

Innovation and Tradition in Seventeenth- and Early Eighteenth-Century Vaulting Techniques in the Southern Low Countries: A First Assessment

Krista De Jonge
Catholic University of Leuven, Belgium

Joris Snaet
Belgian Buildings Agency, Brussels, Belgium

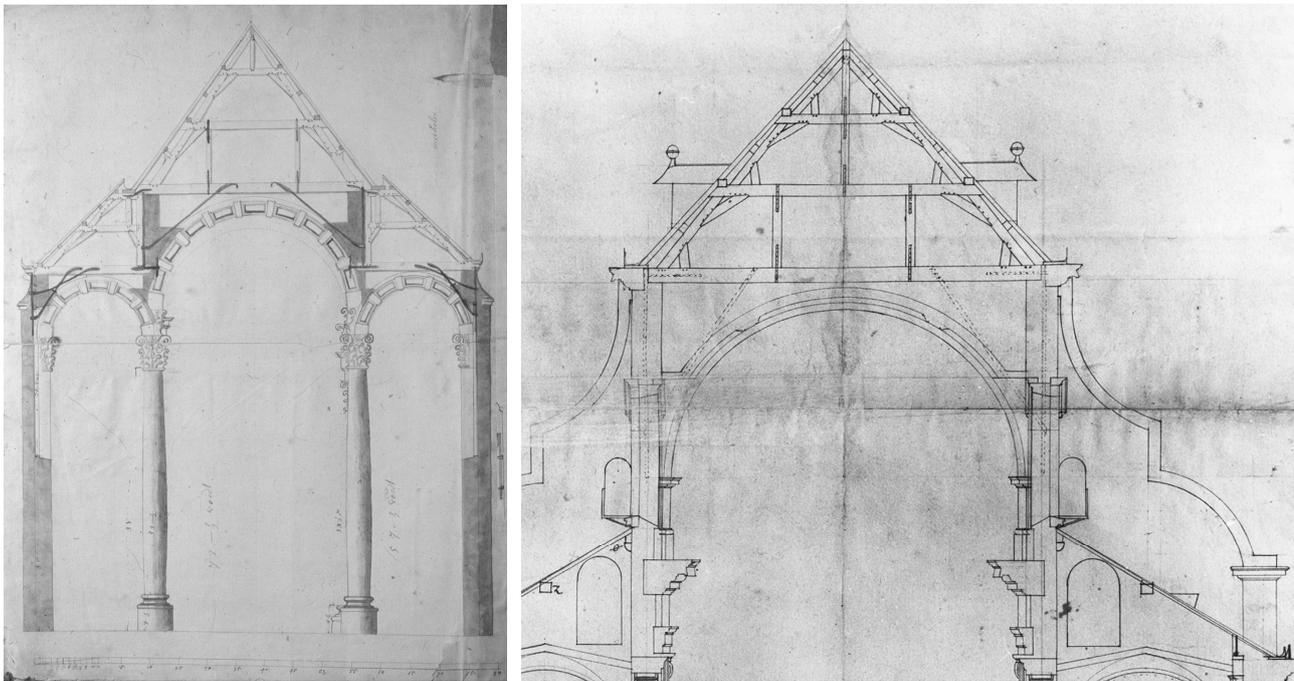
ABSTRACT: Most studies of Southern Netherlandish religious architecture in the Early Modern Period still hold to the view that the ubiquitous rib vault does not have any innovatory character; i.e. is '*still Gothic*'. In this paper we offer a revised assessment, structured around the following 'problems': 1. wood, stone and iron: composite structures; 2. cupolas and domes; 3. light, perforated brick vaults. Rare, surviving architectural drawings (mostly from the Jesuit milieu) indeed suggest that vault, roof structure and anchoring system constitute one structure conceptually. The most obvious test-case of modernity in vaulting is the (brickwork) cupola and its covering wooden dome, which is also considered a 'vault' in contemporary archival sources. Thin-shelled brick vaulting pierced by oculi in all quadrants – still mostly unstudied as a technique – evolved towards the end of the seventeenth century as an alternative to ribbed crossing domes in wood and plaster.

INTRODUCTION

Classical overviews of Southern Netherlandish religious architecture of the Early Modern Period ('Baroque', seventeenth and eighteenth centuries) still hold to the view that the rib vaults seen in most of these buildings do not have any innovatory character; i.e. they are '*still Gothic*' (Plantenga 1926; Philippot et al. 2003, pp. 91-119; on Gothic survival, see Snaet 2007, pp. 280-286; Snaet 2008, I, pp. 214-237). Rib vaults are indeed seen as inherently traditional, a legacy of the past and a symptom of a traditionalist mindset. Research carried out during the past ten years, including observations done, sometimes fortuitously, during restoration campaigns show that this assessment should be revised. Not only the avant-garde Jesuit churches in antique style of the early seventeenth century but also later ones, especially those of the 'Norbertines' (Prémontré) and a number of Marian chapels, show off remarkable vaulting solutions which force us to consider anew the question of tradition and innovation. On the basis of contemporary evidence (drawings and archival sources), we will attempt to offer the starting point for a new, technical history of vaulted structures in the Southern Low Countries of the era, structured around the following 'problems': 1. wood, stone and iron; 2. cupolas and domes; 3. light, perforated brick vaults.

