Tile Vaults in Belgium in the 1930s The Churches of Léonard Homez

Paula Fuentes
Rosa Ana Guerra-Pestonit

During the first half of the 20th century, Belgium witnessed a wide range of styles in church design. While neo-Gothic was the dominant trend until the 1920s, experimentation with new forms and new materials was the main feature of the 1920s. During the middle of the 1930s, design moved towards more traditional forms (Coomans 2014). Tile vaults were introduced in the country at the beginning of the century. Widely used in churches, this technique allowed great flexibility in the design, together with economical and fast construction, which was especially important in the interwar period. In this context, Léonard Homez designed and built three churches, two in Brussels – Sainte-Alix in Wolowe-Saint-Pierre (1935–36) and Divin Sauveur in Schaerbeek (1935–37) – and Sint-Theresia in Dilbeek (1937–39), very close to Brussels. The vaults were built by the specialized contractor Tignol and Joly. This chapter analyses the constructive characteristics of these vaults, their geometry, and their similarities as well as the evolution of their design and construction.

We have combined archival research with careful on-site work. The three churches have been surveyed with a laser scanner, providing the basis for the geometrical studies. We have had access to several of Homez's original construction drawings, which has allowed us to compare the degree of fidelity of the construction to the original design, keeping in mind that tile vaulting implies limited means of construction, and therefore ways of controlling the form. But before going deeper in the analysis of these buildings, we discuss how tile vaulting was introduced in Belgium and why Homez decided to use this technique in his churches.

Figure 1. Top: Sainte-Alix in Woluwe-Saint-Pierre; centre: Divin Sauveur in Schaerbeek; bottom: Sint-Theresia in Dilbeek (Photos: Authors, 2019).

Tile Vaults and Belgian Specialized Contractors

Tile vaults are a particular type of vault where thin bricks (tiles) are placed flatwise, creating a thin surface. The bricks are set with gypsum mortar. The fast hardening of this mortar provides a cohesive bond that holds the bricks in place during construction without centering, resulting in a fast and economical technique. Tile vaults have been built in the Mediterranean area for centuries.[1] In France, the technique became popular in the 18th century and was in common use, at least in some areas, until the 20th century (Fuentes 2021b; Huerta 2021). However, there is no evidence of tile vaults in Belgium before the beginning of the 20th century. Only some references in texts, probably copied from French treatises, mention the possibility of building vaults with this technique. In the *Cours de construction*, Demanet (1847, 246) described the construction of very low-rise vaults, with one or two layers of bricks laid in plaster or hydraulic mortar. He also pointed out that the use of hollow bricks is very advantageous for obtaining light vaults and that such vaults were frequently built in Paris. De Vos (1879) explained the possibility of building vaults placing the bricks flatwise. He stated that if the vaults are carefully built, they can be very robust. However, he did not mention the possibility of building these vaults without centering, which is one of their most outstanding features.

The technique was probably transmitted to Belgium from France, by the hands of French architect Charles Girault and contractor Auguste Fabre. At the beginning of the 20th century, Girault was working for the Belgian king Léopold II to design and build, among other buildings, the Congo Museum and the Palace of Laeken. Fabre was in charge of the vaults in these buildings, and some of them were tile vaults, including the central dome of the Congo Museum, which has a span of 20 m.[2] Auguste Fabre was a contractor who specialized in the construction of vaults. He founded his company in 1896, and patented several systems of light vaults, among them a system of tile vaults (Fabre 1905; Fuentes 2021b). Following Fabre's work in Belgium, up until 1950, hundreds of tile vaults were built in this country. Different contractors specialized in this technique, and different patents were issued (Fuentes 2021a). The advantages of these vaults were evident: they were economical, light and fast to build. Their good acoustic performance was also pointed out: "The research that has been carried out over the last few years in this respect has always shown that the vaults of our system contribute to producing the best thermal and acoustic insulation, as the materials used are hollow"[3] (Fabre n.d.).

