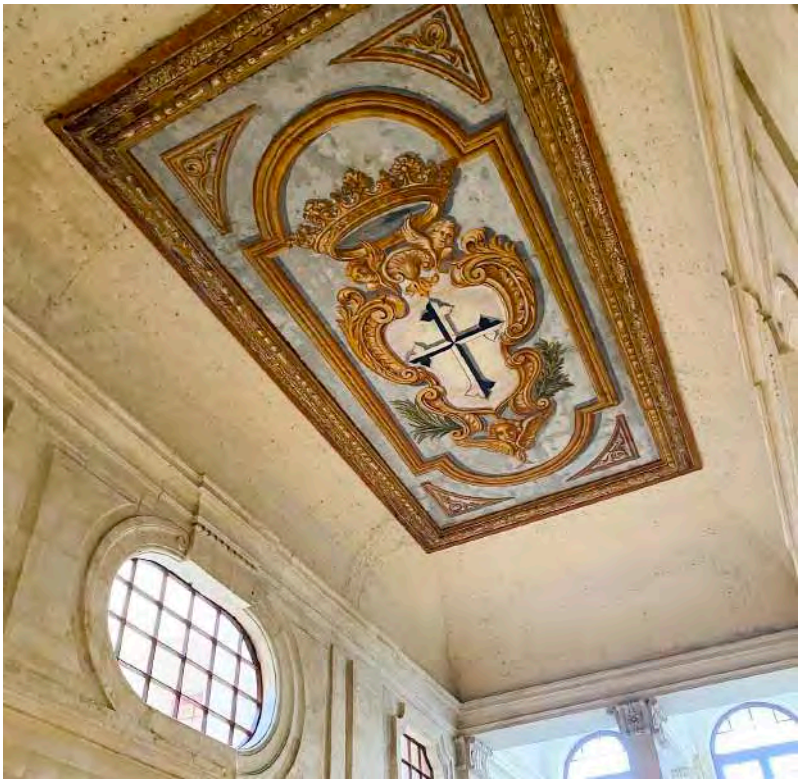


Fig. 15. *The lowered pavilion-headed vault with the central decoration* [photo by the author, 2022].

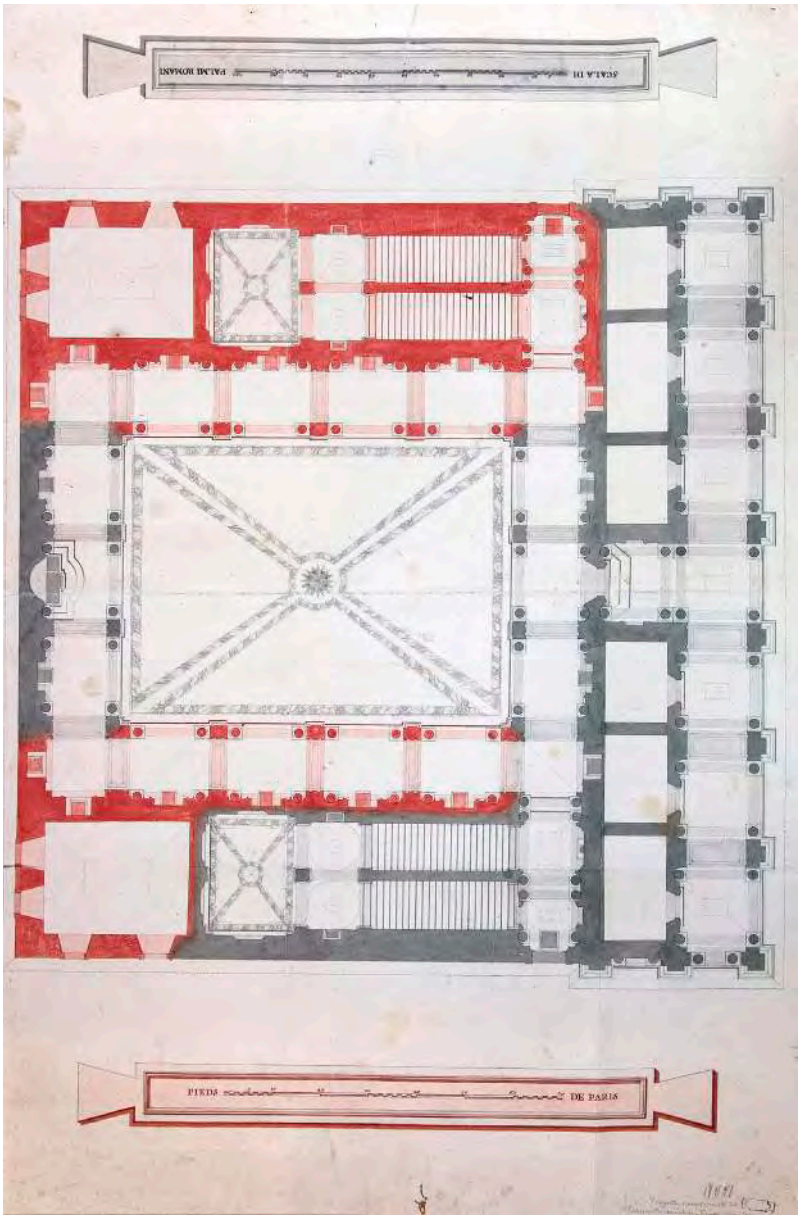
[15.]

