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SUNLIGHT IN SAN CARLO

The original natural light in San Carlo alle Quattro Fontane (Francesco Borromini, Rome, begun 1634) was revealed following the restoration of the church in 1990s, which disencumbered the giant north window in the middle of the façade. Suddenly, the layering of light in the church became apparent: from the windowless lower zone, to the middle stratum of directional light, to the brilliance of the dome. Also revealed were a broken pediment, a gilded balustrade, and a camera di luce, all activated to the worshipful experience of the church. Moreover, the light entering the façade window made sense of the fictive lighting in the since replaced side altarpieces. With the original brightness of the church recaptured, the conspicuous dimness of San Carlo's two subsidiary chapels can be understood, as if they were caught at the edges of the church's pyramid of light. This paper will argue that light, as much as plan and decoration, unites San Carlo's interior.

Introduction

This paper explores the significance of daylight in Francesco Borromini's San Carlo alle Quattro Fontane, the church erected after 1634 for the Roman branch of the order of Spanish Discalced Trinitarians. The original light in San Carlo only became apparent to modern observers in the wake of the 1996-2000 restoration, when the 1855 projecting organ stall and the 1909 metal pipe organ were removed, thereby unblocking the giant north window (here called the *fenestron*) above the door.¹ (Figure 1) Suddenly the lower zone of the church was brightened. It was more coherent too, for the light through the *fenestron* is integrated with the San Carlo's spatial and pictorial program.



FIGURE 1 San Carlo, retro façade with *fenestron* and partially destroyed oval fresco, uncovered after removal of organ stall. Source: Wikimedia Commons.

The paper derives from a project on the geometry of San Carlo, in which questions originating out of a study of the ground plan were answered by considering the elevation and painted decoration of the church as a whole.² In addition, this approach follows recent research by Sergio Bettini and others on the role of light as a component of design in classical architecture.³ The issue of light is formal and symbolic, relevant to San Carlo's function as a place of worship. At this stage, the paper's method is deliberate and descriptive, for the simple reason that this is new material, about which one must be clear. San Carlo's importance is normally defined in terms of its innovative spatial geometry, the standard for the Roman Baroque that followed. The partly hidden operation of San Carlo's *fenestron*, however, suggests Borromini's engagement with contemporary attempts at indirect lighting near altars, such as Bernini's 1625 remodelling of Santa Bibiana, as well as providing a model for the exceedingly complex effects in the work of Antonio Gherardi (1638-1702) later in the century.⁴ With that in mind, the larger proposition of the paper is that the historical significance of San Carlo should extend beyond planning to include the means and expressive effects of its interior lighting by the sun.

The Windows

The *fenestron* is one of six direct lights in San Carlo. The topmost and largest is the lantern, comprised of eight windows inserted in a floorless *tempietto*. (Figure 2) In the *L'idea dell'architettura universale* of 1615, Vincenzo Scamozzi discussed this type of light as the second of six species of natural lighting, consisting of "bright perpendicular light" that entered a building via an opening in the ceiling, in the manner of the Pantheon.⁵ Strictly speaking, San Carlo's lantern is Scamozzi's third species, namely "bright horizontal light"⁶, but perspectival diminution (the lantern is 33 palmi, c.7.5 metres, tall) and the return angle of the white-stuccoed cornice create the impression that the blue lantern ceiling is suspended in a downward facing ring of direct light. (Figure 3) The resplendent Holy Ghost thus appears on a fragment of sky, as if the dove had burnt through the empyrean into the dome of the world.