WOOD, STONE AND IRON

The earliest theoretical reflections on vaults in the Southern Low Countries which are not geometrical rules of thumb, postdate the period under review; they showed up in the academic milieu of the Enlightenment, on the cusp of French influence on architectural thinking (Van de Vijver et al. 2003, pp. 110-114). Earlier and later historiography adopts the same focus on the masonry vault, seen as independent from the roof structure (and its inevitable iron anchoring system). Rare, surviving architectural drawings from the Jesuit milieu on the contrary suggest that vault, roof structure and anchoring system conceptually constitute one structure, even if the components are signed for by different masters (Daelemans 2000); a fact which would go long towards explaining the fluid transition from stone/brick towards wood in the planning history of cases such as the Leuven Jesuit church (see below). Wood, stone and iron thus do not belong to separate categories.

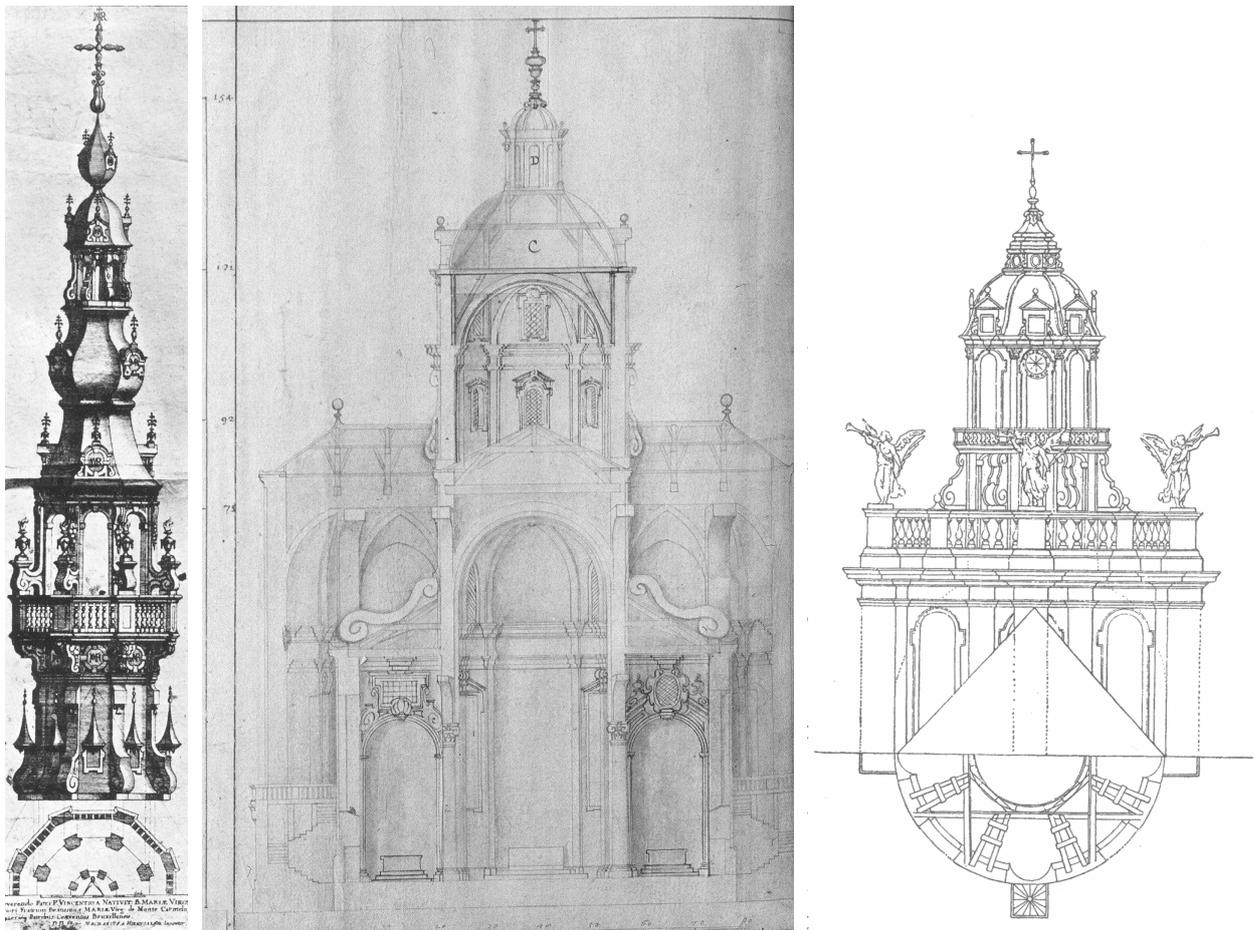


Figures 1 and 2: Section of the Mechelen Jesuit church (left) and (partial) section of the Bruges Jesuit church (right); (AVJH, *Promptuarium Pictorum*, vol. I, 27v and vol. I, 46v-47)