chia were pupils of Carlo Fontana (especially the latter) and almost contemporaries. Cardinal Ruffo, using a large amount of financial resources, changed the structure of the palace. With this project, he substantially changed the urban layout of this significant part of Birgu characterising it with the prolonged symmetry and monumentality of the building. It is evident how the project lies its roots in the Roman tradition also mirrored in the architect's training: Carapecchia designed the great staircase with a spectacular spatial organization typical of this tradition. The plastic and painting decoration is intertwined with the staircase. It becomes an essential component and the link with the scenographic experiments conducted in the central Italy area and also at a European level at that time is evident[55].

The project of a grand staircase with a scenic organisation was used several times by Carlo Fontana's scholars: for example, Filippo Juvarra adopted it in his project for Messina[56] and the same typology can be found in Ferdinando Fuga's[57] extension project[58] for the palazzo dei Conservatori in Rome[59]. The watercoloured pen-and-ink plan drawing, dates 18th-19th-century, is part of the Lanciani Collection[60] (fig. 16): it shows, in red ink, Fuga's extension of the Campidoglio's building with the creation of a solemn space due to the presence of the grand staircase. The open-cased staircase type with two parallel, straight flights is clearly visible but also includes a wall partition dividing the space and lit by a finely decorated and vaulted landing.

The arrangement of the loggia with the staircase in a closed system is typical of scenic and theatrical spaces. Doubtlessly, Carapec-

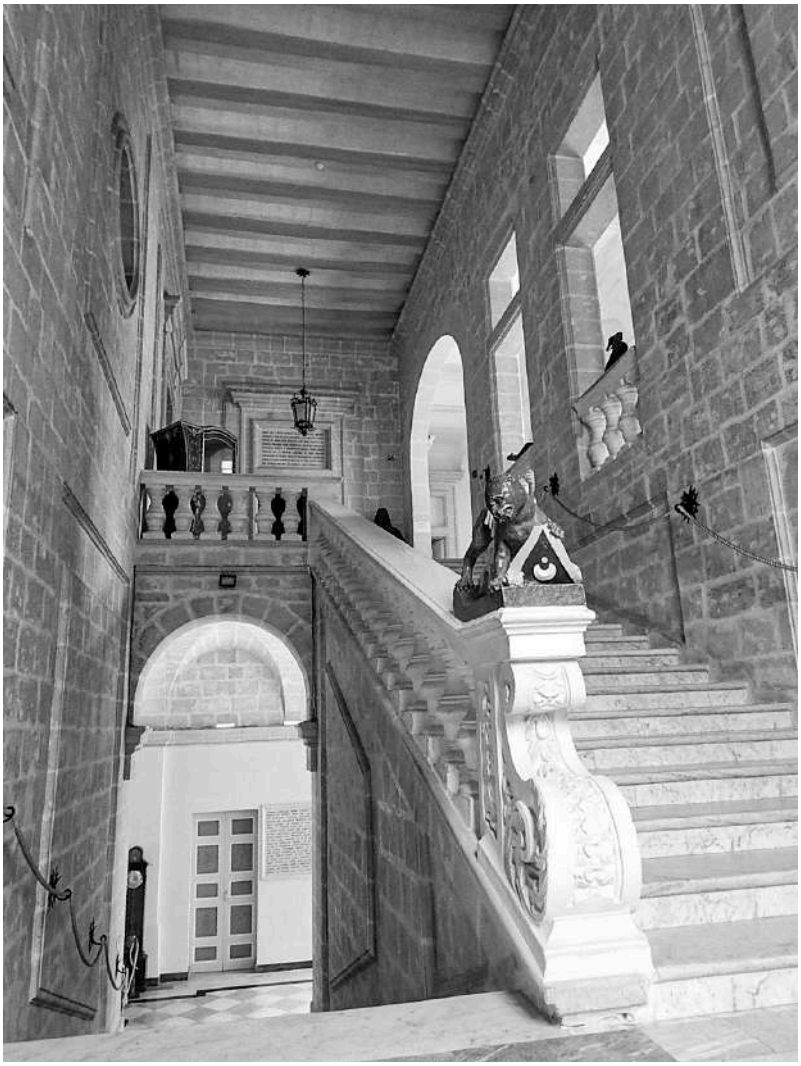
[55] Caglioti 2018.
[56] Caterino 2016.
[57] Gabburri 1739.
[58] Roma, Biblioteca di archeologia e storia dell'arte, *Collezione Rodolfo Lanciani*, inv. 17551 and Roma XI.6.V.4.
[59] Benedetti 2001. See also Pasquali 2000.
[60] Benincampi 2019.