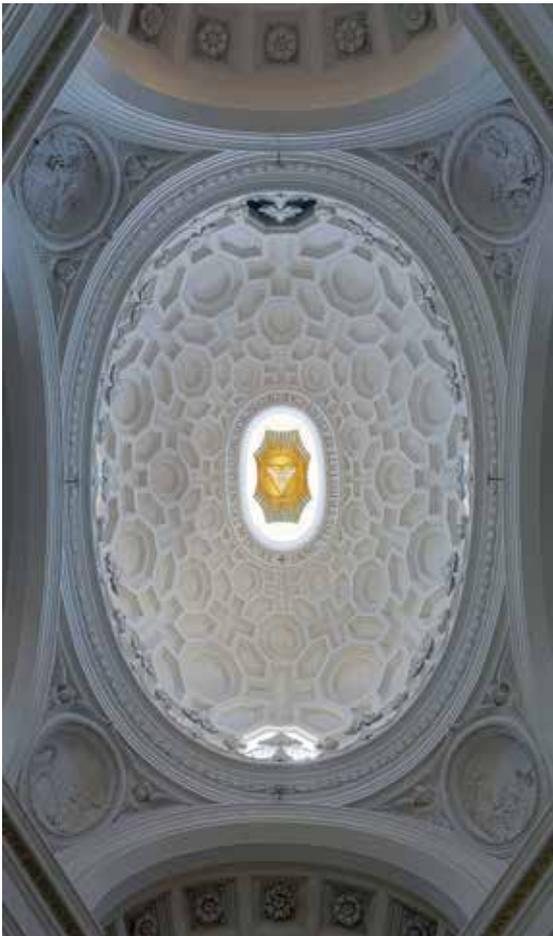


FIGURE 2 San Carlo, Dome. Source: Wikimedia Commons.



FIGURE 3 San Carlo, Lantern. Source: Wikimedia Commons.

The next four windows are 'bright horizontal lights' provided by octagonal openings at the base of the dome.⁷ The one on the north became a source of weaker, indirect light when the façade was heightened after Borromini's death in 1667 and likely against his intentions, creating a top-lit cavity between façade and dome drum, visible in Francesco Bufalini's 1683 cross-section, until it was closed around 1690.⁸ (Figure 4) These horizontal lights uniformly modulate the coffering of the dome, which is separated from the comparative shadow of the pendentive zone underneath by the crown motif rising free of the dome cornice, which partly checks the passage of light to the lower zones. The total effect is that of a bright dome supporting a brilliant lantern.



FIGURE 4 Francesco Bufalini, San Carlo cross section. Published in Giovanni Jacopo de Rossi, *Insignium Romae Templorum Prospectus*, Rome, 1683.

The final direct horizontal light is that of the *fenestrone*. (Figure 1) Normally a church of San Carlo's size would require no more than lantern and dome apertures - such as Borromini's later Sant Ivo della Sapienza, which has no windows underneath the dome. But San Carlo has a cruciform plan, with the niches seeming to be apses at the ends of coffered vaults; it therefore has pendentive zone, which lifts the dome higher above the floor than a church where the dome sits directly on round walls. This was also the case in Pietro da Cortona's Greek-cross church of SS Luca e Martina, likewise begun in 1634, which has windows in the apse niches to brighten each barrel vaulted arm, with the centre space lit by the windows of the dome and lantern above. In reality, San Carlo is cross-armed in name only, and the role of its single apse window is to light the nave as a whole, as if it were a basilica of the sort built in late sixteenth-century Rome, such as the Gesù, Santa Maria in Vallicella, Sant'Andrea delle Valle, and so on.

What makes the *fenestrone* of San Carlo distinctive is that between the outside and perceived interior the light passes through an intermediary space - like an ante-chamber, but above the ground - consisting of the façade wall thickness plus a shallow residual area caused by the four-degree offset of the street-aligned façade relative to the long axis of the church. (Figure 5) Such a space is a type of *camera di luce*, which moderates the explosive quality that the window might otherwise have on the coffering of the apse. The light that enters comprises a middle stratum of uni-directional illumination, between the windowless ground floor and the multi-directional lights of the dome and lantern. (Figure 6)



FIGURE 5 San Carlo, *fenestrone*. Source: Wikimedia Commons.



FIGURE 6 San Carlo, cornice, pendentives, and dome. Source: Wikimedia Commons.

The Broken Pediment

The role of the *fenestrone* in the layered modulation of San Carlo reveals how much observers had missed when the window was obstructed. And it was not only due to the dampened light. In front of the window, the triangular pediment springing from the entablature is broken, unlike the one above the High Altar. A pediment feigns to be the roof of an aedicule (literally, little building). When the pediment is broken it is as if the roof were opened, allowing movement up and down, as when a painted or sculpted saint ascends from earthly to celestial realms. The broken pediment, for example, in the Cavaletti chapel in Sant Agostino permits Caravaggio's *Madonna di Loreto* to climb to *Her Crowning by the Trinity* by Cristoforo Casolani in the apse above. (Figure 7) Alternatively, a broken pediment may offer a passport for real light to enter an image, or, as in San Carlo, the actual space of a room. The aligned relationship of *fenestrone* and broken pediment was observed by Domenico de Rossi, whose 1691 engraving of the retro façade depicts the width of the break in the pediment exactly coinciding with the *fenestrone* architrave. (Figure 8)