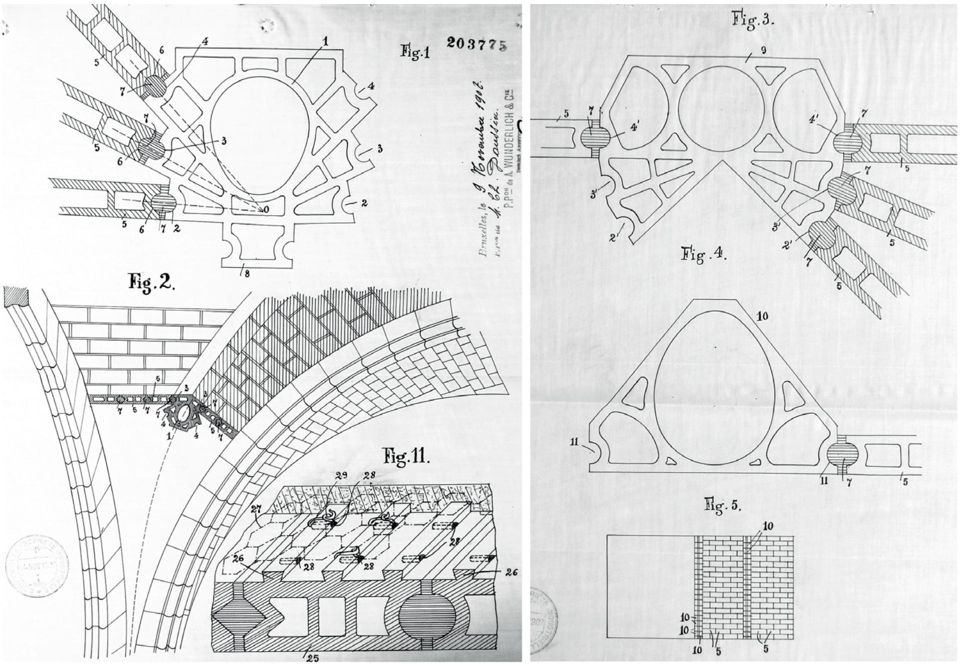


Figure 2. Drawings in the patent by Charles Daussin, 1907 (Archives Générales du Royaume 2 - dépôt J. Cuvelier, Brevets Belges).

From Charles Daussin to J. Tignol and A. Joly

The Congo Museum and the Palace of Laeken also appear in advertisements for two Belgian contractors, Charles Daussin and Gairin and Brochon, who probably collaborated with Fabre in the construction of these vaults.[4] The company founded by Charles Daussin was in charge of the vaults of the churches presented in this chapter. Daussin died in the 1910s and the company changed its name to Vve. Daussin & Tignol. In 1930 the name of the company changed again to J. Tignol & A. Joly. This is the name we find related to the construction of the vaults in Homez's churches. By then, the company had a wealth of experience in the construction of tile vaults.

Although the archive of Daussin's company has not been found, it is possible to follow its trajectory thanks to advertisements published in the journals of the time and to scattered information found in different archives. In the first years of the 20th century, Daussin was using Fabre's patent, as stated in the company's letterhead (Fuentes and Wouters 2019, fig. 9), but in 1907 Daussin patented special bricks and a system for the construction of

Figure 3. From left to right and top to bottom: Church of the Convent of the Pères Barnabites in Forest, Brussels (Architect: L. Pepermans, 1908); Church of Saint-Jean-Berchmans in Etterbeek, Brussels (Architect: J. Prémont, 1912); Church of Sint-Jan-Babtiskerk in Houthulst (Architect: J. Viérin, 1923); Church of Sainte-Cécile, Florenville (Architect: L. P. Servais, 1922); Church of the Abbey Notre-Dame de Clairefontaine (Architect: H. Vaes, 1935); Church of Notre-Dame de l'Annonciation in Ixelles, Brussels (Architect: C. Damman, 1934); (Photos: Authors, 2019).

light vaults (*Briques spéciales pour la construction de voûtes légères et système de voûtes*). In this patent, Daussin explained a method of tile vault construction (Daussin 1907). Daussin's innovation was the introduction of special hollow bricks. These bricks have concave faces filled with plaster mortar or special cement, forming tendons ('Fig. 11' in fig. 2). The vaults are reinforced with ribs, formed by special bricks, with multiple supports for the webs