[16.] Fig. 16. *Watercoloured pen-and-ink plan drawing in the Lanciani Collection, 18th-19th century* (Roma, Biblioteca di archeologia e storia dell'arte, *Collezione Rodolfo Lanciani*, inv. 17551 and Roma XI.6.V.4).

chia was a profound *connoisseur* of theatrical scenography due to his Roman apprenticeship, which led him to write the manuscript *Practice of the Machines of Theatres* (*Pratica delle machine de' teatri*)[61]. Due to his ability, he was also charged with designing the prestigious Manoel Theatre in Valletta for Grand Master de Vilhena in 1731[62]. His skill for theatrical scenes is also evident in the grand staircase for the Inquisitor Palace: here, the desired effect of light and dark to understand the complexity of the geometric volumes is emphasized by the light-dark effect, reproduced with the different use of limestone. The ledger reported: «niro fumo dato con la calce nella scala mag[io]re per il chiaro, ed oscuro dalle mura»[63], that

[61] Carapecchia 1689 is preserved today to the Courtauld Institute of Art, London.
[62] Lenzi Bentini 2000. See Tamburini Carini Motta 1994.
[63] AIM, Mem. 5, c. 372v.



Figg 17-18. *The grand staircase in the Bishop's palace, Mdina* [photo by the author, 2022].

[17.]

is, smoky lime black on the grand staircase to be used to make the walls appear darker. Carapecchia's ability to use perspective can be placed within a broader international context, where the works of "quadrature", that is the geometric perspective used in frescos by the family of painters Galli Bibiena, were well-known in Europe. The attempt to combine architecture and painting, based on the specific experience of scenographic art, was first undertaken with Ferdinando Bibiena's *Architettura Civile*, published in Parma in 1711[64].

Echo of Carapecchia's project in Malta

Carapecchia's project must have generated a great interest. In the same years in which the grand staircase for the Inquisitor Palace was built, another staircase was erected in Mdina in the Bishop's palace. The Mdina grand staircase is one of the great masterpieces built in stone and it could be compared with the monumental *sca-*

[64] Oechslin 1995. See also Matteucci 2000.
[65] Tabarrini 2014a; Tabarrini 2014b.