In 1651, ten years after the consecration of the high altar but still under Borromini's direction, a gilded balustrade (*la ringhiera dorata*) was installed into the broken pediment.⁹ In contrast to the plain iron grills of the chapels, the gilding makes the balustrade sparkle in the sun. Conversely, seventeenth century audiences were accustomed to the visual language of divine glory, in which gold heralds the entry of immaterial light into sacred space. It may be that the balustrade was inserted for the safety of those who need to traverse the entablature for reasons of maintenance. More likely is that gilded railing theatricalises the pediment break as a component of a proscenium, staging an implied human figure in the middle reaches of the interior, between heaven and earth. In fact, in a 1694 cross-sectional drawing by Simon Beausire (R.I.B.A., 21189), a figure is sketched leaning over the fence, providing some sense of scale to the apse. Later in Sant'Andrea al Quirinale (1658-61), only a few short steps from San Carlo and recalling it on almost every level, Bernini explicitly realised the broken pediment as a motif of the theatre of ascension when he showed Sant'Andrea exploding with out-stretched arms through the pediment, which marks the mid point between altar and the gilded dome of paradise above.



FIGURE 7 Cavaletti Chapel, Sant'Agostino, Rome: altarpiece, Caravaggio, Madonna of Loreto, 1603-6; apse, Cristoforo Casolani, Virgin crowned by the Trinity, 1605. Source: M. Hill.



FIGURE 8 Domenico de Rossi, San Carlo, retro façade, *Studio di Architettura civile*, Rome, 1691.

Light Panel

A balustrade also delimits a room, which brings us back to the point made earlier, namely that the space between the glazed window and the curved cornice is a *camera di luce*. One detail shows this better than any other and indicates that Borromini manipulated the light of the *fenestrone* for symbolic reasons. This is the relief moulding of the Trinitarian cross on the underside of the steeply angled plane that connects the top of the *fenestrone* architrave to the edge of the section cut away from the coffered niche. Leo Steinberg, the lone scholar to have noted the panel, took it to be an emblem not only of the Order but of the church plan as well, with its interpenetration of octagon, oval, and cross. Steinberg insisted that it was oriented for the external viewer on the street, sloped to face the entrant light and was meant to be seen as an ideogram of what would be encountered upon entrance; once inside, Steinberg thought, the detail disappeared into the steepness of its aspect.¹⁰ The removal of the organ stall, however, allowed one to take up a position directly underneath the cornice. From this vantage point, no glimpse can be had of the window; instead, Trinitarian panel is isolated between the coffered apse and curved cornice. (Figure 9) Moreover, the panel appears to shine bright, tilted toward the window so that the light strikes it full-face, which minimises relief shadows and maximises the sense of the panel being lit from within, like a star. The apparition is fleeting; another two steps towards the altar causes the star to slide behind its restricted angle of visibility.



FIGURE 9 San Carlo, Trinitarian panel on the fascia of the *fenestron*. Source: M. Hill.

The purpose of the Trinitarian panel is to announce the sacredness of the space just entered. It does this via *quadratura*, a technique borrowed from painting, in which composition is relative to oblique viewing angles. Because the panel is abstracted from its three dimensional disposition, the tilt of the fascia is undetectable, with the result that the oval glory is perceived as a more elongated shape, with a curvature that almost exactly coincides to the corresponding segment of the cornice, some 15 palmi underneath. At this point it might be noted that a shape of the same size has been seen only two or three steps earlier, on the underside of the entrance lintel (figure 10) – namely, a carved panel featuring an oval of eight-pointed stars, which were likewise symbols of the Trinitarians, as Borromini made clear in a drawing of the principal corporate emblems of the order (Vienna, Az Rom. 217).¹¹ In his drawing (Vienna, Az Rom, 225) of the aforementioned carved panel, Borromini shaded the background so that the stars appear suspended in space, like a crown. Borromini was apt to transform motifs in the direction of their symbolic and formal kinships, as demonstrated in his drawings (Vienna, Az Rom 327 and 329) of the morphology of the window grills of the oratory of San Filippo Neri, in which the devoted heart and the burning flame are merged in a single pattern. In San Carlo, the fluid logic of association transforms the starry crown of the outside to the guiding star of the Trinitarian cross of the inside, lighting the way to the altar. (Figure 11)



FIGURE 10 San Carlo, entrance. Source: M. Hill.



FIGURE 11 San Carlo, Interior. Source: M. Hill.