Figure 4. Advertising booklet for Tignol & Joly, ca. 1955 (Rijksarchief te Kortrijk, Inventaris van het archief van architect Jozef DeMeyere, no. 516).

when they form the groin ('Fig. 1' and 'Fig. 3' in fig. 2). If the ribs are visible in the intrados, the piece may have a projection to support the moulding (8 in 'Fig. 1', fig. 2). Figure 2 shows the different designs of bricks used for different types of vaults: groin vaults ('Fig. 1'), barrel vaults ('Fig. 4'), lunettes or cloister vaults ('Fig. 3'). The bricks may have grooves on the upper face in order to provide a better connection with an optional layer of mortar that can be reinforced with a wire mesh ('Fig. 11'). Daussin patented the same system in Germany (Daussin 1908) and in France (Daussin 1909).

This company built vaults in many churches (fig. 3), but also in other type of buildings, such as the Kursaal in Namur (1914), where a vault with a span of 17 m and a thickness of 40 mm was built (*L'index du bâtiment* 1921, 37). Despite slight differences, the technique is always the same: hollow bricks, placed flat. When the vault does not support any loads, only one layer of bricks was used. Bricks were sometimes visible in the intrados, and sometimes had a coat. Over the extrados, there is sometimes a reinforced layer of mortar. Daussin's patent put the emphasis on the bricks, and not so much on the upper layer of mortar, but some years later Tignol and Joly highlighted the importance of this upper layer:

> Up until today, light vaults made of hollow bricks had no other connection between the elements than the mortar of the joints, which is insufficient when it comes to large-span

> vaults. In order to meet the resulting needs, we sought a device for profiling the bricks that would allow us to achieve the non-deformability of the vaults by means of reinforced concrete, which is an essential condition for their stability. Specially manufactured and elegantly shaped, these bricks with a layer of reinforced concrete on the extrados form a perfect monolithic construction.[5] (Tignol and Joly n.d.)

The reference to reinforced concrete, a material in vogue at the time and considered to be of great strength and quality, is not surprising. However, it is important to note that the main technique is tile vaulting, and very often, this upper layer did not exist.[6] Besides, in the 1930s reinforced concrete was not considered an appropriate material to be seen in churches (Wibaut 2019).

There were other contractors who specialized in the construction of tile vaults in Belgium. Ernest Sussenaire, a contractor located in Ecaussines, also patented a system in 1908 (Sussenaire 1908) very similar to Daussin's system, with some differences that have not been found in the buildings. The company Gairin and Brochon advertised the construction of "*Voûtes légères et* économiques *en briques creuses sans armature, ni fer ni bois*" (light and economical vaults with hollow bricks, without reinforcement, iron or timber). This company also collaborated in the construction of the vaults of the Royal Palace of Laeken, where Fabre and Daussin participated.

The Churches of Léonard Homez

As already mentioned, Léonard Homez (1900–unknown) designed three churches in Belgium using tile vaults during the 1930s. Little information is available about this architect.[7] Born in 1900, Homez studied architecture thanks to the financial support of Jules Waucquez, owner of the textile company where Homez's father worked. After qualifying as an architect, Homez carried out various construction works for Jules Waucquez & Co. (Gilon 2006), among them, the churches of Sainte-Alix and Divin Sauveur.[8]

Sainte-Alix and Divin Sauveur are very similar, with oval barrel vaults and oval transverse arches dividing the nave. The vaults of Sint-Theresia feature more innovative shapes. Pointed arches divide the nave in bays, covered by vaults in which the groins multiply (fig. 1). Despite the differences in form, the construction techniques were very similar. Reinforced concrete arches divide the nave into bays. Between these arches, bays are covered with tile vaults, with one single layer of bricks (300 × 150 × 45 mm) and a layer of mortar at the extrados, reinforced with a wire mesh, obtaining a total thickness of around 75 mm. The bricks are joined together with gypsum mortar. Although the bricks are hidden under the layer of mortar, we can imagine the bricks simply resting on these transverse arches that

Figure 5. Plaque with the name of the architect in Sint-Theresia's church (Photo: Authors, 2019).

