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GLASS AND NATURAL LIGHT IN THE SHAPING
OF SACRED SPACE IN THE LATIN WEST
AND IN THE BYZANTINE EAST

Fundamental to the creation of sacred space are the various ways light can be distributed in an interior¹. Natural light changes its intensity according to weather conditions, time of day and by the means in which it is filtered into an architectural space. It is a dynamic natural phenomenon that transfers to the sacred space an active component, influencing and changing its appearance from hour to hour. Already in early Christian times, great attention was paid to lighting churches with precious metal, glass lamps and colourful glazed windows. This paper will concentrate on the latter, and their role in the making of sacred space in the Latin West and the Byzantine East between the 4th and the 12th century². A comparative approach seems desirable in view of the international dimension of 'hierotopical studies'.

Although stained-glass windows are usually associated with the mystic, coloured atmosphere of Western Gothic church interiors, actually, glass window panes had been widely used throughout the Mediterranean area since Roman imperial and early medieval times. To achieve a more comprehensive understanding of the subject, all the monuments of the former-Byzantine Empire which still contain their original window-openings and screens should be studied. Having personally undertaken such studies for Late-Antiquity and the early Medieval West, I leave to Byzantinists the task of exploring this field further.

¹ Cfr.: Bettinelli E., Della Longa G., Maggiani S., Santantoni A. *Celebrare con la luce*. Milano, Bticino spa, 2003, p. 13.

² In this paper I will not deal with the sources of artificial light, since Lioba Theis is going to deliver a book on the subject.

"SUB SPECIE LUCIS": LIGHT AND ARCHITECTURE

Hans Sedlmayr, one of the first students of the theme of light in architecture, noted that we have no art history "sub specie lucis". There is no sector in the history of art devoted to the subject of lighting, even though light has always been one of the main elements in interior decoration contributing to spatial definition especially, as he observed, in Baroque architecture which was a theatre for spectacular effects with natural light³.

Late Antique and early Medieval texts, particularly in the West, often note with considerable detail the innovations made in buildings during campaigns of remodelling and repair, which frequently were guided by a new aesthetic sensibility. Because windows were often involved in such transformations, one can deduce that planners and patrons were fully aware of how natural light could influence architectural design.

Judging by the textual sources and by the surviving material evidence, it seems that most of the buildings with stained glass windows are churches. Probably the majority of viewers were Christian worshippers for whom light assumed not only a physical role (that is lighting the space, enhancing the *décor*, attracting attention and drawing the worshipper towards the liturgical focus) but also had a spiritual, metaphysical role as a symbol of God. This latter theme is rooted in the Old Testament. The early Christians applied Light symbolism to Christ, as the New Testament shows (especially in the Gospel of John, where it has its counterpart in the darkness of ignorance). This also explains why in early times baptism was called *phôtismos*, that is enlightenment. From this attention to light derived also the predilection for praying towards the East where the sun rises. This soon led to the sacramental use of dawn and sunset in Christian liturgy⁴.

Sometimes these buildings had important patrons, and questions arise about the role of the patrons and their architects in the shaping of sacred space and in the management of lighting: who were the designers of natural-lighting devices? Perhaps the architects interpreted the patrons' will to instill in the visitor a sensation of wonder as the light increased walking towards the sanctuary, or of intimacy while approaching the burial places of holy or eminent people. If the texts have revealed how light affected the perception of space, as it can be personally experienced, modern neuro-science has confirmed that light attracts the human eye⁵.

³ Sedlmayr H. *Das Licht in seinen künstlerischen Manifestationen*. Mittenwald, Mäander Kunstverlag, 1979.

⁴ Cfr.: Taft R. S. J. *La liturgia delle ore in Oriente e Occidente // Testi di teologia 4*. Milano, Edizioni Paoline, 1988, p. 445 e ss. (original edition: *The Liturgy of the Hours in East and West*. Collegeville, The Order of St. Benedict, 1986).

⁵ On light's power of attraction and its ability to stimulate an individual's movement as if on a stage, see: Phillips D. *Lighting in architectural design*. New York-Toronto-London, 1964, p. 20, 47; Ramachandran Vilayanur S. *Interaction between colour and motion in human vision // «Nature»*,

NATURAL LIGHT AND "SUBSTANZLOSIGKEIT"

'Appropriate' lighting was already pursued in sacred buildings of Greek and Roman Antiquity⁶, where the use of highly reflective materials in the wall-revetments and in the window-screens was accompanied by a light-aesthetic of neo-platonic origin, which was developed further by early Christian theologians. A careful attention to lighting is already to be found in the first Christian assembly rooms as, for instance, in the Dura Europos complex (3rd cent.) — outstanding and earliest example of an assembly space for Christian worship⁷. It has been observed that although on the outside the building maintained the aspect of an ordinary domestic, civil 'house', inside it underwent a series of transformations so as to create a rectangular room for the assembled Christians and another area for baptism. The rectangular room was 'connected' to the inner court, lined with benches, through several windows that were closed with shutters⁸. If the Dura Europos *aula ecclesiae* can be regarded as the undeniable ancestor of the basilicas built by Constantine the Great⁹, also the windows might be seen as the forerunners of the larger and more numerous ones that were opened in the basilicas. The windows at Dura Europos are forerunners not in regard to their shape or screening devices, but rather to their function of providing sufficient, well concentrated natural light necessary for the liturgy. In fact, in the basilicas, in contrast with the large and numerous windows of the nave, the aisles had either very

328 (1987), n. 6131, p. 645–647. On guided perambulation suggested by decorative patterns in a Byzantine monument, such as the so-called 'mausoleum of Galla Placidia' at Ravenna, see: *Gonosová A.* The role of ornament in the Late Antique interiors, p. 157–158.

⁶ *Herbig R.* Das Fenster in der Architektur des Altertums. Baugeschichtliche Studien. Athen, Buchdruckerei "Hestia", 1929, p. 22 e ss.; *Idem*, Fenster an Tempeln und monumentalen Profanbauten // *Jahrbuch des Deutschen Archäologischen Instituts*, XLIV (1929), Heft 3–4, p. 224–262, esp. 224 e ss. Also in the very early phase of Christendom one should consider the role of patrons and designers working under specific demands with regard to 'shaping' the interiors via light penetration, cfr.: *White M. L.* Building God's house in the Roman world: architectural adaptation among pagans, Jews, and Christians. Baltimore, Md., Published for the American Schools of Oriental Research by Johns Hopkins University Press, 1990, p. 145.

⁷ We do not know anything about the window-openings in the first Christian churches that were founded at Edessa, Alexandria and Nicea.

⁸ *White*, Building God's house, p. 121: "These measures suggest conscious adaptation for specific patterns of ritual, movement, and communication in and between the various areas of the *domus ecclesiae*".

⁹ Many concepts and chronological schemes used by Richard Krautheimer have been taken over by *White* (Building God's house, p. 138), who eloquently stated that: "The Constantine innovation of basilical architecture, therefore, seems less abrupt. Although it surely represents a radically new imposition of scale and style on the architecture and esthetic, it still depended on some continuity with earlier church building. The basilica may be seen as a further adaptation, monumentalization, and ultimately a standardization of diverse pre-Constantinian patterns of development".

small openings or none at all, as for example in Old St. Peter's and in St. Paul's Outside the Walls. This created an interior with differentiated light that focussed on the sanctuary, enhancing its physical appearance, its liturgical relevance and symbolic quality. Such adjustments apparently were used deliberately in most Roman buildings of the Constantinian era and soon afterwards. The aisles of the Constantinian basilicas were decidedly dark and lower than the nave and sanctuary. Also the colonnades supporting the thinner walls exploited the luminosity of the openings thereby creating a deliberately incorporeal effect — "Substanzlosigkeit" — according to new spiritual and artistic ideals¹⁰.

Some architectural features, such as windows, in the first Christian basilicas may well have been influenced by the contemporary debate concerning the impossibility of representing God. In the well-known letter written by Eusebius of Caesarea to Constance, the emperor Constantine's sister, he denies her request to send her an image of Christ¹¹, by thoroughly explaining the futility of trying to represent God, whose essence is invisible. Eusebius is one of the main 'voices' in the long debate about the cult of images¹². In this cultural and theologic context, one can understand why the penetration of natural light — immaterial yet at the same time real and visible — was preferred in Christian buildings for evoking the divine presence¹³.

Unfortunately, little is known of the earliest glazed windows of the Constantinian era, but on the basis of the limited archaeological finds we can

¹⁰ For the masonry of the Constantinian and Justinianic basilicae see, among others, *Sedlmayr H.* Zur Geschichte des justinianischen Architektursystems // *Byzantinische Zeitschrift*, XXXV (1935), p. 38–69; *Idem*, Spätantike Wandsysteme // *Bayerische Akademie der Wissenschaften. Philosophisch-Historische Klasse*, VII (1958), p. 5–55, esp. p. 25 e ss.; *Deichmann F. W.* Wandsysteme // *Byzantinische Zeitschrift*, LIX (1966), p. 334–358, esp. p. 350–354; *Günter R.* Wand, Fenster und Licht in der Trierer Palastaula und in spätantiken Bauten. Herford, 1968; *Krautheimer R.* The Constantinian Basilica // *DOP*, XXI (1967), p. 115–140. *Onasch K.* Lichthöhle und Sternhaus. Licht und Materie im spätantike und frühbyzantinischen Sakralbau. Dresden–Basel, Verlag der Kunst, 1993, p. 47 e ss.