The increasing use of complex iron anchoring systems constitutes a significant difference between seventeenth-century rib vaults and their predecessors. The sections of the Jesuit church in Mechelen by Antoine Losson (1661), conserved in the albums of drawings known as the *Promptuarium Pictorum*, clearly illustrate the importance of the iron anchors connecting the (brick) rib vaults with the roof trusses (AVJH a) (see Fig. 1). The star-ribbed vault above the central space of the Norbertine church in Averbode (planned 1664) is likewise reinforced with iron ties which go through the brickwork and which are attached to the common rafters of the roof. In the case of the Namur Jesuit church (1621-1645) which was designed by Pieter Huyssens, the vault was not considered self-supporting, structurally speaking, by its makers. Each of the over 50 cm thick blocks of yellowish-white tufa which compose this tunnel vault with lunettes, is indeed suspended vertically from the trusses above by an iron anchoring rod (Genicot et al. 1991). Huyssens' putative earlier design for the Bruges Jesuit church (1619-1645) proposes an intermediate solution; i.e. diagonal anchoring rods for the coffered tunnel vault, similar to what can be seen in the Mechelen church (AFJH b, see Fig. 2). In this case also, the rods remain invisible to the viewer in the nave. On the other hand, an unidentified project in the *Promptuarium Pictorum* (AFJH c) illustrates an equally common solution, with simple tie rods spanning each bay in plain view; this system was applied, for instance, to the 'gothic' nave vaults of Our Lady beyond the Dyle in Mechelen (1635), thus rendering flying buttresses unnecessary (Snaet 2008, I, p. 288).

If vaults sometimes show up (tangentially) in the literature, roof structures almost never do; there is also no systematic study as yet of the complex crossing structures, often carrying lanterns, abounding in seventeenth-century Netherlandish religious architecture. Nevertheless, as will also be confirmed by the case of the Leuven Jesuit church (see below), there can be no clear line drawn between the crossing 'spire' and the crossing 'dome', and both should be considered together. Bell towers, and their reduced version, the crossing spire, showed complex carpentry forms from the beginning of the sixteenth century, when they were topped for the first time with the characteristic 'bulb' (called 'apple' in contemporary sources, see Vries 1992, pp. 89-90). The *Sketchbook* of Jesuit architect Hendrik Hoeymaker, once conserved in the main library of the University of Ghent but lost since 1980 (Brouwer 1980, Lenaerts 1992), offered an elaborate example of a bulbous spire, presumably related to the Ghent Jesuit church (ULG a).

The complicated open lantern which topped the polygonal chevet of the Carmelite church in Brussels, designed by Brother Macharius of Jerusalem (alias Macharius Berlere) around 1660 (Plantenga 1926, pp. 131-132) was even published in an engraving comprising plan and elevation (see Fig. 3). This person was also linked with the Carmelite church of Our Lady of Consolation at Vilvoorde and with Our Lady of Succour at Brussels, two domed churches vaulted in brick about which more later. Another 'forgotten' example of a complex seventeenth-century timber construction can be found in the bell-shaped crowning of the western tower of the Kapelle church at Brussels, erected after the French bombardment of 1695. This structure – of rather impressive dimensions – shows some traditionally looking features such as pinnacled clasping buttresses and clover-leaf-shaped belfry windows.



Figures 3, 4 and 5: Lantern of the Carmelite church, Brussels (left), in a contemporary engraving, Hesiuss' 1650 section of the Leuven Jesuit church (middle) and his 1665 compromise in a nineteenth-century copy (right); (Plantenga 1926, p. 129 Fig. 143, AVJH, *Promptuarium Pictorum*, vol. I, 7c and Van Even 1895, p. 375)

CUPOLAS AND DOMES

In the minds of the patrons, the new-fangled crossing domes which first appeared in the Jesuit milieu after the example of the Roman Gesù, were nothing more than a variant on such spires, as is shown by the *Litterae annuae* relating to the Jesuit church in Leuven, which called this structure consistently *turris*, 'tower'. In 1650 Willem Hesiuss, the erudite *architectus templi* (Gilissen 1938) had designed a ribbed cupola for the crossing, which opened up into a tall window in each of its eight sections, thus mirroring the windows of the drum underneath; above this vault, a wooden dome with a tall lantern would receive the bells (AFJH d; De Jonge et al. 1997, pp. 78-81; De Jonge, in press; see Fig. 4). This superposition of brick cupola and wooden dome refers to Jacques Lemercier's vault at the church of the Sorbonne in Paris (completed 1640-1643). The correspondence between the rector of the Leuven college with his superiors in Brussels dated in the month of June 1652, shows that there were still doubts about its construction materials: would it not be better to execute it in wood instead of stone (*struendae vel ex lapide, vel ex ligno, see RB a*)? Grave stability problems in one of the supporting piers finally led to the adoption of a reduced version, also designed by Hesiuss. This probably came to pass in two distinct stages; i.e. one dated before 1657, when the present lower ring of the drum was executed (its wall thickness of only 50 cm pointing to a wooden superstructure, see Styne 2006, I, p. 37), and a second one in 1665. The original drawing related to the latter phase, though lost, is known through a nineteenth-century copy (Van Even 1895, p. 375; Gilissen 1938, p. 234; see Fig. 5), and its volumetric effect can be seen in Sanderus' fictional view of the church (Sanderus 1726-1727, III, 36, between pp. 30-31). The project, surprisingly so, harks back to an earlier solution from the French Jesuit milieu; i.e. the crossing dome and lantern of Saint-Paul-Saint-Louis of Paris probably designed by Etienne Martellange (1627-1641), in which the drum is similarly integrated into the roof structure of nave and transept. This second project was not executed either.