form part of the roof structure, which is also built in reinforced concrete (at least in Sainte-Alix and Divin Sauveur; it has not been possible to access the extrados of the nave of Sint-Theresia).[9]

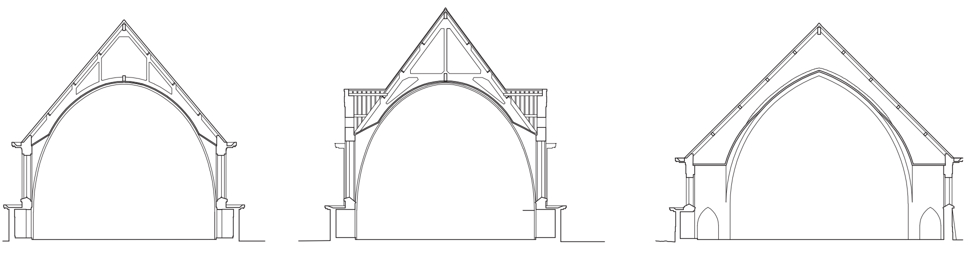


Figure 6. Comparison of the cross-section of the three churches: Sainte-Alix, Divin Sauveur, and Sint-Theresia (It has not been possible to survey and draw the roof structure of Sint-Theresia; Drawing: Authors, 2021).

Table 1. Comparison of the main measurements

	Arch span (m)	Vault span (m)	Impost line height (m)	Arch crown height (m)	Vault crown height (m)	Bay width (m)	Vault thickness (mm)	Thick-ness/ span
Sainte-Alix	13.30	13.50	2.015	11.38	11.52	5.35	75	1/180
Divin Sauveur	13.00	13.20	2.13	11.38	11.54	6.00	75	1/176
Sint-Theresia	13.04	13.64	2.63	12.00	12.50	4.40	75	1/182

An article about Sainte-Alix and Sint-Theresia published in the journal *Bâtir* in 1939 praised Homez's design:

> The architect Léonard Homez possesses that lucidity that is made up of a clear vision of liturgical needs and a perfect knowledge of the profession. In his works, far from opposing each other, feeling and technique support and complement each other, to blend into Unity, which is both constructive and expressive, rational and mystical (…). From the point of view of acoustics, as well as of construction, the recent churches of Léonard Homez are a success.[10] (Deletang 1939, 469)

The same article remarks that the vaults are *voûtes légères en briques creuses* that "have been built over simple groin templates, without formwork or support."[11] We also find information about the contractor of the vaults: "The light vaults of the two churches are built by the firm J. Tignol et A. Joly (...), according to their well-known brick and concrete system"[12] (Deletang 1939). Attention should be drawn to the adjective "well-known" – it is clear that the technique was part of the building culture of the time.

We have found several drawings by Homez. There are some drawings of Sainte-Alix kept at the Archives de Woluwe-Saint-Pierre. We have included here one plan view (plate I), one longitudinal section (plate II), and two cross-sections through the nave and transept (plate III). The drawings of Divin Sauveur are kept at the Archives de Schaerbeek: three plan views at different levels (one of them reproduced in plate VII), three elevations, one longitudinal section (plate VIII), and two cross-sections (plate IX). For Sint-Theresia, only the copies of three of the original drawings are kept at the Regina Caeli school. The originals have not been found. They represent the foundations, a plan view (plate XI), and a longitudinal section (plate XII). In these drawings, the vaults are represented with a total thickness of 100 mm with an inner coat around 30 mm thick. In the coloured drawings of Divin Sauveur, the key explains that they were thought to be built in masonry (plates VII–IX). This suggests that the architect had decided at this point on the system to be used to build the vaults. However, in the drawings of Sainte-Alix (plates II–III), drawn prior to those of the Divin Sauveur, the vaults are coloured like reinforced concrete, indicating a change in the vaulting technique.