¹¹ *Eusebius of Caesarea.* Ad Constantiam Augustam, in *Eusebii Pamphili Caesareae Palaestinae Episcopi Opera Omnia, Patrologia Graeca*, t. XX / Ed. J.-P. Migne, Turnholti, col. 1546–1547; cfr.: *Koch H.* Die altchristliche Bilderfrage nach den literarischen Quellen. Forschungen zur Religion und Literatur des Alten und Neuen Testaments 27 = N. F. 10, Göttingen, 1917, p. 41 and ff. In this regard I thank Hans Belting for his useful comments.

¹² About the teaching functions of the images as recognised by early Christian authors cfr.: *Mathews T. F.* The Sequel of Nicaea II in Byzantine Church Decoration // *Perkins Journal*, XLI, 3 (1988), p. 11–21, esp. p. 15–16.

¹³ One has also to keep in mind several examples of late Antique and Medieval mosaics, paintings, or stuccoes that show holy figures in attitudes of devotion beside windows: see the fifth century mosaic with two Apostles in the so-called Mausoleum of Galla Placidia in Ravenna; the ninth century mosaics of the San Zeno Chapel in Santa Prassede in Rome; the eighth-ninth century monumental stucco figures of virgins on the west wall of the Tempietto in Cividale, etc.

imagine large geometrical panels set in a wooden framework¹⁴. In the second half of the 1st cent. AD thanks to the invention of glass blowing, large glass panes began to be used for windows in public buildings through the Roman Empire, in particular thermal baths, and then in the fourth century also in basilicas built for Christian worship¹⁵. This revolutionary technical invention has been regarded as one of the factors that contributed to the increased number and size of window openings in late Roman architecture. Besides some practical reasons for the enlargement of windows in the early Christian basilicas¹⁶, one should also consider that the increased light has been associated by some scholars with the symbolism of the *Sol Invictus*, appropriated by Constantine the Great for his imperial image, and with the Christian theological theme of Light as a manifestation of God¹⁷.

Already in the writings of Pliny the Elder glass was a paragon for brightness and transparency. Since the commonest natural colours of glass were pale green and blue, the light they transmitted contributed to a mystic atmosphere that was readily associated with the precious colours of the Heavenly Jerusalem¹⁸. Alexei Lidov has noted that in one of the first representations of the

¹⁴ Traces of the presence of window screens have been observed in the painted window splays of the Constantinian hall at Trier while the only hitherto known examples of window pane fragments have recently been discovered in the Constantinian basilica of Porta Laurentina at Ostia. See the preliminary report on the Ostia excavations in: *Bauer F. A., Heinzelmann M., Martin A. et al.* Untersuchungen im Bereich der konstantinischen Bischofskirche Ostias. Vorbericht zur ersten Grabungskampagne 1998 // *Mitteilungen des Deutschen Archäologischen Instituts. Römische Abteilung. Bullettino dell'Istituto Archeologico Germanico. Sezione Romana*, CVI (1999), p. 289–341; *Martin A., Einzelmann M.* The joint AAR-DAI research project at Ostia: 1998 and 1999 seasons // *Memoirs of the American Academy at Rome*, XLVI, 2000, p. 277–283.

¹⁵ In Vitruvius' architectural treatise, despite his concern for the quality of light in buildings, he never mentions window glass. This was because glass was not yet widely used during the time in which he wrote his treatise was written, during the first Augustan age. In fact, the earliest known examples of glass panes were employed in window screens dating from the late first century A.D., particularly in baths for the preservation of heat such as those in the Forum at Pompeii repaired between the earthquake of 62 A.D. and the eruption of Vesuvius in 79 A.D. See: *Dell'Acqua F.* Le finestre invetrate nell'antichità romana / Ed. M. Beretta, Giovanni di Pasquale // *Vitrum, il vetro tra arte e scienza nel mondo romano*. Exhib. cat., Museo degli Argenti, Palazzo Pitti, Firenze, 27 Marzo-31 Ottobre 2004, Firenze, Giunti Editore Spa, 2004, p. 109–119.

¹⁶ Richard Krautheimer noted that the need of opening impressive sequences of large windows in the upper walls of the nave was due to the fact that the side aisles (intended to accommodate a vast number of worshippers) leaned on the lower parts of these walls (*Krautheimer*, *The Constantinian Basilica*).

¹⁷ *Sedlmayr*, *Spätantike Wandsysteme*, p. 5 e ss.

¹⁸ For a bibliographical selection cfr.: *Lidov A.* Heavenly Jerusalem: the Byzantine Approach / Ed. B. Kühnel // *The Real and Ideal Jerusalem in Jewish, Christian and Islamic Art*. Jerusalem, 1998, p. 341–353. On the perception of the church as Heavenly Jerusalem by Christian worshippers resulting from their rhetorical and religious education cfr.: *Onians J.* Abstraction and Imagination in Late Antiquity // *Art History* III, 1 (1980), p. 1–24, esp. p. 20.

Heavenly City, the fifth century mosaic in Hagios Georgios in Thessaloniki, main features of the representation of the city-temple are its 'transparency' and splendour¹⁹. This theological idea influenced, for example, Isidorus of Seville († 636), author of the most important encyclopedic work of late Antiquity and the early Middle Ages. In a chapter on glass Isidorus lists the various hues that this material can assume using the same names that John the Evangelist employed for the gems and precious stones adorning the heavenly walls²⁰.

During Carolingian times, figured stained glass, painted with holy personages and accompanied with *tituli* spread throughout the Imperial realm — from Hungary, Germany, to France and Italy. Hrabanus Maurus contemporary encyclopedia included a chapter on glass with a list of gem-like colours based on Isidorus' text. He also refers to the Apocalyptic description of the Heavenly Jerusalem in order to justify a predilection for glass in the decoration of sacred space²¹. Moreover, one should keep in mind that the Apocalypse (21, 22–26) contains what the eminent liturgist Robert Taft calls "the most beautiful passage regarding the identity between God and light"²².

LIGHT THROUGH GLAZED WINDOWS

The stained glass window is a complex work involving many artisans: the many phases of production require the cooperation of various specialists. The master glass-maker had to discuss the project not only with the patrons so as to satisfy their wishes, but also had to agree with the architects on the size of the glass screens that would fill the windows, the proportions of which had to provide adequate interior lighting. In this way the window took form through a combination of practical exigencies, functional aims, and aesthetic aspirations, culminating in the realization of sacred space by means of a mystic atmosphere. When the window glass became figured during Carolingian times, theologians and skilled painters also participated in the conception of the subjects to be painted on the glass panes.

¹⁹ *Lidov*, Heavenly Jerusalem, p. 342.

²⁰ *Isidorus of Seville*. *Etymologiarum sive Originum libri XX*, Lib. XVI, Caput XVI De vitro, in *Patrologia Latina*, t. LXXXII / Ed. J.-P. Migne. Parisiis, 1850, coll. 582–583: "Tinguitur etiam multis modis, ita ut hyacinthos, sapphiresque, et virides imitetur et onyches vel aliarum gemmarum colores".

²¹ *Maurus R.* De universo. Lib. XXII, cap. X, *Caput X De vitro* // PL, t. CXI, 1852, col. 474: "Unde in Apocalypsi ita scriptum de structura civitatis supernae; Ipsa vero civitas aurum mundum similis vitro mundo (Apoc. XXI)". For comment on these passages from Isidorus and Hrabanus Maurus, cfr.: *Dell'Acqua F.* "Illuminando colorat". La vetrata tra la tarda Antichità e l'alto Medioevo attraverso le fonti e l'archeologia. Studi e Ricerche di Archeologia e Storia dell'Arte, 4. Collana diretta da L. Pani Ermini e A. Peroni. Spoleto, Centro Italiano di Studi per l'Altomedioevo, 2003, p. 146–147, 153–155.

²² *Taft S. J.* La liturgia delle ore, p. 447–448.

As said, despite the highly informative art historical studies of late medieval stained-glass in its historical, aesthetic and socio-political contexts, little attention seems to have been paid to the effect that glazed windows as well as the light that passed through them, had on the beholders. For this, we must sift through the literary patrimony of late Antiquity and the Middle Ages.

Through a Medieval hagiographical text we know that in a very small and simple monastic church built in Northern France around the middle of the 6th cent., the founder, a British abbot named Gilda, commissioned the glazing of the most important window that faced the East, so that he could prostrate himself in the direction of the natural light source that he obviously identified with God²³. The abbot must have realized that glass was the most appropriate material for the penetration of sunlight, the symbol *par excellence* of divinity, and that it could enhance the sacred atmosphere of the modest space. Very likely his glazed window consisted of simple geometric panels of naturally coloured glass (green, blue and yellowish). One has to keep in mind that during the early Middle Ages glass had become very rare because the main sources for raw materials, as well as the chunks of glass to be subsequently re-worked, came from the Middle East and therefore glass was regarded as a precious commodity²⁴.