The Paintings

The angle of the aforementioned fascia is such that if were extended into the church it would cut across the upper parts of the altarpieces in the side chapels. This is important because this fascia angle corresponds to the angle of light in the 1643 side altarpieces by Giovanni Domenico Cerrini, depicting the *Holy Family* on the east wall and the *Martyrdom of St Ursula* on the west wall.¹² That is to say, in the original altarpieces, executed under Borromini's direction, the raked lighting of the paintings as physical objects was layered over the fictive illumination of the paintings as narrative windows. Such a configuration of window and painting was common since Masaccio in the fifteenth century, and was explicitly recommended by Giovanni Paolo Lomazzo in his treatise on painting of 1584.¹³ Sadly, Cerrini's paintings were replaced in the nineteenth century by the present dull pictures, which neither participate in the interior light, nor reflect the Trinitarian institutional colours of blue and red.¹⁴

By contrast to the original side altarpieces, the paintings on the long axis receive their fictive light from a steeper direction. The first was Pierre Mignard's *Annunciation* of 1641, frescoed within an oval moulding above the door and immediately underneath the *fenestron*. It is difficult to be certain about the light source for this work, as it was two-thirds destroyed by the 1855 installation of the organ gallery; however, the bright red knee of the Virgin in the part that remains suggests an elevated source, perhaps corresponding to the lantern (animating Gabrielle's words to Mary that the Holy Spirit will over-shadow her).¹⁵ Pierre Mignard also painted the high altarpiece, *Holy Trinity with Saints Charles Borromeo, Jean Mattha, and Felix Valois*, installed in 1645, which likewise receives its fictive light from the acute angle of the dome.¹⁶

To recapitulate in allegorical terms, the raking light for the side altarpieces corresponds to the light from the window - the *fenestron* - whose purpose is to illuminate the middle reaches of the church, while the paintings on the high altar axis are fictively lit by the lights corresponding to the heavenly zone above. The site-specific paintings confirm the proposition that Borromini orchestrated distinct light zones in San Carlo: a middle and directional stratum of light created by the *fenestron*, and an upper floodlit stratum created by the dome windows and lantern. From the bottom up, the middle layer of light appears to cushion, like a transparent cloud, the high-keyed modulation of the coffered dome, which in turn buoys the blinding circle surrounding the dove of the lantern.

The Chapels

There are three further spaces in San Carlo relevant to the topic, namely the chapel of the crucifixion beside the entrance, the chapel of the Madonna beside the high altar and the subterranean church. Next to nothing has been written about the two above ground chapels.¹⁷ The Crucifixion chapel is austere and dim, lit indirectly by the ambient light of the church; in addition, a small window inside the chapel funnels light onto the 1653 altar painting by Master Giuseppe, in the manner of the real and fictive alignment of light seen in the side altarpieces. The deathly shroud of the crucifixion is therefore aptly nested in the shadowed chapel, decorated with the severity of a tomb. By contrast, the Madonna Chapel - celebrating birth not death - is floridly surfaced and twice as bright as the Crucifix chapel, with indirect light from the church coming from the chapel entrance and an adjacent un-walled bay; in addition, an internal window beside the chapel altar opens onto the corridor behind. Relative to the church, both the Crucifix and the Madonna chapels are caught in pockets of shadow at farthest distance from the apex of the lantern.¹⁸ Such a picture of the church interior corresponds with a basic image of Christian poetics, whereby space is made sacred by the "overshadowing" caused when the Dove of the Holy Spirit intervenes between Heaven and Earth.¹⁹ The final layer of San Carlo's illuminated spaces is the subterranean church destined for the Trinitarian brothers - an empty, dark mirror of the church above.²⁰ (Figure 12)

The journey from light to dark is complete. A vertical cross-section of the church is like a hierarchy of being: in the lantern, blinding brilliance of creation; in the dome, modulated lumen, representing the pure lux above; in the pendentive zone, an earthly, directional light, announced in gold and buffering the realms of heaven and worshipper; in the crypt, deathly shade of the underworld.²¹



FIGURE 12 San Carlo, Subterranean Church. Source: Wikimedia Commons.