Sainte-Alix in Woluwe-Saint-Pierre

There is scarce information about the construction of this church. Some letters kept in the Archive of the Archdiocese of Mechelen-Brussels tell us that the church of Sainte-Alix was

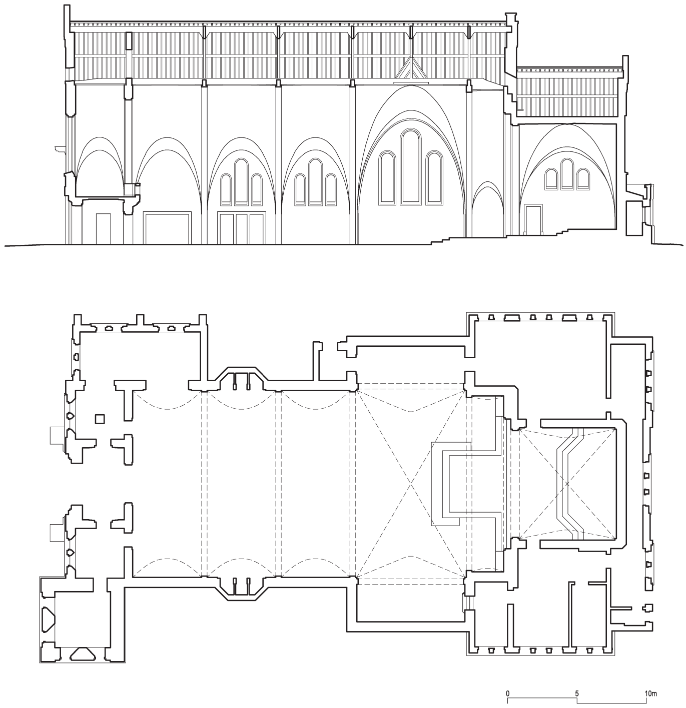


Figure 7. Sainte-Alix in Woluwe-Saint-Pierre (Drawing: Authors, 2021).

under construction in January 1936,[13] and the works were progressing slowly in April 1936.[14] The vault was due to be completed at the end of April,[15] and the church was finally consecrated on 26 July 1936.[16] According to Deletang (1939), the general contractor was F. de Knoop, and the specialized contractor of the vaults, as already mentioned, J. Tignol and A. Joly.[17]

The Vaults of Sainte-Alix

Sainte-Alix is a single-nave church (fig. 7, plates I and IV), covered by an oval barrel vault, with a span of 13.50 m. Slightly protruding oval transverse arches (with a span of 13.30 m) divide the nave into three bays (5.35 m wide). A fourth bay covers the gallery (*jubé*). The crossing (plate V) and the apse (plate VI) are covered with groin vaults with lunettes. There is a short transept covered with barrel vaults. A massive brick arch separates the crossing from the apse (fig. 1).

The transverse arches, visible at the extrados, are built in concrete. These arches are connected by a longitudinal beam running along the crown of the vault, and completely separated from the brick vault. A layer of mortar, thicker in the upper part, hides the bricks. In the vault of the apse it is possible to see a wire mesh within this layer of mortar. The main groins of the crossing and the apse protrude on the extrados (fig. 8, top right). There may also be special rib bricks, similar to the ones shown in figure 2, but this is not clear in the intrados. The fillings of the vault, measured in the first bay (the one of the gallery), have a height one half that of the total height of the vault. The lunettes also buttress the vault. The bricks can be seen in the lower part of the vault of the first bay, where the layer of mortar is very thin, and even disappear at some points due to the steep slope. The bricks measure 300 × 150 mm and have a longitudinal groove in the central part. One third of the brick, cut longitudinally, builds the line of the lunette (fig. 8, bottom left).

Figure 8. Extrados of the church of Sainte-Alix; Left: Nave; top right: Transept; bottom right: Apse (Photos: Authors, 2019).