Already in the early Middle Ages the subject of light penetrating a window became a topic of complex theological exegesis, as shown by the tradition around Ezechiel's account of Solomon's Temple. From Gregory the Great (sixth-seventh century), to Bede (seventh-eighth century), and Hrabanus Maurus (ninth century) the splayed windows of the Temple which are wider towards the interior were interpreted on two levels. Literally, they were seen as a useful means of guaranteeing the best interior lighting; while on an anagogical level they were interpreted as representing the Apostles and the Prophets, who enjoyed direct contemplation of the divine mysteries, and who had the duty of rendering these accessible also to the faithful who were intellectually and spiritually less endowed²⁵. These theological elaborations

²³ Vita Gildae sapientis abb., XXIX Ianuarii, cap. III, 17 // Acta Sanctorum, Ianuarii Tomus II. Antuerpiae, apud Ioannem Mursium, 1643, p. 961; *Dell'Acqua*, "Illuminando colorat", p. 108.

²⁴ Its use had spread widely in the Western Mediterranean world during the 1st cent. AD, and had a great impact on everyday Roman life. Glass involved a revolution in the life-style of the West that can be compared to that of plastic in the 20th cent., cfr.: *Beretta M.*, *Di Pasquale G.* Introduzione // *Vitrum* / Ed. Beretta, Di Pasquale, p. 19–35.

²⁵ *Gregory the Great*. Homiliae in Ezechielem, in *Patrologia Latina*, t. LXXVI / Ed. J.-P. Migne. Parisiis, 1849, col. 995; *Beda*. De Templo Salomonis, Liber 7, *Patrologia Latina*, t. XCI / Ed. J.-P. Migne. Parisiis, 1850, col. 750; *Maurus R.* Commentaria in libros Regum, in *Patrologia Latina*, t. CIX / Ed. J.-P. Migne. Parisiis, 1852, col. 143; *Idem*. Commentaria in Ezechielem // *Patrologia Latina*, t. CX / Ed. J.-P. Migne. Parisiis, 1852, col. 914. Cfr.: *D'Onofrio G.* Oltre la teologia. Per una lettura dell' "Omelia" di Giovanni Scoto Eriugena sul Prologo del Quarto Vangelo // "Studi Medievali", s. 3°, XXXI (1990), fasc. I, p. 285–356, esp. p. 285 e ss. e p. 328–329. Cfr.: *Dell'Acqua*, "Illuminando colorat", p. 38.

were soon visualized in early Christian and Medieval religious buildings where often wall paintings executed between the window openings represented Prophets and Apostles, the chief messengers of the word of God. Such figures were painted for example on the clerestory walls of the Roman basilicas of Old Saint Peter's and Saint Paul's Outside the Walls, the pictorial schemes of which subsequently became iconographic models of great importance for the western world²⁶. Within the decorative hierarchy, while the light led the worshipper towards the sanctuary, these figures and scenes displayed on the clerestory walls of the great basilicas "were like words proceeding from the mouth of God"²⁷. Already in the well-known Syriac hymn of the seventh century describing the church of Saint Sophia at Edessa (now Urfa, Turkey), the windows are said to represent the Apostles, the Prophets, the Martyrs and the Confessors, according to a symbolism that continued in the Medieval West²⁸.

An early medieval example of how space in a religious context could be defined and emphasized via light shining through glazed windows is that of the monastery of San Vincenzo al Volturno (9th century). In the refectory and its adjacent ante-room, where the community of monks assembled before entering for their meals, the walls were painted with figures of Prophets and Apostles. In the refectory these appeared between large windows that were screened with geometric glass panels coloured in vivid green and blue²⁹. Therefore, meals were accompanied by listening to Holy Scripture while beholding paintings illuminated by a series of windows all of which formed a solemn reminder of the monks' mission: like the Prophets, they had to become interpreters of God's words; and like Apostles, they had to spread the message to the people.

Between the 9th and 11th centuries, stained glass windows became figurative. This coincided with the iconographic transposition of the Prophets and Apostles from murals to windows. It is hardly fortuitous that the earliest

²⁶ Kessler H. L. *Old St. Peter's and Church Decoration in Medieval Italy* // *Collectanea* 17. Centro italiano di studi sull'Alto Medioevo, Spoleto, 2002, p. 76.

²⁷ Spieser J.-M. The representation of Christ in the apses of early Christian churches, in *Urban and religious spaces*, XVI (originally appeared in "Gesta", 37, n. 1, 1998, p. 1–27), p. 8.

²⁸ Cfr.: Grabar A. Le témoignage d'une hymne syriaque sur l'architecture de la cathédrale d'Edessa au VII^e siècle, et sur la symbolique de l'édifice chrétien // *Cahiers Archéologiques*, II (1947), p. 41–67; De Lavergne S. La lumière dans l'aménagement de l'espace liturgique: aspects théologiques // *Symbolisme et expérience de la lumière dans les grandes religions*. Actes du Colloque tenu à Luxembourg du 29 au 31 mars 1996 / Ed. Ries J., Ternes C.-M. *Homo religiosus*. Série II, 1, Turnhout, Brepols, 2002, p. 224–237, esp. p. 226.

²⁹ Cfr.: Tavola Rotonda, in *La vetrata in Occidente dal IV all'XI secolo*. Atti delle giornate di studi, Lucca, Villa Bottini, 23–24–25 Settembre 1999. *Il colore nel Medioevo*. *Arte Simbolo Tecnica*. Collana di studi sul colore 3 / Ed. Dell'Acqua F., Silva R. Lucca, Istituto Storico Lucchese-Scuola Normale Superiore di Pisa-Corpus Vitrearum Medii Aevi Italia, 2001, p. 281–287; Dell'Acqua. *Illuminando colorat*, p. 38–39.

cycle of stained glass windows still *in situ*, at Augsburg (Bavaria), illustrates a series of prophets³⁰. The stained glass must date to around 1065, the date of the church's consecration. At almost the same time that these windows were installed, Honorius Augustodunensis, a man of letters, compared society to a church with windows that could be assimilated to the *doctores* who spread knowledge protecting people from heresies just as glass permits natural light to penetrate while shielding the devout from inclement weather³¹. In the wake of such suggestions, the Prophets became an essential element recurring in the iconographically rich cycles of Gothic stained glass windows.

Much later on, in the late 16th century, the association between windows and the 'holy teachers' is still to be found in the writings of Carlo Borromeo (*Instructiones fabricae et suppellectilis ecclesiasticae*, ch. 7) whose statement in this regard has been considered of great importance to Italian Baroque architecture³².

'HEAVEN' AND 'EARTH'

In Byzantine thought and liturgy, very soon the sanctuary became a symbol for Heaven and the nave a symbol for Earth. In the seventh century, quoting the Apostle Paul [2 Cor. 6: 16], Saint Germanus of Constantinople wrote that "the church is Heaven on Earth, where the God of Heaven dwells and moves"³³. As Slobodan Ćurčić has observed, this concept "remained the basis for understanding church architecture and art throughout the Byzantine era, notwithstanding the implementation of various modifications over the centuries pertaining to the building form, its functions, and its decorative program"³⁴. The profound awareness of the importance of natural light in

³⁰ Boeckler A. Die romanischen Fenster des Augsburger Domes und die Stilwende vom 11. zum 12. Jahrhundert // Zeitschrift des Deutschen Vereins für Kunstwissenschaft, X, (1943), Heft 314, p. 153–182.

³¹ Honorius Augustodunensis. Gemma Animae, cap. CXXX — De fenestris ecclesiae // Honorii Augustodunensis Opera Omnia / Ed. Migne J.-P. Patrologia Latina, t. CLXXII, Paris, 1854, col. 586; cfr.: Dell'Acqua. Illuminando colorat, p. 142–143.

³² The possibilities of natural light to evoke the Divine were particularly exploited by Gianlorenzo Bernini. Above the *Cathedra Petri* (1657–1666), designed in the apse of Saint Peter's in Rome, he conceived a glazed *oculus* as the source of natural light, of *Lux*/God, from which metallic rays spread upwards. Thanks to the painted glass and the light passing through it, the architect made manifest the holiness of the site, cfr.: Barry F. Lux and lumen: the symbolism of real and represented light in the Baroque dome // Lichtgefüge des 17. Jahrhunderts. Ed. A. Lütgens. Kritische Berichte, XXX, 4 (2002), p. 22–37, esp. p. 24–25.

³³ St. Germanus of Constantinople. On the Divine Liturgy / The Greek Text with Translation, Introduction and Commentary by Paul Meyendorff. Crestwood, St. Vladimir's Seminary Press, 1984, p. 56, 58. On this subject, I warmly thank Robert Taft for his generous help.

³⁴ Ćurčić S. Religious settings of the Late Byzantine Sphere // Byzantium. Faith and Power (1261–1557) / Ed. by H. C. Evans. New York, The Metropolitan Museum of Art, 2004, p. 65–77, esp. p. 65; cfr.: Mango C. The Art of the Byzantine Empire: 312 — 1453, Sources and Documents. Englewood Cliffs, New Jersey, Prentice-Hall, 1972, p. 141–143.

ecclesiastical contexts in the Byzantine world may have been due to the movement of Hesychasm, that had as its central theme the Transfiguration of Christ on Mount Tabor, where the Apostles were blinded by the glaring light emanating from Christ³⁵.