In both projects, the ribbed octagonal cupola must be considered as an original development of the gothic polygonal rib vaults in the chevet, current in Netherlandish church architecture since the fourteenth century. Similarly, the star-patterned rib vaults found, for instance, in the church of the Discalced Carmelites at Namur (1627) and the Brussels Beguinage church (from 1657 onwards) can be seen as natural descendants of the most modern vaults of the preceding century. In the Low Countries, rib vaults with complex net and star patterns indeed only gradually showed up in the course of the sixteenth century, for instance in the nave of Saint Bavo's at Ghent, completed from 1550 with subsidies from Emperor Charles V, and the court chapel in Brussels

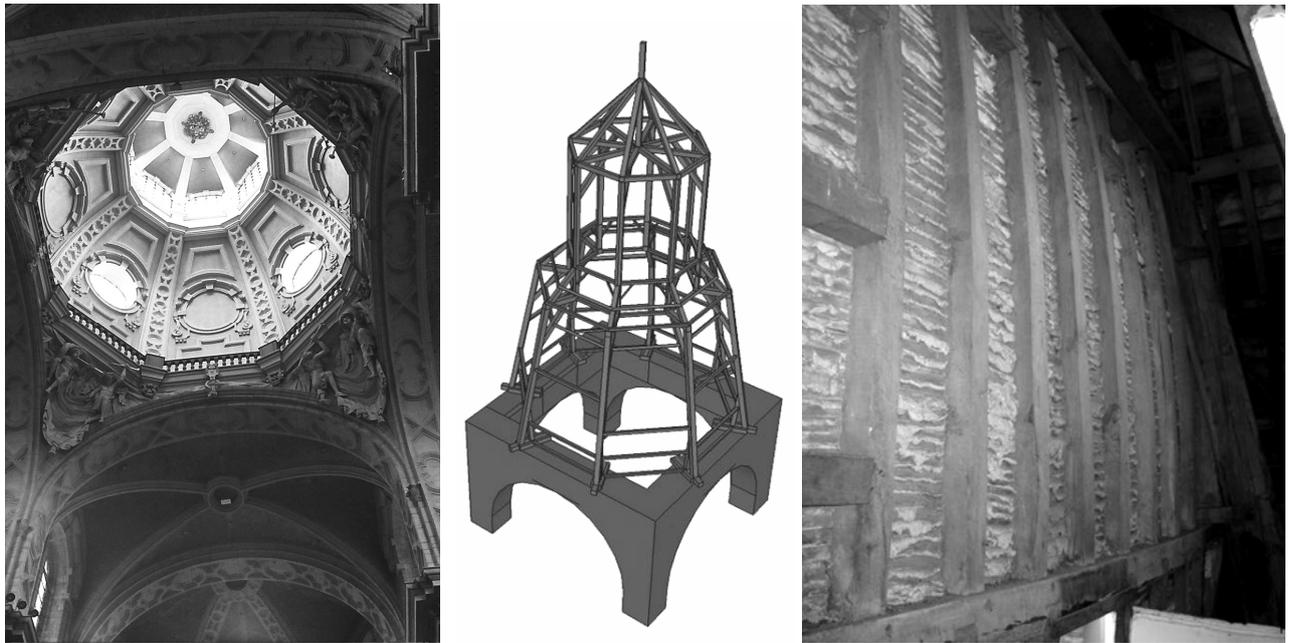
(1548-1552). Significantly, similar vaults abound in seventeenth-century church construction, not only on sites where construction was interrupted during the Revolt such as Saint Paul's, Antwerp (choir, 1618-1639) and Saint Jacob's, Antwerp (till 1656) but also in cases of reconstruction such as Saint Michael's, Ghent (1628-1648) and in new projects such as the ones mentioned above. In this light, the star vault above the central bay of the Norbertine church at Averbode seems like a natural, and eminently suitable, alternative to the crossing dome: it repeats a still current solution, found above the crossing of only recently completed churches such as the aforementioned Saint Bavo's (from 1628 onwards), Saint Michael's and Saint Jacob's.