[18.]

le regie of the 18th-century Roman palaces[65]. Also here, the grand staircase leads to the noble floor, and it is inserted in the Vestments Hall, a huge and important space decorated with a painted frieze. On the left side of the noble floor, there is the octagonal chapel. From its lateral exit, it leads to the first of the three huge rooms. This space has been transformed into galleries and it was used to expose paintings and other work of art. The grand staircase, like at the Inquisitor Palace, has a simple structure with an open case, and two parallel ramps. Here, there is not a wall do divide the two flights, which conducts to the intermediate landing. The two flights of stairs are connected by an intermediate landing, but what differentiates it from the grand staircase of the Inquisitor's palace is the side opening with a large loggia on the top landing from which the grand staircase gets light. The upper part of the staircase leads to the noble floor, where the ceremonial rooms are located (figg. 17-18). This staircase, however, did not have the same scenographic effects and monumentality conferred by the double loggia in Carapecchia's project. In the Bishop Palace, the architect's name does not appear in the payments, but the literature usually attributes its authorship to the Maltese Andrea Belli or Giovanni Barbara. A hypothesis could be that the staircase in the Bishop's Palace may have been influenced by the Carapecchia project for the Inquisitor Palace. This idea is supported by material evidence and by the fact that both were Church commissions, even if the relations between the Bishop and the Inquisitor in Malta were never relaxed.

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Abstracts

Ilaria Papa

Per scala commodas: *systems of bell towers staircases on the shores of lake Orta (11th and 12th centuries)*

This contribution investigates the architecture and the technical solutions used for the construction of the bell towers between 11th and 12th century in the Cusio area (Piedmont, Italy), with particular reference to staircase system. In the period studied, an important transition seems to occur from 'light' to more complex wooden systems, made in masonry and *intra muros*. This corresponds to a fine-tuning of construction skills and techniques. Given the paucity of documentary sources related to the Middle Ages, the investigation of the construction systems of staircases usefully contribute to identifying the as yet uncertain chronologies of some bell towers.

Keywords
Cusio Region; bell towers; stairs; medieval age; construction techniques

Silvia Beltramo

Construction systems in Cistercian monasteries: technical construction expertise in staircases (12th-13th centuries)

The religious heritage of Cistercian monasteries between 12th and 13th centuries preserves significant examples of technical solutions and constructive systems connecting the space inside and outside the monastery and between the church and the other places. This connection is realised through articulated systems of staircases. Day and night staircases allowed access to the church and cloister from the monks and the *conversi* dormitories. Another well-defined network of vertical connections allowed access to the attic space, a composite system of passageways for workers and materials, as well as for maintenance of the building. The research focuses on the solutions adopted in Cistercian monasteries in Piedmont and Lombardy (Morimondo, Chiaravalle Milanese and Cerreto, Rivalta Scrivia, Casanova and Staffarda), investigating construction techniques and architectural details.

Keywords
Cistercian monasteries; medieval architecture; staircases; construction techniques

Rinaldo D'Alessandro

***Medieval construction techniques of spiral staircases: cast vaulted staircases, self-supporting steps, and* vis de Saint-Gilles**

This paper analyses the constructive history of spiral staircases. The structures are classified into three different main categories: stairs carried by vaults, self-supporting steps, and *vis de Saint-Gilles*. Several staircases are studied for each typology in terms of their technology, their differences, advantages, and disadvantages. This paper adds to the literature on dating buildings through the stairs. Some examples analysed in this paper are the case studies of Cosenza's cathedral and Castel Maniace in Siracusa.

Keywords
Spiral staircase; vis de Saint-Gilles; stereotomy; construction history; medieval architecture

Emanuela Garofalo

The square* caracol *staircase in Sicily (16th Century)

Square spiral staircases appear in Sicily during the 16th century in different contexts and for different purposes. This contribution focuses on two case studies at the "opposite poles" of a casuistry that shares the common characteristics of suspended ramps revolving within a square masonry box around a central void. By analysing these cases we find a probable link with models from Spain. At the same time, they demonstrate a common descent from a constructive culture rooted in the Spanish and Mediterranean stereotomic experience of the early modern age.

Keywords
Square spiral staircase; stereotomy; Sicily; 16th century

Edoardo Piccoli

Cantilevered staircases in 17th-18th c. Piedmont

The text deals with the construction of cantilevered staircases in Early modern Piedmont. First, some seventeenth- and eighteenth-century structures of particular interest are identified. Guarini's elliptical staircases in Palazzo Carignano seem to play a relevant role in the introduction of this kind of staircase in high-ranking buildings, while Piacenza's 1788 Venaria staircase provides a "closure", before the innovations of the 19th century.
We then proceed to examine some recurring constructive features. A link is proposed between the staircase with monolithic stone steps ("a tutt'alzata") in use in Piedmont, and the Palladian and English ones, emphasizing the difference with the stereotomic French models instead. The essay continues with an analysis of the characteristics of the local stone material, the "serizzo", and with the study of some construction details, including the need to provide mural continuity when the staircase intersects the windows of the building.