In the 15th century Symeon of Thessalonika still writes that: "The sanctuary is a symbol of the higher and supra-heavenly spheres, where the throne of God and His dwelling place are said to be. It is this throne that the altar represents... The upper regions of the church [building] represent the visible heavens, its lower parts what is on earth and [the earthly] paradise itself..."³⁶. So as to enhance this vision, several devices were employed by architects and decorators, and certain ornamental schemes recurring in late antique Western and early Byzantine mosaics, painting and sculpture, were intended to define the surfaces and develop a hierarchy in the decorative and spatial setting of interiors³⁷. As with Baroque churches, also in early Christian and Byzantine churches, the quantity and quality of natural and artificial light were carefully deployed among 'surface defining' devices, as well as wall-revetments, wall-painting, mosaics, etc. In this way, the space within a church does not remain neutral, but rather becomes structured by boundaries and itineraries, that enhance a focal point with a carefully planned decoration. In this respect the elements that simultaneously connect, separate and protect, such as windows and doors, assume a decisive role³⁸. In fact, the iconostasis often had decorated doors like those of gilded copper originally from Saint Sophia of Novgorod, now in the Russian State Museum there, and dated around 1330–1350³⁹. Their precious metallic revetment reflecting light alludes to the light shining in the sanctuary. The decorative gilded motifs display lions, griffins, etc., traditionally linked in Christian bestiaries to apotropaic functions: in this case, they were supposed to protect 'Heaven's doors' leading to the sanctuary. In the Byzantine domain, doors were often 'pro-

³⁵ The role of Hesychasm in shaping Byzantine liturgy and ecclesiastical decoration has not yet been thoroughly investigated in the view of *James Liz*, *Light and colour in Byzantine art*. Clarendon Studies in the History of Art, Oxford, Clarendon Press, 1996, p. 120, n. 12. For the iconographic repertoire of Transfiguration in Western and Byzantine art, see: *Griffeuille M. F.* La conception byzantine de la lumière dans le thème de la transfiguration. Thesis (diplome). Paris, École du Louvre, 1978, p. 8 and ff.

³⁶ *Symeon of Thessalonika*. De sacro templo, ch. 131 // *Symeonis Thessalonicensis Opera Omnia*, in *Patrologia Graeca*, t. CLV, ed. J.-P. Migne, Parisiis, 1866, coll. 337–340.

³⁷ *Gonosová A.* The Role of Ornament in Late Antique Interiors with Special Reference to intermedia borrowing of Patterns / Ph.D. thesis, Harvard University, Cambridge, Mass., 1981, p. 294.

³⁸ *Spieser J.-M.* Doors, boundaries and the use of space in early Christian churches // *Urban and religious spaces in Late Antiquity and early Byzantium*. Ashgate, Aldershot–Burlington, 2001, XV, p. 1 (originally appeared in "Klio", 77, 1995, p. 1–14).

³⁹ *Bukhman S.* 63. Iconostasis Doors with the Annunciation and the Four Evangelists // *Byzantium. Faith and Power (1261–1557)* / Ed. by H. C. Evans. New York, 2004, p. 127–128.

tected', but at the same time they protected those who were going through the gates keeping Evil away by means of images of the Virgin, Christ and saints placed overhead.

We may assume that every patron and/or architect in charge of building or refurbishing a church would have carefully considered appropriate natural illumination and artistic devices to reflect it, such as liturgical furnishing in precious metals and marble revetments. It is not coincidence that the main elements 'creating' the sacred space either reflected light or allowed its penetration. The magnificence of these furnishings made of light-reflecting materials was described in the famous *Novgorod Chronicle* account of the Frankish sack of *Hagia Sophia* on the 12th of April 1204: the rich decoration included countless liturgical furnishings in silver, precious stones and mother of pearl set all around the altar together with the icons on the silver iconostasis⁴⁰. This dazzling décor of the metal objects, as well as of the mosaics and the marble revetments, was enhanced and exalted by the careful orchestration of natural and artificial lighting which must have stunned the faithful beholder. Relying on this and other Russian accounts from the late Byzantine period, John Arnott Hamilton evokes the impression made upon those who entered a Byzantine church during a liturgical celebration thus: "As the light from thousands of candles gleamed on the polished surface of green marble and purple porphyry, as the figures of austere saints and bejewelled emperors looked down from the encrusted walls, as the wings of seraphs lay outstretched in the pendentives far above, as the clouds of incense floated through the expanse, as the priests in their coloured silken vestments moved slowly in procession, as the celebrant passed through the iconostasis into the presence of the altar, as a great multitude stood in rapt devotion and as the solemn chant echoed through the nave, it is no wonder that the visitors from the Russian plains felt the throb of an unprecedented emotion in their souls, and beheld mingling with the worshippers angelic visitants from heaven"⁴¹. In this regard, an interesting comparison has been traced again by Hamilton between Byzantine and Baroque architecture: the Baroque artists and architects tended to carry "earth up to heaven" with magniloquent statues and paintings of saints captured in ecstasy with radiating haloes and floating draperies, etc. Meanwhile "the Byzantine artist brings heaven down to earth" through mild, celestial effects of natural light and images of holy figures of an idealized corporeality. In this sense one can imagine how the interior of a Byzantine church was "permeated with the sense of the unseen"⁴².

⁴⁰ The Chronicle of Novgorod, 1016–1471 / Translated from the Russian by R. Michell and N. Forbes, with an introd. by C. R. Beazley, and an account of the text by A. A. Shakhmatov. New introd. by W. K. Hanak. Hattiesburg, Miss., 1970, p. 47.

⁴¹ Hamilton J. A. Byzantine architecture and decoration. London, 1956, p. 79.

⁴² Ibid., p. 34.

OPTICAL DEVICES IN THE MAKING OF SACRED SPACE

In Byzantium sacred space was not usually enhanced by the presence of figurative stained glass, but two important exceptions are known in the *Chora* and the *Pantocrator* in Istanbul, of which more later. However, one must first consider how sacred space was treated in Byzantium through a careful deployment of windows.

Certain optical devices were already put into practice during the early stages of 'Byzantine' architecture by Anthemios of Tralles, who, together with the architect Isidorus of Miletus, was in charge of re-building *Hagia Sophia* in the middle of the 6th century. Anthemios was known not only as an engineer, but also for having written an important treatise on glass mirrors observing their many peculiarities. In this respect, it can hardly be accidental that glass played such an important role in the decoration of *Hagia Sophia*. The glitter of the mosaic revetments, with their tesserae intentionally set at various angles, was greatly enhanced by the light shining through the many windows screened with glass panels. In this way the theories of Anthemios found a practical application, as recently Marco Beretta has pointed out: "The combination of using grandiose wall mosaics in glass with large and numerous windows to let in the light, leads us to suppose that the theoretical competence of Anthemios regarding the reflective property of mirrors found practical application in the basilica that aroused the marvel of his contemporaries"⁴³. Aside from these technical details, certainly the enhancement of light in the area below the main dome defined the sacred status of the sanctuary⁴⁴. As is well known, Paul the Silentiary described the light radiating from the many windows screened with glass panes in the central dome's drum, which contributed to the creation of a space of heavenly beauty making the dome appear as suspended in a void hung to a chain held by the hand of God⁴⁵.

⁴³ Beretta M. *Vetro e visione // Vitrum* / Ed. Beretta, Di Pasquale, p. 121–133, esp. p. 132–133; *Idem*. From the eye to the eye-glass. A pre-history of spectacles // *When Glass Matters. Studies in the history of science and art from Graeco-Roman antiquity to early modern era* / Ed. M. Beretta. Firenze, Olschki Editore, 2004, p. 249–282, esp. p. 274. See also: Dell'Acqua F. *Lux et vitrum: the Evolution of Stained Glass from the late Roman Empire to the Gothic Age // When Glass Matters* / Ed. Beretta, p. 221–248, esp. p. 228.

⁴⁴ About the symbolism and the role of domes in the making of sacred space see *Ida Sinkevic* in this volume. One should recall once more the religious architecture of the 17th century: in fact, reflecting mirrors are known to have been used to "entice light" in chapels built by Bernini and Borromini in Rome, cfr.: *Barry*, *Lux et Lumen*, p. 30.

⁴⁵ *Paul the Silentiary. Descriptio Ecclesiae Sanctae Sophiae. V. 407–410 e v. 509–511 // Patrologia Graeca, t. LXXXVI, 2* / Ed. J.-P. Migne. Parisiis, 1865, col. 2135 e coll. 2138–2139; *Descriptio Ecclesiae Sanctae Sophiae*, in *Johannes von Gaza und Paulus Silentiarius, Kunstbeschreibungen justinianischer zeit* / Ed. P. Friedländer. Leipzig–Berlin, 1912; cfr.: *Mango C. The Art of the Byzantine Empire 312–1453. Sources and Documents*. Englewood Cliffs, 1972, p. 74, 82.