The cupola in brick and stone with wooden, lead-covered dome obviously constituted a test-case of modernity in seventeenth-century Southern Netherlandish vaulting, as is shown by the fact that the most ambitious projects attempted something of the kind; generally without success, however. In the Mechelen pilgrimage church of Our Lady of Hanswijk, designed in 1663 by Lucas Faydherbe who had known Hesius personally (De Jonge et al. 1997, pp. 91-105), the original concept must have resembled Hesius' first project for the Leuven Jesuit church. This can be deduced from the engraving in Petrus Croon's book, published in 1670; i.e. during the works, as a means of gaining additional means for its construction (Croon 1670, fol. 132; see Fig. 6). The lower drum pierced with windows must have supported a rib vault, also lighted by the windows in the upper drum; a dome covered the whole. The balustrade could be a reminiscence of Hesius' last project for Leuven. In the end, here also a reduced version was adopted in 1677-1681, in the form of a twelve-sided ribbed cupola, placed on a very tall drum (see Fig. 7). This vault turns out to have been realized in brick (Stynen 2006, I, p. 68); the absence of any exterior buttressing whatsoever leads to the hypothesis of an extensive tie rod system embedded in the masonry, to be checked when the church will be finally restored. Faydherbe's original concept already needed similar anchoring, as shown by a written protest he lodged with his patrons in 1677: *met force van yser* (Van Caster 1903, p. 27).



Figures 6 and 7: Faydherbe's original concept for the dome of Our Lady of Hanswijk, Mechelen, in an engraving by Bouttats (left) and the actual vault (right); (left, De Jonge et al. 1997, p. 96)

Contrary to the Mechelen example, however, most seventeenth-century cupolas we have examined were executed in wood with lath-and-plaster finishing, a fact which is rarely apparent when seen from below. The example covering the crossing of the Norbertine church at Grimbergen (start of construction, 1660) must also be linked to Hesius' last project for Leuven: the ground plan mirrors the Leuven one with its trefoil-like eastern part. Moreover, the Norbertine community is known to have donated limestone from its own quarries for the construction of the Leuven church (RB b). The lower cupola is lighted by oval windows on the diagonals only, since the axial ones are partially obscured by the adjacent saddle back roofs covering the nave and transept; eight ribs support the octagonal lantern, which in its turn is topped by an eight-sided ribbed vault (Stynen 2006, I, pp. 75-77; see Figs. 8-10). The 'sunken' dome on the crossing of the former Norbertine church at Ninove, which was finished in the year 1722, offers a compressed version of this (Van de Perre 1985; Stynen 2006, I, pp. 81-83). Recent research of the truss in the bell-shaped lantern revealed that the eight 'oculi' (which look like protruding portholes on the outside) were not originally filled in with black paintings as they are now, but let the light through; they will be opened up again during the current restoration campaign (Steenmeijer et al. 2008).



Figures 8, 9 and 10: Crossing dome at Grimbergen (left), its timber structure (middle) and detail of lath-and-plaster shell (right); (middle and right, drawing and photograph Tijl Stynen)

The slightly earlier crossing dome of the (lost) Cistercian church at Hemiksem, erected after a fire from 1672 to 1677, resembles both Norbertine solutions (Snaet 2008, p. 283). As shown by Harrewijn's engraving (Foppens 1717, p. 153), the lower drum, sunk into the roof structure, had four diagonally placed windows, while the octagonal upper drum had eight, one per section.

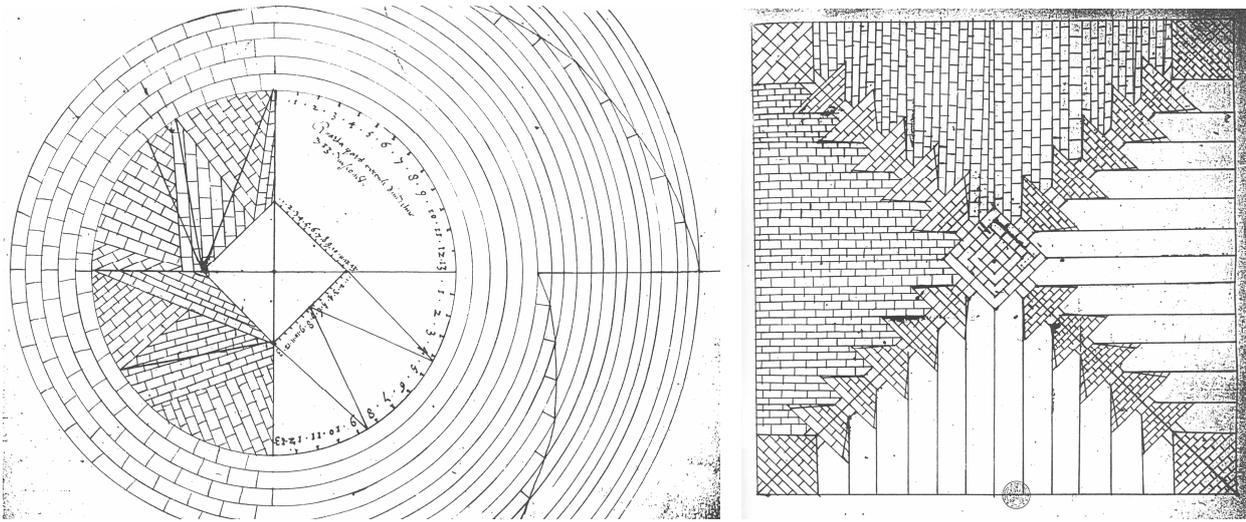
In the Benedictine church of Saint-Peter's at Ghent, Pieter Huysens had planned a monumental dome for the centrally planned western part (1628), but this was only realized a long time after his death (*1637); i.e. in 1717-1722 (Van Driessche 1978). The drum, carried on four cruciform pillars, was executed in stone-clad brick, but the airy vault above is a double-shelled wood construction. The space behind the pendentives is filled with rubble, which is not very usual in the Low Countries – does this reflect Huysens' alleged voyage to Rome between 1626 and 1627 (Braun 1907, p. 105-122)? A cunning system of relieving arches in brick and stone can be seen in the lower ring of the drum (Stynen 2006, I, pp. 90-93) as well as in the pendentives, more specifically in the sculptured clouds above the heads of the Evangelists.