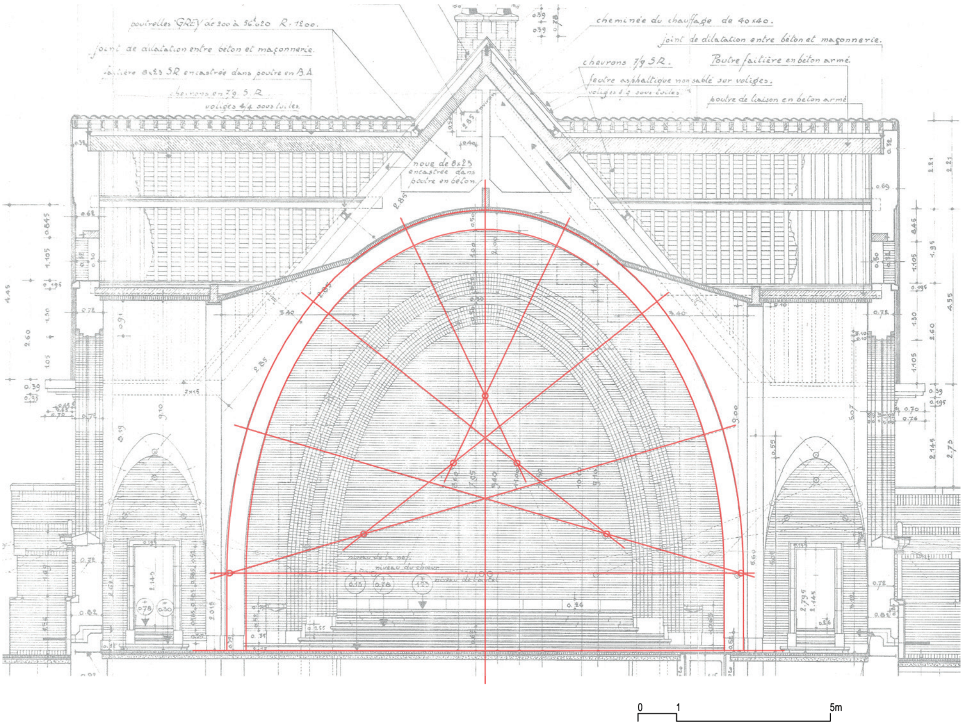


Figure 9. Cross-section of the church of Sainte-Alix by Homez with the oval geometric construction in red (Homez n.d.; Archives Woluwe-Sainte-Pierre).

The transverse arches are of oval shape with seven centres as well as the barrel vault. Their geometry is specified in the working drawings (fig. 9) and has been built accordingly, with only slight differences. Both the transverse arches and the vault spring from the pilasters at 2.015 m above the floor, slightly above the level in the drawings. Painted in a light colour in contrast with the brick walls, the pilasters make it look like the vault starts directly from the ground. The transverse arches protrude 10 cm from the vault.

To define the geometry of the lunettes, Homez designed ovals with seven centres on the wall. The elevation of the actual spatial curve of the lunette groin was defined as well as an oval. However, the actual construction of the lunette is different. In fact, the actual groin is not geometrically defined, but constructed by the masons by finding the intersection of the nave's barrel vault and the lunette, with the help of an angle template. But even the geometrically defined ovals on the walls differ from the designed ones, as can be seen in figure 10.

The bonding can be seen through the inner coating, giving an idea of the construction of the vault. It is not exactly the same in the three bays, but the general pattern is very similar.

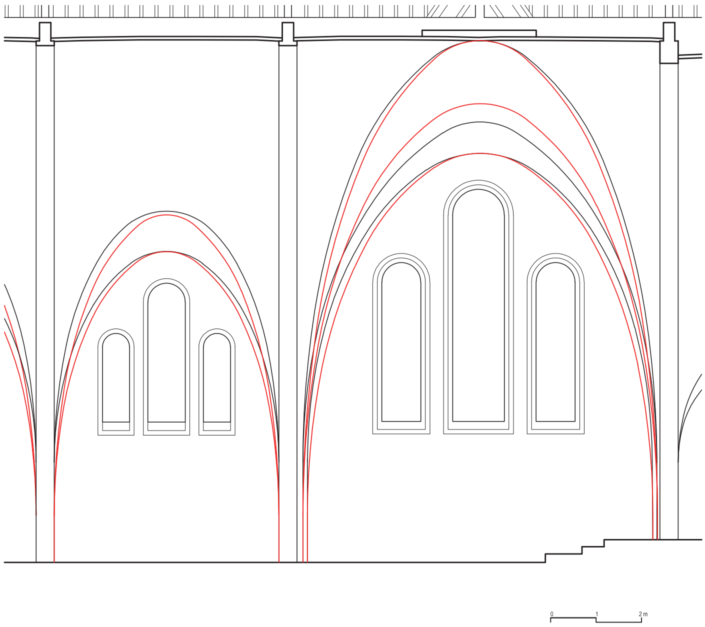


Figure 10. Ovals of the crossing and the adjacent bay, as designed (red) and as built (black) (Drawing: Authors, 2021).