Conclusion

It is sometimes said of San Carlo that neither colour nor decoration distracts a viewer from the architecture.²² Yet as has been shown, gilded iron and painted altarpieces are integrated into the symbolic and formal program of the architecture. Setting aside the modernist preference for purity, what blinded observers to the significance of these elements was, firstly, the nineteenth-century removal of Cerrini's side altar paintings and, secondly, the slightly later insertion of an organ stall, which covered Mignard's *Annunciation* fresco and obscured the view to the gilded balustrade above it. Most importantly, the organ stall compromised the modulation of the middle stratum between ground level and dome, and hid the little *camera di luce* that lights the way of the in-coming devotee. Underpinning these observations is the recognition that Borromini like other architects was accustomed to designing in the context of raking light, and accustomed to the idea that Divinity expressed its generation by the passage of light into the world.

Endnotes

- 1 Paolo Degni, "La cronaca del restauro dell'interno della chiesa di San Carlino alle Quattro Fontane," in Paolo Degni, ed., *La Fabbrica di San Carlino alle Quattro Fontane: gli anni del restauro* (Rome: Bollettino D'arte speciale, 2007), 159-89. The 1855 organ gallery originally housed a small pipe organ, which did not intrude on the *fenestrone*.
- 2 Michael Hill, "Practical and Symbolic Geometry in Borromini's San Carlo alle Quattro Fontane," *Journal of the Society of Architectural Historians*, 72, no. 4 (December 2013): 555-83.