It may be noted that similar combinations of cupolas topped with domes or with more elaborate lantern structures abound in French Jesuit architecture from the second quarter of the seventeenth century, most particularly in Etienne Martellange's drawings and in Mathurin Jousse's carpentry treatises of 1628 and 1642, which were also linked to the Jesuit milieu of La Flèche (De Jonge, in press). While a causal link cannot be demonstrated, it is interesting to see that the crossing dome evolves in a parallel manner in this context, which is after all not too dissimilar from the Southern Netherlandish one on the level of carpentry: since the middle ages both parts of Europe traditionally share a preference for tall, complex roof structures with thick main timbers.

PIERCED BRICK SHELLS

Lastly, by the end of the seventeenth century examples of pierced, thin-shelled brick vaulting can be noted in churches such as Our Lady of Succour in Brussels, the convent church of the Riches Claires in the same city and the church of the Discalced Carmelites in Bruges. These shells are distinct from the ribbed cupolas mentioned above, which are skeleton structures properly speaking. They nevertheless fulfil the same task; i.e. letting abundant light into the crossing from above. Contemporary documentation is mostly lacking, and structures are often inaccessible: this technique, which has gone unremarked so far, needs further study.

Two rare drawings from the Jesuit context suggest that bricklaying patterns for (non-ribbed) vaults were an object of study already from ca. 1600. The Hoemaker Sketchbook mentioned above, indeed shows a vault on a circular plan, possibly a hemispheric cupola, and one on a square, possibly a groin vault or maybe a square dome, with the brick patterns carefully drawn in (ULG b) (see Figs. 11-12). The cupola design can be compared with the brick hexagonal umbrella vault of Our Lady of Consolation at Vilvoorde (from 1663 onwards) which shows a similar brick pattern on its extrados: concentric, horizontal layers in the lower part with perpendicular layers in the crown (Stynen 2006, II, Fig. 55). Although without direct lighting in its actual state, the latter



Figures 11 and 12: Masonry patterns for vaults by Hendrik Hoeymaker, ca. 1600; (ULG, Ms. G.60751)

vault might have been lighted from above, as one of the preserved project drawings shows a windowed lantern on top (ADCVa; Buonocore et al. 2000, p. 141).

The present, brick cupola shell of Our Lady of Succour at Brussels (see Fig. 13), a hospital church for pilgrims, was installed after the French bombardment of 1695 to replace the original wooden construction realized in 1669-1671 after a design by the carpenter and woodcarver Jan Cortvriendt (Plantenga 1926, pp. 201-205; Mörsch 1965, pp. 124-138). The new vault is hexagonal and would have been originally lighted from above by an open lantern (said to be the one which now stands on the short nave and serves as clock tower). Of the six oval oculi which are now obscured by paintings, the two on the main axis would never have been open as the roofs of nave and choir apse about the covering dome at this point, but the four lateral ones could very well have been on the condition of having lower roofs on the side chapels, and of taking out the St Andrews' crosses in the dome (Stynen 2006, I, pp. 56-58). It is clear that a more thorough examination in situ is needed to chart successive changes and restorations in this structure.

In another Brussels church, the diagonally placed oculi are actually functional, however, with a very light and airy space as a result in spite of the fact that the vault is sunk into the roof volume (see Fig. 14). The crossing of the convent church of the Riches Claires (built 1665-1683) is covered with a brick cupola on four arches, lighted by four diagonally placed oculi and a lantern (Plantenga 1926, pp. 197-201; De Poorter et al. 1995, pp. 32-27). This construction strongly resembles the timber crossing domes in Grimbergen and Ninove even if its material is different.

Finally, the church of the Discalced Carmelites at Bruges (1688-1691) has an octagonal vault on pendentives above the crossing (De Groote 2001), but with a flatter profile than the Brussels examples quoted above. Here, eight oculi pierce the vault; at one point they might have been open since they are now only covered over with planking. The original function of the small round opening in the centre of the vault remains unclear, as its proportions seem too small for a proper lantern.