In the lower part of the barrel vault, the courses follow the longitudinal direction. At a certain height, the vault was continued by the construction of transverse arches that become smaller towards the centre, and by drawing a rectangle with two sides forming arches parallel to the transverse arches and two sides running in the direction of the nave. In the central upper part, courses again parallel to the longitudinal direction close the vault (fig. 11, left). In the lunettes, the courses go from the wall (groin A, fig. 11) to the groin of the lunette (B in fig. 11), with a certain angle, until the point where the courses spring from the axis of the lunette, and not from the wall. In the axis, the courses meet with the ones coming from the other half of the lunette. As it can be seen in the cross-section, the axis of the lunette is virtually a straight line.

The vault of the crossing has a plan of 8 × 13.70 m (plate V), while the vault of the apse is considerably smaller (7 × 8.10 m, plate VI). In the apse, the bonding is not completely symmetrical. In compartments 1 and 3, bricks are placed in the direction of the longitudinal axis up to approximately three-quarters of the height of the vault. Over this height, bricks form arches in the transverse direction. In compartment 1, bricks maintain this direction until the crown of the vault, while in compartment 3 (next to the crossing), in the upper part

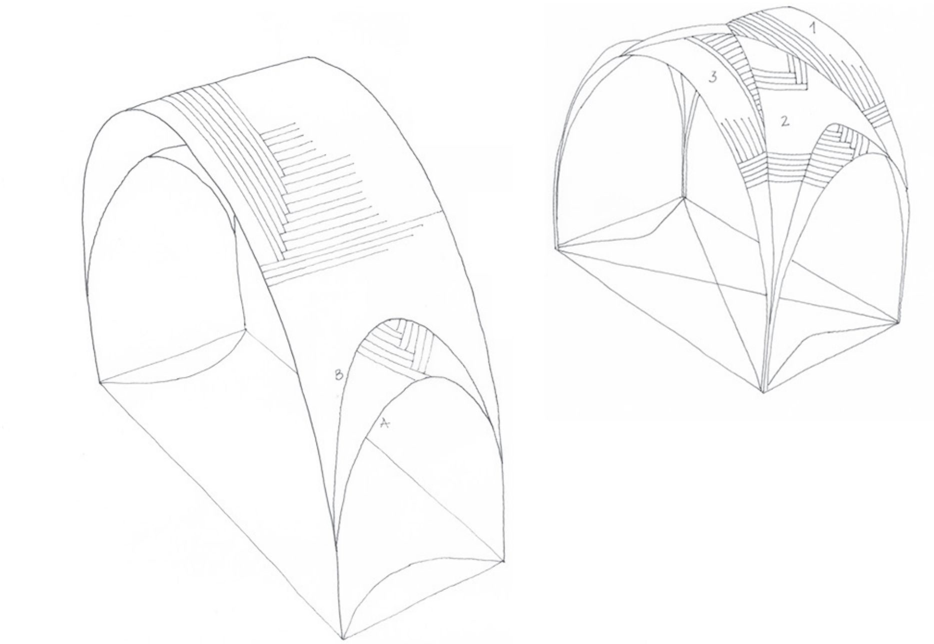


Figure 11. Church of Sainte-Alix, sketch of the bonding. Left: Vault of the nave; right: Vault of the apse (Drawings: Authors, 2021).

the direction of the bricks change again to a perpendicular direction. While compartments 1 and 3 are almost barrel vaults, compartment 2 has a double curvature. The bricks form arches between the diagonals and the transverse ridge line (or the groin of the lunette in the lower part). In the lunettes the bricks are placed with the same pattern of the nave's lunettes.