Keywords
Cantilevered staircase; stereotomy; elliptical staircases; Guarino Guarini

Alberto Grimoldi, Angelo Giuseppe Landi

From "scaloncino" to "scalone". The suspended staircase su volta in palazzo Fraganeschi in Cremona between the 18th and 20th centuries

Palazzo Fraganeschi in Cremona is a fragment of an ambitious construction program of the late Seventeenth century, that was soon abandoned. As a result of its transformation into a professional school between 1919-26, only a very modified wing survives of the noble residence. The staircase suspended in a vault in reinforced concrete appears involuntarily mimetic, and perhaps aims to recall the earlier and smaller brickwork staircase that was probably also in a vault.

Keywords
Palazzo Fraganeschi; suspended staircase; construction history; reinforced concrete

Cesare Tocci

Structural function and architectural representation of two staircases by Alessandro Antonelli

This paper discusses the structural behaviour of two remarkable spiral staircases housed in the Mole of Turin and San Gaudenzio in Novara. In these two staircases Antonelli proposes a sort of condensation of the geometrical staircase type in perfect coherence with his whole constructional system that constantly translates the structural function into architectural representation. The analysis extends the interpretation of geometrical stairs proposed by Heyman introducing the potentially bilateral nature of the contact constraints between individual treads, which represents the most characterising and innovative aspect of Antonelli's solution.

Keywords
Mole Antonelliana; San Gaudenzio; geometrical stairs; unilateral constraints; rigid body mechanics

Maurizio Gomez Serito, Edoardo Piccoli, Giulio Ventura

The marble slab cantilevered staircase in Turin during the early 20th century

The essay provides some historical coordinates for the study of a type of cantilevered staircase that has only rarely been mentioned in the literature: the cantilevered staircase made of thin marble slabs, developed and widely used in Turin and Northern Italy from the late 19th century through the 1950s. The paper proposes a chronology of use and the reasons behind the short-lasting success of these staircases. Two case studies are examined in depth, one involving an experience of repair of such a staircase, casting light on its static behavior, and on the marble chosen for these peculiar assemblages. The problems arising from the unavoidable brittleness of the slabs are also discussed, with reference to accidents and repairs that occurred since the early days of use of this kind of stair.

Keywords
Cantilevered staircase; marble slab; 20th century; conservation

Sergio Bettini

Decorum and the need for light: composing façades and illuminating grand staircases in the Renaissance

This paper deals with the composition relationship between grand staircases and façades in Renaissance buildings. The openings for illuminating the staircases conditioned their design, as they could not be positioned along the sides of the inclined ramps and tended to be located at the landings. This generated dissonant misalignments in the composition of the façades. Architects addressed to the problem by placing the landings on the sides, rather than on the sides of the façade in an attempt to conceal the openings. The essay investigates cases in which the stairs are concealed and gradually declared in the façades of buildings in the Ducal Palace of Urbino, the Riario and Farnese palaces in Rome, the Legato and Magnani palaces in Bologna, the Scuole Grandi in Venice, the Villa Giustiniani Cambiaso in Genoa and Collegio Borromeo in Pavia.

Keywords
Decorum; light; staircases; Italian Renaissance architecture

Federico Bulfone Gransinigh

«Una schalla [...] fatta chon gran spesa». ***The staircase of the castle of Udine designed by Giovanni da Udine: materials, techniques and construction practice***

In 1547 Giovanni da Udine received the assignment for the construction of the staircase of Udine Castle. After collaborating with Raffaello, Giovanni imported forms and types of the Roman area to Friuli. This paper analyses Giovanni da Udine's project and focuses on the architectural references, construction types and materials used. The second part of the paper analyses 20th century restorations, revealing how much remains of the original 16th century building. The unpublished work by the architect Giovanni Battista Comencini allow important insights into the restoration methods implemented and the materials used.

Keywords
Giovanni da Udine; Giovanni Battista Comencini; castle of Udine; ashlar; stone processing

Marisa Tabarrini

The square staircase "alla moderna" of palazzo Barberini in Rome and its European context

This paper provides an overview of the European context in which the 17th-century square staircase of palazzo Barberini was conceived. It reviews contemporary treatises and significant cases that confirm the extent of the exchanges between France, the Spanish dominions and Italy at the turn of the century. Particular emphasis is made on the influence of different construction and design traditions beyond the formal translation of the model of the square staircase with open shaft.