Figure 13: Our Lady of Succour, Brussels



Figure 14: Our Lady of the Riches Claires, Brussels

CONCLUSIONS

Taken all in all, the only 'classical' stone cupola built in the Southern Low Countries in the seventeenth century seems to be, to date, the seven-sided vault covering the centrally-planned pilgrimage church of Our Lady at Scherpenheuvel (Montaigu), the main symbol of the new Counter-Reformation actively promoted by the Spanish Habsburg regents, Archduke Albert of Austria and the Infanta Isabel of Spain (Duerloo et al. 2002). Its construction, subsidized by Philip III of Spain, was completed before 1627 when the church was consecrated. Only this vault conforms to the commonly accepted image, contrary to the other designs we have examined in this paper. These must on the contrary be seen as composite structures, covering the full range of possible combinations in brick/stone and wood, with fluid transitions from one material to another; and as profoundly original concepts, which in the case of the ribbed cupola constitute a natural development of the gothic chevet vault. This subject obviously needs a more profound analysis and in particular, a thorough-going examination of the surviving constructions with special regard to hidden buttressing or anchoring systems. While recent restoration campaigns at Averbode, Grimbergen, and Ghent have revealed some of these particulars, their findings mostly remain unpublished and thus unexploited by the scientific community. It is to be hoped that this paper, a synthesis of intermittent work on the subject during the past ten years, generates further research of a more systematic nature.

REFERENCES

- Braun, J., 1907: *Die belgischen Jesuitenkirchen. Ein Beitrag zur Geschichte des Kampfes zwischen Gotik und Renaissance. Freiburg im Breisgau: Herdersche Verlagshandlung.*
- Buonocore, M.; Cassaro, G.; Windmolders, N., 2000: De kerk van Onze-Lieve-Vrouw-ten-Troost te Vilvoorde. In: De Jonge, K.; De Vos, A.; Snaet, J. (eds): *Bellissimi ingegni, grandissimo splendore. Studies over de religieuze architectuur in de Zuidelijke Nederlanden tijdens de 17de eeuw.* Leuven: University Press Leuven, pp. 127-159.
- Croon, P., 1670: *Historie van Onse Lieve Vrouwe van Hanswijck.* Mechelen: Gijsbrecht Lints.
- Daelemans, B., 2000: Het Promptuarium Pictorum als spiegel van de ontwerppraktijk der Vlaamse Jezuïetenarchitecten in de 17^{de} eeuw. In: De Jonge, K.; De Vos, A.; Snaet, J. (eds): *Bellissimi ingegni, grandissimo splendore. Studies over de religieuze architectuur in de Zuidelijke Nederlanden tijdens de 17de eeuw.* Leuven: University Press Leuven, pp. 175-198.
- De Grootte, S., 2001: *De klooster en de kerk van de ongeschoeide karmelieten te Brugge.* Leuven: Catholic University of Leuven, Master Thesis, K. De Jonge (dir.).
- De Jonge, K.; De Vos, A.; Van Langendonck, L.; Van Riet, S., 1997: Lucas Faydherbe als architect. In: De Nijn, H. et al. (eds): *Lucas Faydherbe, 1617-1697, Mechels beeldhouwer & architect.* Mechelen: Stedelijke Musea Mechelen, pp. 71-122.
- De Jonge, K., in press: Echanges architecturaux entre la France et les anciens Pays-Bas dans le domaine religieux: coupôles et dômes. In: Maes, G.; Leblanc, J. (eds): *Les échanges artistiques entre les anciens Pays-Bas et la France, 1482-1814.* Turnhout : Brepols.
- Depoorter, A.; Demeter, S., 1995: *De Rijke Klarenwijk: van Priemspoort tot klooster,* Brussels: Dienst Monumenten en Landschappen van het Brussels Hoofdstedelijk Gewest.
- Duerloo, L.; Wingens, M., 2002: *Scherpenheuvel. Het Jeruzalem van de Lage Landen.* Leuven: Davidsfonds.
- Foppens, F., 1717: *Historia Episcopatus Antverpiensis continens Episcoporum Seriem et Capitulorum, Abbatiarum, et Monasteriorum Foundationes.* Brussels: Foppens.