Forty years ago a Greek scholar, Giannes Triantaphyllides, made a study of the lighting system in Byzantine architecture⁴⁶. Thanks to photometry he was able to examine the quantity as well as the quality of natural light in the interior, the effect of the filter of coloured window glass, and the symbolic value of light in a Christian context. Above all, he was able to measure the natural light's intensity during different times of day in many buildings, noting that there was a general progression of luminosity from the entrance towards the sanctuary⁴⁷. Furthermore, he also was able to confirm that both the decoration and the liturgical action were orchestrated so that the apse was signified as the most sacred place in the building⁴⁸. Light triumphant in the apse reminded the faithful beholder of the materialization of the divine presence there.

One of the buildings studied by Triantaphyllides is San Vitale in Ravenna. As he had done for other Byzantine churches, he measured the amount of light which could pass through the coloured windows. He did this by analyzing the glass fragments from old excavations at San Vitale. But he had to admit that it was impossible to reconstruct the final effect of the original coloured windows on the interior illumination there because it is unknown how and where they were situated. The coloured discs (made according to the 'crown' method and measuring between 19,5–26 cm in diameter) ranged in colour from sky-blue to emerald green, amber brown, purple and opaque white. For the most part, therefore, these colours permitted relatively little light to penetrate, modulating its access according to the thickness of glass and the saturation of the colouring⁴⁹. However, it must be kept in mind that the glazing of San Vitale's win-

⁴⁶ *Triantaphyllides G. D.* *Stoicheia physiku photismu ton byzantinon ekklesion*. Athenai, Huperesia Archaioteton kai Anasteloseos, Demosieumata tu Archaiologiku Deltiu 3, Athenai, 1964, (summary: *De l'éclairage naturel des églises byzantines*, p. 93–102), p. 98. *Korać V.* *La lumière dans l'architecture byzantine tardive, en tant qu'expression des conceptions hésychastes // L'art de Thessalonique et des pays balkaniques et les courants spirituels au XIVe siècle*. Belgrade, 1987, p. 125–131. See also: *Gelfenbien G. P.* *Spheres of light: light as the common element of the Byzantine East and the Gothic West* / Ph. D. Thesis. Rensselaer Polytechnic Institute, 1987.

⁴⁷ Cfr. also: *Spieser*, *Doors, boundaries and the use of space in early Christian Churches*, p. 11. He notes that, for example, in St. Peter's in Rome the original architectural and decorative organisation suggested this progression, "leading the visitor's eye toward the goal he sought, the apostle's tomb, the effect heightened yet more by the additional illumination from the transept..."

⁴⁸ *Spieser*. The representation of Christ in the apses of early Christian churches, in *Urban and religious spaces*, XVI (originally appeared in "Gesta", 37, n. 1, 1998, p. 1–27), p. 8: "...the purpose of Christ's image in the apse was to convince the worshipper that his God was truly present in the sanctuary... This aim was achieved by hierarchical organization of sacred space. Its climax is the sanctuary with its apse, where the glimmering picture of God dominates the congregation in the nave. The architectural setting... led the believer to this very image".

⁴⁹ For a catalogue and drawings, see: *Deichmann F. W.* *Ravenna. Hauptstadt des spätantiken Abendlandes. Band II. Kommentar, 2. Teil*. Wiesbaden–Stuttgart, Franz Steiner Verlag GMBH, 1976, p. 139–140. In a noted essay on the role of natural and artificial light in the

dows cannot be dated with precision, since they may either belong to the original phase of the building (6th century), or to the Carolingian phase (ninth century) when Benedictine monks took over the building complex⁵⁰. Today in the basilica there are pale coloured glass windows, and the brightness increases as one proceeds from the narthex towards the sanctuary. This effect, according to Deichmann, was due not only to the distribution of the apertures, but also to the deliberate absence of intervening obstacles such as piers and arches⁵¹. In this regard, Triantaphyllides noted the sharp contrast between the relative darkness of the western part of the building, illuminated only indirectly from the main portal in the ardicca (narthex), and the brightness of the sanctuary area lit by large windows⁵².

Another building studied by Triantaphyllides is the church of Sant'Apollinare in Classe, outside Ravenna. Here the original window openings and their glazed screens already altered in the past were restored in the early 20th century⁵³. The interior appears as evenly illuminated, with a perceptible progression towards the sanctuary, thanks to an attentive distribution of the windows⁵⁴. One should consider also that the darkness and the shadows also had a

perception of paintings and mosaics, see: *Schöne W. Über das Licht in der Malerei*. Berlin, Gebr. Mann Verlag, 1954, p. 47–48, 52–54 e fig. 2, p. 54. The author stated almost fifty years ago that unlike typical paleochristian architecture where the large gridded screens for windows made of various materials admitted a light not so different from daylight, the effect at San Vitale must have been very different due to the presence of coloured discs set into circular openings — for which the author provided a suggested graphic reconstruction. The author noted how the alabaster panels visible today disperse an ivory coloured light softer than coloured glass. Coloured glass conditions the very perception of whatever the wall decorated surface happened to be made of.

⁵⁰ Deichmann, 1976, p. 50 e p. 139–141.

⁵¹ Ibidem, p. 75 e 77.

⁵² Although the windows had undergone changes in the course of centuries, their original appearance was restored somewhat during work carried out during the last century.

⁵³ Since the church was rebuilt under Leo III in 814 one supposes that the wooden window screens closed by glass panels cut in geometrical shapes might have been renewed on this occasion. In any case, it is highly probable that the 6th century building had similar elements. Among those favouring such an hypothesis are *Schöne* (1954, p. 45–46, note 73 and the reconstruction of the screen in fig. 1, p. 47), who maintains that this would have provided adequate illumination to exalt the decorative features of the mosaics; see also *Deichmann* (1976, p. 239–240). The portico in front of the basilica still has an original wooden screen — one of the two discovered at the beginning of the 20th century. Only a dendrochronological analysis of this surviving screen can resolve the question if it dates from the 6th or the 9th centuries. The local Soprintendenza has been advised of this.

⁵⁴ The comment as well as the content is founded in *Deichmann's* case (1969, p. 258) on structural observations and in that of *Triantaphyllides* (1964, p. 96) on the measurement of light waves inside the basilica made with optical instruments. Regarding the paleo- and mid-Byzantine churches, *Hamilton*, *Byzantine architecture and decoration*, p. 75: “There is a striking contrast between the complexity of the aisles and the simplicity of the nave... The aisles afford intricate fragmentary views, with illusive vistas and reced-

positive role in making more evident the areas or objects that are well lit⁵⁵: darkness recalls the world of shadows in which we live separated from light at the beginning of Creation (Genesis 1, 2–5). The alternation of light and dark has been used in the past as an interior ‘design device’ to exalt, and circumscribe the radiant sanctuary, as Evangelia Hadjistryphonos has clarified in this symposium⁵⁶. In the 15th cent. Leon Battista Alberti, in his famous architectural treatise, noted the importance of the contrast between light and darkness, and the balance between natural and artificial light in Christian temples. He wrote that “the awe that is naturally generated by darkness encourages a sense of veneration in the mind... What is more, the flame, which should burn in a temple, and which is the most divine ornament of religious worship, looks faint in too much light”⁵⁷.

In Sant’Apollinare the marble revetments, along with the mosaics on the walls reflecting the natural light, contribute to the brightness of the space. Moreover, the panels of veined marble are set so that they converge towards the apse and direct the beholder’s attention there. The decorative device of artistically arranging the marble panels was also used, for example, in the contemporary Justinianic church of Saint Catherine at Sinai⁵⁸, where the apse mo-

ing planes, with shadowy recesses and picturesque effects: the nave is clear and open and easily grasped, with its impression of closed and substantial space. Yet the two are not disparate, for by means of the nave arcades there is a spatial relationship between nave and aisles”.

⁵⁵ On the interesting counterposition between shadows and darkness in sacred space so as to enhance the illuminated, most important areas, see: *Bettinelli, Della Longa, Maggiani, Santantoni*. Celebrare con la luce, p. 12–13.

⁵⁶ This occurred in a similar fashion in other, older churches with windowed aisles such as San Giovanni in Laterano, the famous Constantinian building, or in San Giovanni Evangelista and Sant’Apollinare Nuovo in Ravenna built in Theodosian and Theodoric times (5th–6th centuries); see: *Helou C.* Le conflit des ténèbres et de la lumière dans les écrits johanniques. Une approche symbolique // Symbolisme et expérience de la lumière dans les grandes religions / Ed. Ries. Ternes, p. 159–173.

⁵⁷ *Alberti L. B.* De re aedificatoria, lib. VII, cap. XII // Leon Battista Alberti. L’Architettura. Traduzione di Giovanni Orlandi. Introduzione e note di Paolo Portoghesi. Milano, 1989, p. 335–41: “Le finestre dei templi devono essere di dimensioni modeste e in posizione bene elevata, sì che attraverso di esse non si possa scorgere altro che il cielo, né i celebranti e gli oranti siano in alcun modo sviati dal pensiero della divinità. Il senso del timore suscitato dall’oscurità contribuisce per propria natura a disporre la mente alla venerazione... Si tenga presente inoltre che le fiamme accese nei temple — le quali rappresentano le forme di culto più divino che esista-esposte a troppa luce impallidiscono”. Cfr.: *Barry*. Lux et Lumen, p. 28, and *Dell’Acqua F.* Di fronte alle vetrate // Arti e Storia nel Medioevo, 3° vol. / Ed. Castelnuovo E., Fossati P., Giuseppe S. Torino, 2004, p. 369–403, esp. p. 375–376.