Keywords
Rome; palazzo Barberini; square staircase; European context

Maria Concepcion López González, Roberta Spallone, Marco Vitali

The grand staircase in civil architecture in Baroque Turin. The case of palazzo Birago di Borgaro (Turin)

The grand staircase assumes a central role in the baroque palace, as treatises and manuals of the period testify. The grand staircase of the palazzo Birago di Borgaro is a significant case in Baroque Turin. This study compares data obtained from the digital survey of architectural literature to retrace the ideation process behind the construction techniques, using digital modelling.

Keywords
Grand staircase; architectural treatise; digital survey; digital modelling; digital fabrication

Armando Antista

Building stone staircases in Malta during the modern age. The case of the "Bibliotheca" in La Valletta

The staircase of the "Bibliotheca" of the Order of Saint John in Valletta is one of the most important examples of early 17th century stereotomy in Malta. It is the monumental epilogue of a long series characterised by the need to adapt international models to the specificity of the local construction community, i.e. stereotomy. Before analysing its constructive aspects, the most significant local precedents are retraced to identify local models and consolidated practices.

Keywords
Caramuel; *arquitectura oblicua*; Order of St. John; Malta; Ittar

Valentina Burgassi

The Inquisition Palace staircase in Birgu by Carapecchia (18th century): architecture and construction under the Order of St. John of Jerusalem

Carapecchia's 18th-century project for the grand staircase of the Inquisitor's palace in Birgu belongs to a long construction tradition based on the use of carved stone. During the Order of St. John of Jerusalem's rule, works of exceptional value are documented in the staircase construction sector, such as the imperial staircases in the Grand Master Hugues Loubenx de Verdalle's palace, extensively studied by the scientific literature. This contribution aims to analyse the construction history of the Inquisitor's 18th-century staircase by looking on one side to the long-standing stereotomy tradition of the use of stone in Malta and on the other side, to the application of Carapecchia's theoretical knowledge to this particular construction site.

Keywords
Grand staircase; Carapecchia; Order of St. John; cut stone; Malta

Stefano Piazza, Gaia Nuccio

Monumental staircase, columns; static, Butera palace, Palermo

This paper focuses on the 18th-century Sicilian red marble staircase in the palace of the princes of Butera in the Kalsa district of Palermo. It consists in an in-depth study of the construction phases of palazzo Butera, a survey with a laser scanner and the construction of a 3D model of the staircase. This investigation brings to light the remarkable boldness of the staircase in palazzo Butera, which is compared to staircase in Genoese buildings.

Keywords
Monumental staircase; columns; static; Butera palace; Palermo

Alessandro Spila

The two triangular staircases in palazzo Barberini. Typology, construction and hybridisation from the Pantheon to Baroque palaces

The two triangular staircases in the intermediate block of the Pantheon constituted a famous model: the subject of representations, studies, and re-propositions especially in the Renaissance. Perhaps their most famous derivation was the design of the staircase around the circular courtyard of villa Madama in Rome. This paper focuses on a particular declination of such a characteristic antique example at the beginning of the Baroque period: the pair of triangular staircases connected to the Sala Ovale of palazzo Barberini in Rome. A solution of composition that seems – again – a reference to the prototype of the Hadrian's Rotunda. The construction systems are analysed especially in comparison with earlier examples, also derived from antiquity.

Keywords
Palazzo Barberini; Pantheon; treaties; Borromini; triangular staircase

Marica Forni

From discussion to construction: the Borgovico Rotunda staircase through models, design and construction

The architecture of the Borgovico Rotunda takes shape as a new way of living within a dialogue between the client, Eleonora Doria Villani, her closest entourage and the architects she turns to.
Whether it comes from the pages of a well-known repertoire of French architecture or from the marquise's own memoirs, the model of the staircase, remedies issues due to the absence of a unitary project. The stairway appears brilliantly deceiving if we look at the materials, the masonry and vaulting techniques. Moving from paper to built architecture, the final construction seems distant from the original project. The final result is a cutback of the construction for reasons of economy and traditional practices.