- Genicot, L.F. ; Coomans, Th., 1991: Les bâtiments des jésuites à Namur aux XVIIe et XVIIIe siècles. In: Berleur, J.; Vanden Bemden, Y. (eds.): *Les jésuites à Namur 161-1773. Mélanges d'histoire et d'art publiés à l'occasion des anniversaires ignatiens*. Namur: Presses universitaires de Namur, pp. 99-173.
- Gilissen, J., 1938: Le Père Guillaume Hesius. Architecte du XVII^e siècle. *Annales de la Société royale d'Archéologie de Bruxelles: mémoires, rapports et documents* 42, pp. 216-255.
- Lenaerts, T., 1992: Broeder Hoeymaker en de Gentse collegekerk. In: De Block, J.; Polfliet, L. (eds): *400 jaar jezuïetencollege te Gent, Ghent: Museum Arnold Vander Haeghen* (exhibition catalogue), pp. 63-70.
- Mörsch, G., 1965: *Der Zentralbaugedanke im Belgischen Kirchenbau des 17. Jahrhundert*. Bonn: Rheinische Friedrich-Wilhelms Universität, Ph.D. thesis.
- Philippot, P.; Vautier, D., 2003: L'architecture religieuse baroque dans les Pays-Bas méridionaux et la Principauté de Liège 1620 – 1760/70. In: Philippot, P. et al.(eds): *L'architecture religieuse et la sculpture baroques dans les Pays-Bas méridionaux et la Principauté de Liège 1600-1770*. Liège: Mardaga, pp.43ff.
- Plantenga, J.H., 1926: *L'architecture religieuse dans l'ancien duché de Brabant depuis le règne des archiducs jusqu'au gouvernement autrichien (1598-1713)*. The Hague: Martinus Nijhoff.
- Sanderus, A., 1726-1727: *Chorographia sacra Brabantica*. The Hague: Christianus van Lom, 2nd augmented ed.
- Snaet, J., 2007: For the Greater Glory of God. Religious Architecture in the Low Countries 1560-1700. In: De Jonge, K.; Ottenheim, K. (eds): *Unity and Discontinuity. Architectural Relations between the Southern and Northern Low Countries 1530-1700* (Architectura Moderna, 5). Turnhout : Brepols, pp. 251-298.
- Snaet, J., 2008: *Reformatie versus contrareformatie. De religieuze architectuur in de Noordelijke en Zuidelijke Nederlanden gedurende de 16de en 17de eeuw*. Leuven: Catholic University of Leuven, Ph.D. thesis, 2 vols.
- Steenmeijer R.; Baksteen, H. (Architectenbureau) 2008: Ninove, Kerk O.L.Vrouw Hemelvaart, Dossier, Restauratiefase III.
- Stynen, T., 2006: *Koepelstructuren in de Zuidelijke Nederlanden in de 17de en vroege 18de eeuw*. Leuven: Catholic University of Leuven, Master Thesis, K. De Jonge (dir.), 2 vols.
- Van Caster, G., 1903: Quelques remarques sur les constructions élevées par Luc Fayd'herbe à Malines, *Annales de l'académie royale d'archéologie de Belgique* 4.
- Van Driessche, R., 1978: De barok Sint-Pieterskerk te Gent. *Handelingen van de maatschappij voor geschiedenis en oudheidkunde te Gent* 32, pp. 1-77.
- Van de Vijver, D.; De Jonge, K. (ed), 2003: *Ingenieurs en architecten op de drempel van een nieuwe tijd (1750-1830)*. Leuven: University Press Leuven.
- Van de Perre, D., 1985: De bouw van de huidige kerk, 1623-1723, van gotiek tot barok, een moeizame evolutie. In: Steyaert, R., Vande Winkel, G. (eds): *De premonstratenzerabdij van Ninove (1137-1796), 700 jaar Premonstratenzerleven te Ninove*. Ninove: Werkgroep abdij Ninove, pp. 24-36.
- Van Even, E., 1895: *Louvain dans le passé et le présent*. Leuven : Fonteyn.
- Vries, D.J. de, 1992: "Soe dattet een Ewyck Werck mach bliven"; de bouw van de Onze Lieve Vrouwetoren of Peperbus te Zwolle. *Jaarboek Monumentenzorg*, pp. 71-96.

Archives of the Discalced Carmelites, Vilvoorde (ADCV):
ADCV a, Project for the Eastern Marial Chapel.

Archives of the Flemish Jesuits, Heverlee (AFJH):
AFJH a, Promptuarium Pictorum, vol. I, 27v and 23.
AFJH b, Promptuarium Pictorum, vol. I, 46v-47.
AFJH c, Promptuarium Pictorum, vol. I, 105.
AFJH d, Promptuarium Pictorum, vol. I, 7c.

Rijksarchief te Beveren (RB), formerly Algemeen Rijksarchief, Brussels:

- RB a, Jezuiten, Provincia Flandro-Belgica, 778, minutes of a letter of Provincial Superior G. De Wael to A. Cools, rector of the Leuven college, and to A. van Boereghem, (financial) supervisor of the works, Antwerp, June 1652.
- RB b, Jezuiten, Provincia Flandro-Belgica, 771, letter of G. Ottonis to Provincial Superior G. De Wael, 3 May 1652; answer of De Wael, 4 June 1652; letter of A. van Boereghem to G. De Wael, 3 June 1652.

University Library, Ghent (ULG):

- ULG a, Ms. G.6075¹, Hoeymaker Sketchbook (photocopy Collection R.M. Lemaire, Catholic University of Leuven), 19(right), 20, 24 (our numbering).
- ULG a, Ms. G.6075¹, Hoeymaker Sketchbook (photocopy Collection R.M. Lemaire, Catholic University of Leuven), 18 (left), 19 (left) (our numbering).

Photo Credits:

- Figs. 1, 2, 4 – © Archives of the Flemish Jesuits, Heverlee (photo Catholic University of Leuven/Paul Stuyven).
Fig. 3: Plantenga 1926, p. 129 Fig. 143.
Fig. 5: Van Even 1895, p. 375.
Fig. 6: De Jonge et al. 1997, p. 96 – © Stadsarchief bibliotheek Mechelen.
Fig. 7 – © Catholic University of Leuven / Paul Stuyven.
Figs. 8, 13, 14 – © Joris Snaet.
Figs. 9, 10 – © Catholic University of Leuven / Tijn Stynen.
Figs. 11, 12 – © University Library Ghent (after photocopy Collection R.M. Lemaire, Catholic University of Leuven).