⁵⁸ *Scurati-Manzoni P.* L’architettura romana. Milano, Guerini Studio, 1991, p. 136–37. On the 6th century craftsmen skill in cutting and artistically joining marble slabs, cfr.: *Onians*. Abstraction and Imagination in Late Antiquity, p. 10.

saic represents the same subject as at Sant'Apollinare: the Transfiguration where Christ appears as light⁵⁹.

As seen in the two Ravennate cases, light seems to have been planned in ways to enhance the most important liturgical areas, and therefore to shape the sacred space. This theme has recently been taken up by a group of architects and liturgists, who have studied how light should function in sacred buildings, in the various moments of its exploitation (during liturgical celebrations or during private prayer, etc.). Among many possible examples, the basilica of San Clemente in Rome was chosen in an effort to reconstruct the most appropriate natural and artificial lighting arrangements⁶⁰.

THE HIEARARCHICAL DISPLAY OF PLASTER AND GLASS

Surprisingly perhaps, Byzantium, which is traditionally considered to have played no part in the history of stained glass, has offered valuable clues to the reconstruction of original sacred spaces through its fragmentary but historically significant coloured glass screens. Nevertheless, this is a field that awaits further studies and a great deal remains to be done.

The archaeological investigation of the "Lower-City" church at Amorium, the former capital of Anatolikon, has brought to light the remains of the interior decoration of the late-Antique and middle-Byzantine phases of the building⁶¹. Between the 9th and 10th cent., after a disastrous natural event, the columns dividing the nave from the aisles were eliminated and substituted by four piers which support a central dome. New mosaics, frescoes and an *opus sectile* floor were laid, and the wide windows were narrowed and closed by stucco screens with circular holes filled with crown-glass discs in pale colours⁶². At Amorium interesting details have emerged concerning the decorative procedures: mosaicists and painters seem to have shared the scaffoldings, suggesting that a carefully planned decorative program existed that included glazed window-screens. In this 9th–10th century phase, before the frescoes were executed, architectural features such as wall joints, pier corners, arches and also window embrasures were decorated with red lines and circles. Although this very simple kind of painting was soon replaced by

⁵⁹ Cfr.: Boespflug F. Sur la Transfiguration dans l'art médiéval d'Occident // Symbolisme et expérience de la lumière dans les grandes religions / Ed. Ries, Ternes, p. 199–223, esp. p. 202.

⁶⁰ Cfr.: Bettinelli, Della Longa, Maggiani, Santantoni. Celebrare con la luce, p. 11 e 21–25.

⁶¹ Lightfoot C. et al. The Amorium Project: the 1997 Study Season // DOP, LIII (1999), p. 333–349, esp. p. 40, n. 27.

⁶² Amorium excavations 1995. The eighth preliminary report // Anatolian Studies, XLVI, 1996, p. 91–110, esp. p. 106–09; Lightfoot C., Ivison E. A. The Amorium Project: the 1995 excavation season // DOP, LI (1997), p. 291–300, esp. p. 296 and fig. C for a drawn reconstruction of a restored disc. The catalogue of the glass found at Amorium during the excavations of 1987–1997 is in press. The catalogue of the stucco-screen fragments was written by the present writer at Amorium / Hisarköy in August 2002.

figurative fresco painting, the red lines remained on the windows' stucco screens. These, taking on stylized vegetable and geometric patterns, enhanced the multi-lobed profile of the circular openings in which glass discs were set. These stucco screens are the first known example of a kind that became the most wide-spread type in the Byzantine empire. Against the predominium of this non-figurative type, figurative stained glass fragments recovered in the *Pantocrator* and in the *Chora* churches in Istanbul appear among the most controversial examples of Medieval glazed windows⁶³. In fact, scholars have been puzzled by their origins, since the artistic medium of stained glass is unprecedented in the Byzantine craft tradition⁶⁴. There is insufficient data to establish whether Constantinopolitan artisans possessed the skill and technology to make figurative stained glass. Technical observations made on the window-glass from the *Chora* and the *Pantocrator* suggest that the stained-glass windows had been manufactured by a workshop of Westerners⁶⁵. The cultural *milieu* of the regency of John II Comnenus (1118–1136) and his direct descendants welcomed contacts with the Western powers and arts, thereby suggesting a 12th century date for these stained glass windows⁶⁶. Since plain crown-blown discs were also found in the *Pantocra-*

⁶³ Megaw A. H. S. Notes on recent work of the Byzantine Institute in Istanbul // DOP, XVII (1963), p. 333–371; Lafond J. Découverte de vitraux historiés du Moyen Age à Constantinople // Cahiers Archéologiques, XVIII (1968), p. 231–238.

⁶⁴ For a long time scholars have believed the 'disc' painted with an enthroned Christ recovered at San Vitale in Ravenna as the first example of Byzantine, figurative stained glass, but recent research has questioned its chronology and cultural milieu, cfr.: Dell'Acqua. Illuminando colorat, p. 27. The debate concerning Byzantine stained glass has broadened with new discoveries at Studenica in Serbia (twelfth-century), Lesnovo in Macedonia (mid-fourteenth century, cfr.: Ljubinković R. Sur un exemplaire de vitraux du monastère de Studenica // Archlug 3 (1959), p. 137–141; Idem. Un vitrail en plomb à l'église de la Vierge à Studenica // Musée des arts décoratifs. Recueil de travaux (Belgrade) 6–7 (1960–1961), p. 19–27; Corović-Ljubinković M. Quelques problèmes relatifs au verre medieval en Serbie // Verre medieval aux Balkans, 63–69, esp. 66–68), and the Cluniac abbey of the Santissima Trinità at Mileto in Southern Italy (twelfth-century) (Peduto P., Fiorillo R. Saggi di scavo nella Mileto Vecchia in Calabria (1995 e 1999) // II Congresso Nazionale di Archeologia Medievale, Musei Civici, Chiesa di Santa Giulia, Brescia, 28 Settembre-1 Ottobre 2000 / Ed. G. P. Brogiolo. Firenze, All'Insegna del Giglio, 2000, p. 223–233).

⁶⁵ Cfr.: Dell'Acqua F. The stained-glass windows from the *Chora* and the *Pantocrator*: a 'Byzantine' mystery? // Restoring Byzantium: The Kariye Camii in Istanbul and the Byzantine Institute Restoration / Ed. Holger Klein, Robert Ousterhout. New York, 2004, p. 68–77.

⁶⁶ Megaw ("Notes on recent work", 367) had already expressed himself in favour of a link between the presence of stained glass in the *Chora* and the patronage of the *Sebastocrator* Isaac the Comnenian, recently a Comnenian chronology of the stained glass of the *Pantocrator* has been confirmed by: Ousterhout R. Master Builders of Byzantium. Princeton, 1999, p. 154. In a recent oral communication, Ousterhout favored the idea of a direct Comnenian commission for the windows of the *Pantocrator*. The influence of the Comnenian patronage on the urban and architectural development of the city is demonstrated by Magdalino P. Constantinople médiévale. Études sur l'évolution des structures urbaines. Paris, 1996, p. 69–76.

tor and the *Chora*⁶⁷, it may be that the simpler discs within plaster frames, initially displayed in all the windows of the building, were substituted with stained glass screens in the most important areas. Stained glass was intentionally used to create and enhance the most sacred areas of the buildings, playing a specific role in the making of sacred space. Another, early example of a hierarchy in the display of window screens has been recalled by the *Chronicon* of Leo of Ostia, that tells about the rebuilding of the monastery of Montecassino commissioned by the abbot Desiderius (1058–1087) whose decorative campaign was also undertaken by Byzantine craftsmen. In the main church Leo says that different types of window screens were installed, perhaps according to the hierarchical importance of the spaces. In fact, in the sanctuary were set glazed screens held with leading; in the rest of the building and in the monastic areas not used for liturgical purposes the openings had stucco screens⁶⁸.

Coming back to the *Chora*, it has been observed that light is abundant also in the *Paraekklesion* where there are various *arcosolia* tombs for prominent people (possibly the founders or the patrons)⁶⁹. Natural as well as artificial light must have been intended to enhance the holiness of the area, along with the warrior-saints painted on the walls, who watched over the dead thereby confirming the funerary function of the area. The windows of the *Paraekklesion*, as archaeology proved during the early 1960's, had plaster screens with circular holes filled with clear glass discs, a lighting device that allows a great deal of light to filter through, but which at the same time is soft and does not strike the wall-decoration with strong rays or colourful effects, as stained glass would do.

For this reason, during the last quarter of the 12th century, the fenestration of Monreale cathedral was changed in order to adapt the penetration of natural lighting to the optimum viewing of the mosaics made, as often

⁶⁷ Megaw. Notes on Recent Work, p. 365, n. 106.