Keywords
Borgovico Rotunda; Eleonora Doria Villani; eclectic architecture; models

Paolo Cornaglia

Three architects, one King and a staircase. Quarrels about form and structure concerning the new staircase at the castle of Moncalieri (1816-1820)

After the defeat of Napoleon, King Vittorio Emanuele I chose the castle of Moncalieri as one of the symbolic places of the Restoration. The staircase needed to be rebuilt: the project by the architect Giuseppe Battista Piacenza, who died in 1818, was not implemented. The sovereign entrusted his ideas to Piacenza's son Gioello, who made four proposals. Carlo Randoni, who succeeded Piacenza, criticised them from a structural point of view: masonry, wood or iron, were unsafe solutions.

Keywords
Staircase; castle of Moncalieri; Carlo Randoni; Giuseppe Battista Piacenza; royal residences of the House of Savoy

Carla Bartolozzi, Francesco Novelli

The church of St. Eusebio in Camagna Monferrato: the ascent to the cupola and Crescentino Caselli's lanternino

Since the early 1880s, the architect Crescentino Caselli was involved in the expansion project of the church of St. Eusebio in Camagna Monferrato and the construction of the new dome. The construction faced economic difficulties that led to the modifications of some aspects of the initial project, both from a formal and technical constructive point of view. In the same years (1883-1890) Caselli was engaged in the construction of the large complex of the Hospice of Charity (1881-1887) in Turin. Here we propose an analysis of the stairways to the cupola, an integral part of Caselli's design inspired on the parish church of Camagna.

Keywords
Restoration; Crescentino Caselli; staircase; religious architectural heritage; valorisation

Rossella Maspoli

The evolution of vertical distribution and reinforced concrete in factories of the early 20th century

The innovation of reinforced concrete spread in industrial constructions of the early 1900s, as a functional response and as a representation of innovation, due to the dimensional exceptionality and seriality of the new construction types. The vertical and horizontal distribution evolves in relation to the Fordist rationalization of production processes, defining an inventory of shapes that would characterize the century, from technical stairs to vehicle ramps and freight elevators.

Keywords
Automotive heritage; reinforced concrete; technological innovation; stairs

Gentucca Canella, Tanja Marzi

Reaching "the blue of the sky" in monumental architectures by the protagonists of Italian 20th-century architecture

This paper investigates the topic of memorial monument in architecture, mainly considered in its connections between construction, structure and technical-functional layout, and also in its intent of "ascent", suspended and celebratory. Through some emblematic cases of Italian 20th-century architecture, the paper highlights how the constructive consistency and the logic of the technique developed alongside the ideological intention of political and moral "redemption", expressed through the plastic tension and the figurative nature of the work. The central role of the ascending element is analysed in some of the main monumental architectures, including works by Gardella, Rossi, and Gabetti and Isola, with a special focus on the Competition for the Monument to the Resistance movement held in Cuneo in 1962-63.

Keywords
Monument-memorial in architecture; stairs and risings; Italian 20th-century architecture; monument to the Resistance in Cuneo; construction technologies

Valentina Florio

The ascent to the Octagon of Simon Magus in St. Peter's Basilica: from Michelangelo's spiral staircase to the elevator of the 2000s

We propose here a study of the 1960s elevator inside the *Scala di Santa Marta* in St. Peter's Basilica. The lift is an indispensable connection to both the top level of the dome and the General Historical Archive of the *Fabbrica di San Pietro*. Documents from the Archive allow us to retrace the well-known events of the construction of the 16th-century spiral staircase, the so-called "lumaca". The documents also illustrate the installation of the first elevator in the 1960s, are hitherto to unexplored project. With the support of construction site reports, this study offers new insights into the issues of plant adaptation and improvement, and of respect of the historical-artistic significance of buildings.

Keywords
Spiral staircase; Saint Peter's Basilica; elevator; technological adaptation

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Il *Construction History Group* (CHG) è un Centro interdisciplinare di Ricerca del Politecnico di Torino (Dipartimento di Architettura e Design) ed accoglie studiosi e ricercatori dell'ateneo torinese che abbiano svolto o stiano svolgendo ricerche sul tema della Storia della Costruzione di età moderna e contemporanea, in ambito architettonico ed ingegneristico.
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