- 3 Charles Davis, "Architecture and Light: Vincenzo Scamozzi's Statuary Installation in the Chiesetta of the Palazzo Ducale in Venice," *Annali di Architettura: Rivista di centro Internazionale di studi di architettura Andrea Palladio di Vicenza*, 14 (2002): 171-93; Fabio Barry, "Lux and Lumen: the Symbolism of Real and Represented Light in the Baroque Church," *Kritische Berichte*, 4 (2002): 22-37; Paul Davies, "The Lighting of Pilgrimage Shrines in Renaissance Italy," in E. Thuno and G. Wolf eds., *The Miraculous Image in the Late Middle Ages and Renaissance* (Rome: L'Erma di Bretschneider, 2004), 570-80; Sergio Bettini, "Ricerche sulla luce in architettura: Vitruvius e Alberti", *Annali di architettura: Rivista di centro Internazionale di studi di architettura Andrea Palladio di Vicenza*, 22 (2011): 21-44; Sergio Bettini, "I lumi del Pantheon", in M. Basso, J. Gritti, and O. Lanzarini, eds., *The Gordian Knot: studi in offerta a Richard Schofield* (Rome: Campisano editore, 2014), 163-71; Daniele Mondini and Vladimir Ivanoci eds., *Manipolare la luce in epoca premoderna* (Università Svizzera Italiana: Silvana Editorial, 2014).
- 4 Carlo del Bravo, "Sul significato della luce nel Caravaggio e in Gianlorenzo Bernini," *Artibus et Historiae*, 4, no. 7 (1983): 37; Barry, "Real and Represented Light", 25; Anna Bülow, "Directed Light in Antonio Gherardi's Avila Chapel: Reflections on the Convergence of Baroque Sacred Architecture, Stage Design, and *Quadratura* Painting", in Mondini and Ivanoci, *Manipolare la luce*, 139-54.
- 5 Vincenzo Scamozzi, *L'idea dell'architettura universal* (Venice: Vincenzo Scamozzi, 1615), Part I, Book I, ch. 13, 137-9. The significance of Scamozzi's typology of light is discussed in Davis, "Architecture and Light", 171-6.
- 6 Vincenzo Scamozzi, *L'idea dell'architettura universal* (Venice: Vincenzo Scamozzi, 1615), Part I, Book II, 137.
- 7 The east and west octagonal windows were boarded-up in the early twentieth century (unblocked c. 1970), which misled many historians to think that San Carlo was gloomy. See Leo Steinberg, *Borromini's San Carlo alle Quattro Fontane: A Study in Multiple Form and Architectural Symbolism* (New York: Garland, 1977), 13.
- 8 The cavity is shown closed in Simon de Beausire's 1694 cross-sectional drawing (R.I.B.A. 21189).
- 9 Paolo Portoghesi, *Storia di San Carlino alle Quattro Fontane* (Rome: Newton & Compton Editori, 2001), 176.
- 10 Steinberg, *Borromini's San Carlo*, 279-82 and 404-10.
- 11 Az Rom 217 (Vienna, Albertina) is briefly discussed by Joseph Connors in R. Bösel and C. Frommel, eds., *Borromini e l'universo barocco* (Milan: Electa, 2000, vol. 2), 115.
- 12 A reconstruction of the plan of the paintings is provided in Hill, "Practical and Symbolic Geometry": 578.
- 13 "Tutti i lumi per regola generale si danno à' corpi secondo il luogo cui passano, e percuotono il muro ò la tavola dipinta; la quale dolcemente hà di riceverlo non altrimenti che se naturalmente lo recevesse essendo di rilievo." Giovanni Paolo Lomazzo, *Trattato del arte della pittura, scoltura, . . .*, Milan, 1584, bk4, ch. 21, 238. See Leo Steinberg, "Observations in the Cerasi Chapel", *Art Bulletin*, 41, no. 2 (June 1959): 185; Paul Hills, *The Light of Early Italian Painting* (New Haven and London: Yale University Press, 1987), 132-4; and Louis Waldman, "New Light in the Capponi Chapel in S. Felicità," *Art Bulletin*, 84, no. 2 (June, 2002): 300-1.
- 14 Steinberg, *Borromini's San Carlo*, 8-9. Cerrini's paintings remain in the convent corridor behind the church. The replacement paintings depict the *Ecstasy of S. Michele* by Amalia de Angelis (1847) and *Ecstasy of San Giovanni Battista della Concezione*, by Prospero Mallerini (1819).
- 15 That Mignard might have calibrated the painted light source in the *Annunciation* to that of the architectural light of the lantern would be consistent with his unusual compositional choice of positioning the angel on the right. As Don Denny has observed, this position emphasises, at the expense of Virgin, the Universal authority of the Messenger Gabriele, sent by the Trinity to incarnate the Lord. See *The Annunciation from the Right from Early Christian Times to the Sixteenth Century* (New York: Garland, 1977), 134-47. Picturing the Annunciation as an enactment of Trinitarian Providential history would fit the iconography of the church, which is co-dedicated to the Trinity and San Carlo Borromeo. See Hill, "Practical and Symbolic Geometry": 573-9.
- 16 The contract for the painting is dated 21 June 1645. See Pierre Mignard, "le Romain", in *Actes du colloque organisé au muse du Louvre*, ed. Jean-Claude Boyer, (Paris: Documentation Française et Musée Louvre, 1997), 33. The church was consecrated on Sunday, 14 October 1646. See Fra Juan de San Buenaventura, *Relatione del Convento di San Carlo alle Quattro Fontane* (Rome: Polifilo, 1999), 58.
- 17 The exception is Joseph Connors, who noted the austere tone of the Crucifix chapel, compared to the florid one of the Madonna. See "A Copy of S. Carlo alle Quattro Fontane in Gubbio," *Burlington Magazine*, 137 (September 1995): 594-5 and Portoghesi, *Storia di San Carlo*, 90-1.
- 18 In this sense, church interiors like San Carlo might be understood as models of the sort of pyramidal lighting seen on ceiling painting. Twenty years after San Carlo, Giovanni Battista Gaulli projected shadowing on the ceiling of the Gesù, where the nethermost angles worshipping the name of Jesus are caught on the underside of light obstructions above. Thomas Frangenberg, "The Geometry of a Dome: Ludovico David's Dichiarazione della pittura della capella del Collegio Clementino di Roma," *Journal of the Warburg and Courtauld Institutes*, 57 (1994): 191-208.
- 19 Luke, 1: 35; Yjrn Hirn, *The Sacred Shrine: A Study of the Poetry and Art of the Catholic Church* (Boston: Beacon Books, 1957 [1909]), 152-4 and 474.
- 20 Joseph Connors compares it to a bracing walk in the night air after a rich dinner. See Joseph Connors, "Il teorema sacro," in M. Kahn-Rossi and M. Francioli eds., *Il giovane Borromini: Dagli esordi a San Carlo alle Quattro Fontane* (Milan: Skira, 1999), 468.

- 21 John Hendrix referred to the hierarchy of light in San Carlo, from the divine lantern, to the angelic dome, and finally the ground level place of prayer. See John Hendrix, "Ascesa attraverso gerarchie neoplatoniche in San Carlo alle Quattro Fontane," in C. Frommel and E. Sladek eds., *Francesco Borromini: Atti del convegno internazionale Roma, 13-15 gennaio 2000* (Milan: Electa, 2000), 280.
- 22 For example, Anthony Blunt, *Borromini* (London: Allen Lane, 1979), 68; David Watkin, *A History of Western Architecture* (London: Lawrence King, 2nd ed, 1992), 243.