⁶⁸ Leo of Ostia. *Chronica Monasterii Casinensis*, lib. III, cap. 10, 28, 33, 34 // MGH, SS, t. XXXIV, 1980, p. 372, 397, 405–06, 408–09; cfr.: Dell'Acqua. *Illuminando colorat*, p. 135–137. Neither type of window screen survives among the Montecassino examples. However their appearance can be reconstructed from a collation of the remains of the window screens of San Benedetto in Capua, Desiderius' last monumental commission, as well as from the monastery of San Vincenzo al Volturno rebuilt by an abbot who had been Desiderius disciple; cfr.: Dell'Acqua. *Shades of Desiderius. An early example of Italian stained-glass from the Romanesque abbey of San Vincenzo al Volturno (Molise, Italy)* // *Corpus Vitrearum Medii Aevi. XIX International Colloquium. Kraków, 1998, 14–16 May, Stained glass as monumental painting, Proceedings. Krakow, 1999*, p. 81–95.

⁶⁹ Gerstel S. 'It is now time to be mindful of death:' The Chora Parekklesion, Palaeologan Burial Chapels, and Hopes for a Peaceful Afterlife. Paper presented at the symposium *Restoring Byzantium*, held at Columbia University, NYC, on the 16th of April 2004, organized by Holger Klein.

claimed, by Byzantine craftsmen. The original windows had been furnished with white stucco screens with Islamic-style ornamentation. Some of these openings in the sanctuary area were subsequently walled up and covered with mosaics, according to the needs of the mosaicists, who arrived after the building's completion. Evidently, these craftsmen not only required more surface for their mosaic programme, but also needed to adjust the means of lighting them⁷⁰. Three sketches of perforated screens measuring about 20 cm high were found on the plaster of a walled-up window embrasure, one of which shows a screen with round holes and a semi-circular top; the other two show a grill of more geometric type with pointed tops. As Giuseppe Naselli Flores noted, the sketches reveal a different conception of the space and express the conflicting needs of the architects and the mosaicists. They also imply a discussion, or rapid exchange of ideas regarding the type of screen to be installed to replace the previous 'Islamic' ones⁷¹.

This can be explained if one takes into account a sort of antagonism that developed through the centuries between two artistic, figurative media: mosaics and stained glass. This was not the case originally. In Roman imperial times the use of glass windows, for protection from the elements, led to increased levels of light and thus encouraged the development of interior decoration such as wall-mosaics⁷². But glazed screens then had delicate colours, were cut in large geometrical rectangles, and were inserted in rectangular wooden or stucco transennae. Therefore these screens did not cast too much shadow on the walls and did not interfere much with the appreciation of the outlines and details of the wall decoration. In the West, murals became the more common medium for wall-decoration, it too was less frequent in those buildings in which figurative stained glass predominated, such as the transalpine Gothic cathedrals. In fact, intensely coloured and richly historiated stained glass attract the eye so effectively, that the kaleidoscopic rays of transmitted light made wall paintings obsolete.

On the other hand, a close interaction between sufficient, soft natural light and wall-mosaics is detectable in the history of Byzantine art. Elsewhere I have raised the question whether the lack of development of stained-glass in Byzantine art is due to its incompatibility with the system of architectural

⁷⁰ Naselli Flores G. Novità e ipotesi, in *I mosaici di Monreale: restauri e scoperte* (1965–1982) // XIII Catalogo di opere d'arte restaurate. Quaderno n. 4 del Bollettino «B.C.A.» Sicilia. Palermo, 1986, cap. II, p. 47–54; *Idem*, *Architettura e mosaici di Monreale* // Quaderni dell'Accademia delle Arti e del Disegno, 2 (1990), p. 25–32. Cfr.: *Dell'Acqua F.* Parvenus eclettici e il canone estetico della varietas. Riflessioni su alcuni dettagli di arredo architettonico nell'Italia meridionale normanna // *Kunst und Form im normannischen Sizilien* / Ed. David Knipp. Roma, Bibliotheca Hertziana-British School at Rome, 6–7 Dicembre 2002. “*Römisches Jahrbuch der Bibliotheca Hertziana*”, 35 (2003), in press.

⁷¹ Naselli Flores. *Architettura e mosaici*, p. 26 e n. 13.

⁷² Cfr. Beretta, Di Pasquale. *Introduzione* // *Vitrum* / Ed. Beretta, Di Pasquale, p. 26.

decoration developed in Byzantium during the central centuries of its history⁷³. Among the characteristics recurrent in this Byzantine system during the centuries before and after 1000 are figural mosaics, precious marble revetments, carved chancel screens, and narrow windows closed by stucco screens with round perforations. This kind of preciously decorated interior required considerable illumination, natural or artificial, in order to make the most of the luxurious furnishings. But at the same time the light had to be relatively soft so as not to strike the reflecting surfaces too violently. Liz James, one of the few scholars to study the interaction between light and colour in Byzantine art, has observed that mosaic is a monumental art to be appreciated and seen “from a distance and at an angle”, because they are made with “strips of pure colour” that cannot be mixed as in a painting and that could seem too ‘separated’ one from the other once viewed at a close distance. In this regard, one begins to understand why natural light had to play a specific role not only in rendering mosaics visible, but also in making their appearance more blended and soft⁷⁴. This explains why Byzantine mosaicists working in Monreale to enhance the iconography of light and to recreate a mystic atmosphere in the sanctuary insisted on changing the window openings and their screens. They were pursuing their own idea of creating a sacred space by means of natural light and precious wall decoration.

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СТЕКЛО И ЕСТЕСТВЕННЫЙ СВЕТ В ФОРМИРОВАНИИ
САКРАЛЬНЫХ ПРОСТРАНСТВ ЛАТИНСКОГО ЗАПАДА
И ВИЗАНТИЙСКОГО ВОСТОКА

Роман А. S. Byatt, действие которого происходит в Турции, содержит поразительное определение стекла, подходящее также и к витражам: это нечто, «сквозь что смотрят», и в то же время — то, «на что смотрят».

⁷³ Cfr.: Dell'Acqua F. Enhancing luxury through stained glass, from Asia Minor to Italy // Workshop on Byzantine glass. Dumbarton Oaks, 16th of Novembre 2002 / Ed. Talbot A.-M., Whitehouse D. DOP (2005), in press.

⁷⁴ As noted by Liz James, Byzantine mosaicists were skillful enough in manipulating optical artifices to get the best out of their medium. Furthermore she notes that natural light has influenced sometimes the way in which light itself is represented in mosaics (through highlighting), that take into account the direction in which it arrives on the surfaces: “Real light is used therefore in combination with an awareness of its effects in the space between viewer and picture”. See *James L.* Light and colour, p. 2 e ss.; *Eadem.* What colours were Byzantine mosaics? // *Medieval Mosaics. Light, color, materials* / Ed. Eve Borsook E., Superbi F. G., Pagliarulo G. The Harvard University Center for Italian Renaissance Studies at Villa Tatti. Cinisello Balsamo, 2000, p. 35–46, esp. p. 43.

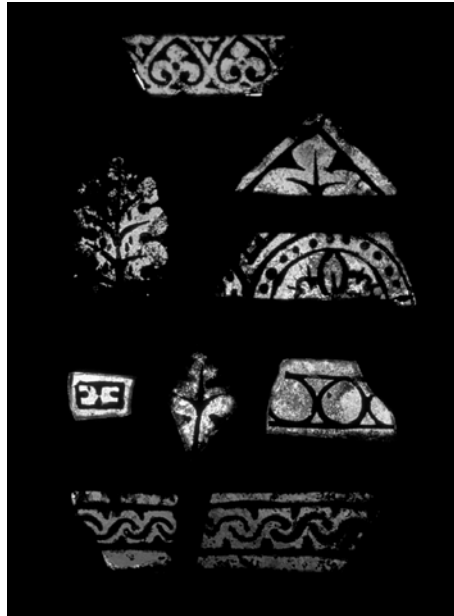
Несомненно, витражи имеют тройную ценность. Функционально они защищают от стихии и пропускают свет, эстетически увеличивают пространство и заставляют оценить как красоту самих окон, так и цвета убранства, впуская в помещение полосы цветного света, форму которым придают окна. Их символическая ценность, по крайней мере в христианстве, определяется тем, что окно уподобляют сокровищнице, сберегающей естественный свет, который считается величайшим символом божественного.

В связи с этим возникают вопросы о роли *concepteurs* (мастеров, *фр.* — создателей, устроителей, оформителей) сакрального пространства и «постановки» освещения. Важность источников света в планировке интерьеров всегда, с античности и до наших дней, была первостепенной и для архитекторов, и для заказчиков. И в самом деле, «подходящее» освещение — главный фактор в нашем восприятии пространства, оно может передать посетителю ощущение блеска, ясности, таинственности, сокровенности и т. д.

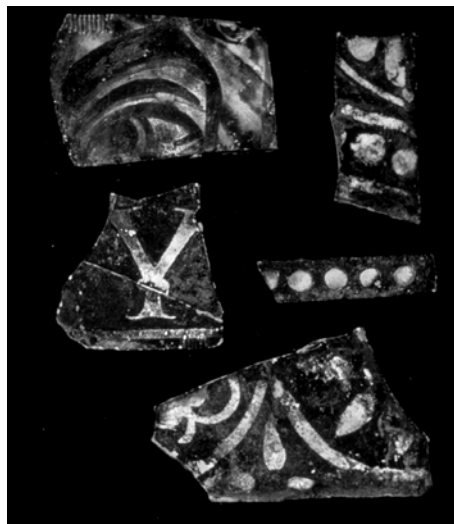
Чтобы понять, до какой степени свет был значимым для проектировщика (и заказчика) сакрального пространства, я решила исследовать практические задачи и эстетические цели, скрывающиеся за использованием стекла для заполнения оконных проемов в важнейших зданиях Запада и Востока во времена Константина Великого, а также Фридриха Барбароссы и Мануила I Комнина (соответственно, IV и XII века). Изобилие археологического материала, опубликованного в последние десятилетия, убедило меня в необходимости реконструировать исторический и культурный контекст этих периодов. Я стала сравнивать материальные и технические данные, в некоторых случаях просто куски оконных стекол и камней, деревянные и лепные рамы, с сохранившимися литературными источниками. В числе включенных в мое исследование зданий — константиновские базилики в Риме, юстиниановские постройки Сан Витале и Сан Аполлинаре в Равенне, а также Святая София в Константинополе. Как и Генрих Ойдтман в конце XIX и Энрико Кастельнуово в конце XX веков, я работала на двух уровнях, сравнивая множество новых археологических находок с письменными источниками, привлекая филологов и историков искусства, чтобы избежать непонимания, возникшего в дни Ойдтмана и повторявшегося многократно. Такой подход был разработан, чтобы, насколько это возможно, реконструировать роль витражей и вообще застекленных окон в оформлении интерьеров. Иногда археологические и письменные свидетельства повествуют о зданиях, возведенных именитыми заказчиками, и это делает исследование еще более захватывающим, несмотря на то, что приходится работать с историческими периодами, от которых сохранилось мало текстов.

К тому же я обнаружила третий компонент, который отсутствовал в работах Ойдтмана и Кастальнуово: речь идет о роли оптики. С учетом этой проблемы было исследовано лишь очень небольшое число церквей. И хотя их первоначальные естественные и искусственные источники света (окна и лампы) с течением времени изменились, они все еще предоставляют интересную информацию об этом третьем элементе, которую еще предстоит учесть. В целом свет, как нам кажется, должен был подчеркивать важнейшие литургические зоны и тем самым «формировать» сакральное пространство. Возможно, это покажется странным, но именно Византия, которую обычно не упоминают в исследованиях, посвященных витражам, так как считается, что она не играла роли в их развитии, в своих редких, но исторически важных окнах-экранах из цветного стекла демонстрирует ряд принципов, позволяющих продвинуться в реконструкции изначальных сакральных пространств. В любом случае, к этой области должно быть привлечено внимание, в ней еще многое предстоит сделать.

Несмотря на большую информированность истории искусства о позднесредневековых витражах и их исторических, эстетических и социально-политических контекстах, мне представляется, что тому впечатлению, которое эти окна и проходящий сквозь них свет оказывали на смотрящих на них людей, уделено недостаточно внимания. Большинство построек с витражными окнами — церкви, так что мы можем предположить, что большинство зрителей были христианами, для которых свет играл не только «материальную» роль (освещая помещение, подчеркивая декор, привлекая внимание верующих к центру литургического действия), но и «духовную», являясь символом Бога, к которому так обращаются в Ветхом и Новом заветах. Поэтому, начиная с раннехристианских времен, освещению церковей посредством светильников из драгоценных металлов и стекла, а также красочных окон предавалось огромное значение. Интенсивность света меняется с погодой, а также зависит от различных типов стекла и материалов оконных рам. Поэтому свет является действительно «динамическим» элементом в создании сакрального пространства и в связи с этим заслуживает нашего внимания, когда мы пытаемся понять замыслы его заказчиков и/или творцов.



1. Fragments of glass painted with *grisaille* from Kariye Camii, 12th or 13th cent.? (photo: courtesy of the Dumbarton Oaks Center for Byzantine Studies, Washington D.C.)



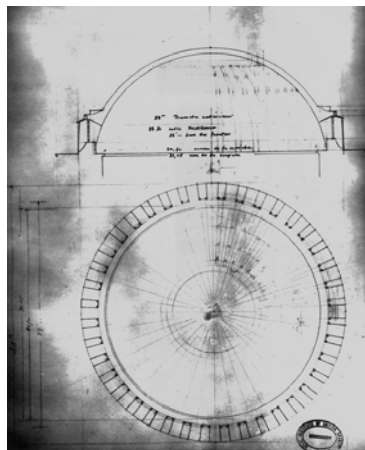
2. Fragments of glass painted with *grisaille* from *Pantocrator* or *Zeyrek Camii*, 12th or 13th cent.? (Istanbul, Archaeological Museum, photo: courtesy of the Dumbarton Oaks Center for Byzantine Studies, Washington D.C.)



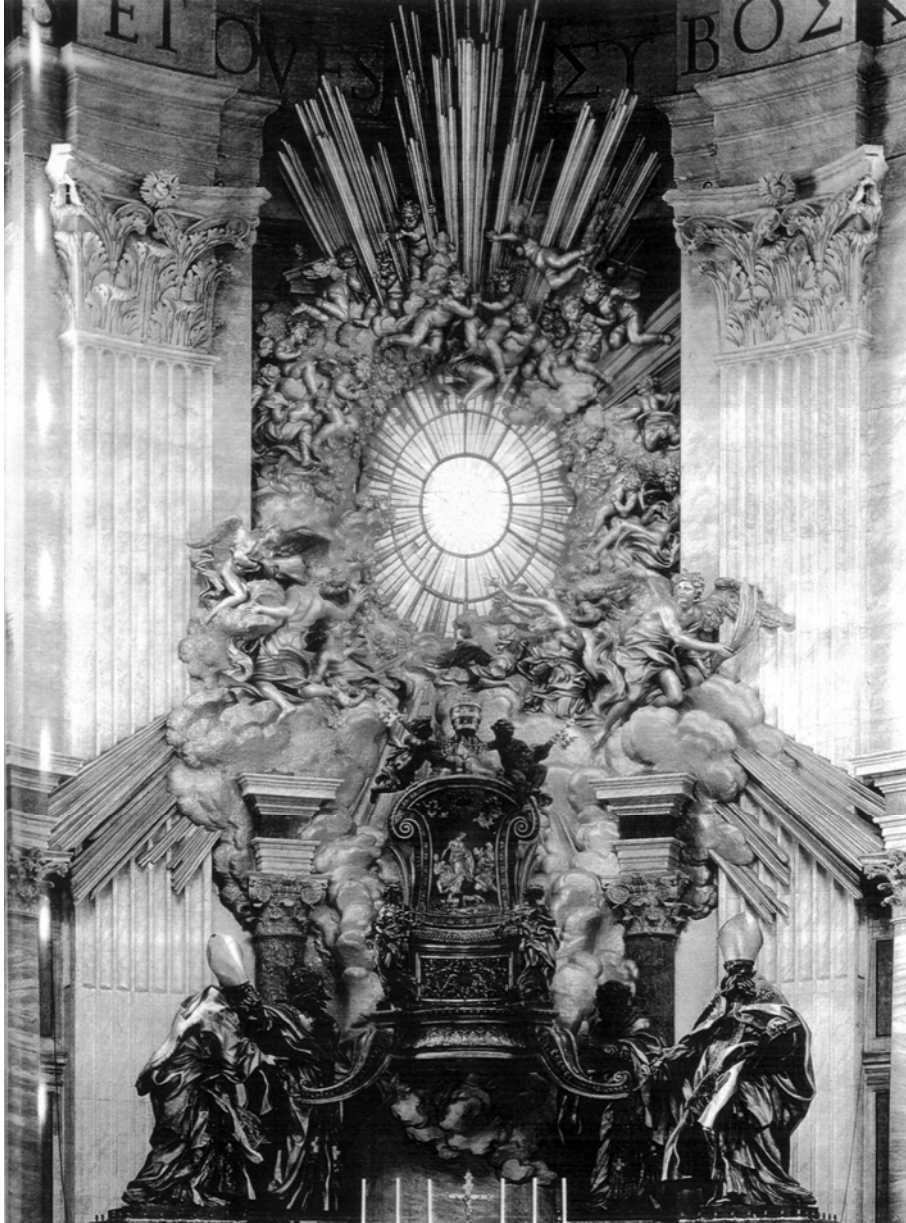
3. Basilica of San Clemente, Rome, interior in day-light



4. Graphic reconstructions of light-experiments in San Clemente (from the volume *Eugenio Bettinelli, Giorgio Della Longa, Silvano Maggiani, Antonio Santantoni, Celebrare con la luce*. Milano, 2003)



5. Reproduction of the section and plan of the Dome of Hagia Sophia drawn by Robert Texier. Dumbarton Oaks Center for Byzantine Studies



6. Saint Peter's, "Gloria" by Gianlorenzo Bernini, 1657–1666, Roma