The auxiliary means used to build these vaults were minimal. Deletang (1939) already mentioned that only a "*gabarit d'angle*" was used. For the vaults of the nave, skilled masons only require some strings to keep the form. For the construction of the lunettes, only an angle template is needed. No more devices are required for the construction of the crossing. A slight curvature of the courses facilitates stability during construction. Once the vault is finished, the groins are shaped up with a template.[18]

Divin Sauveur in Schaerbeek

The church of Divin Sauveur is situated in the municipality of Schaerbeek, very close to Woluwe-Saint-Lambert, in the Brussels Capital Region. This part of the city was growing fast, and in 1933 the construction of a new church was approved. Léonard Homez presented

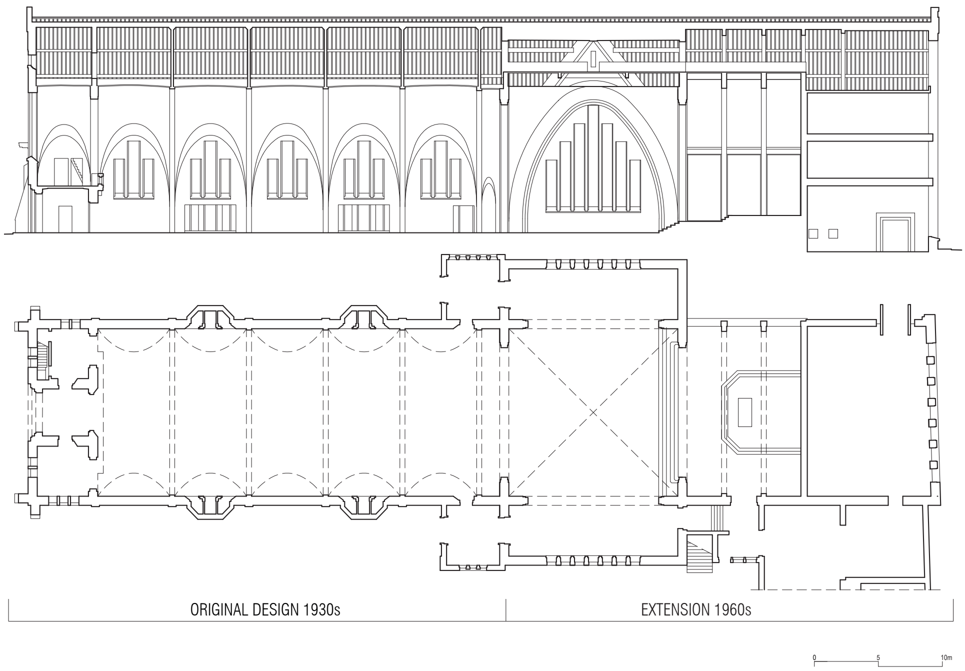


Figure 12. Divin Sauveur in Schaerbeek (Drawings: Authors, 2021).

the design of the church in March 1935,[19] and in May he received the approval of the Commission Royale des Monuments et des Sites.[20] In a call for tenders for the structural work, vaults and ceilings, the lowest offer was 461,000 francs, and the highest 660,000 francs.[21] Contractors Mr Braekeleir and Mr Kallaert were selected for the construction. A note about a modification in the design is found in June 1935, when Homez informed Monseigneur Van Cauwenbergh about an increase in the budget to allow for adding one bay, two confessionals, a side porch, and an independent entrance to the *magasin*. On 14 June 1935, the architect received notice of the increased cost from the contractor, 78,690.50 francs, and he explained that he could persuade the contractor to reduce his offer by 10,000 francs. Besides, the vaults and the ceilings had been directly commissioned to Tignol and Joly, saving 2000 francs.[22] On 15 June, Homez received confirmation of the contractor for the works (under certain conditions) from the Archbishopric.[23] The foundation stone was laid on September 1935 (*Inventaire* 2010–12). A letter of November 1935 provides evidence of problems with the general contractor regarding the supply of bricks.[24] The termination of the contract with the general contractor would take place in April 1936.[25] At the end of the month, contractor De Knoop (who was already working with Homez on Sainte-Alix) made an offer

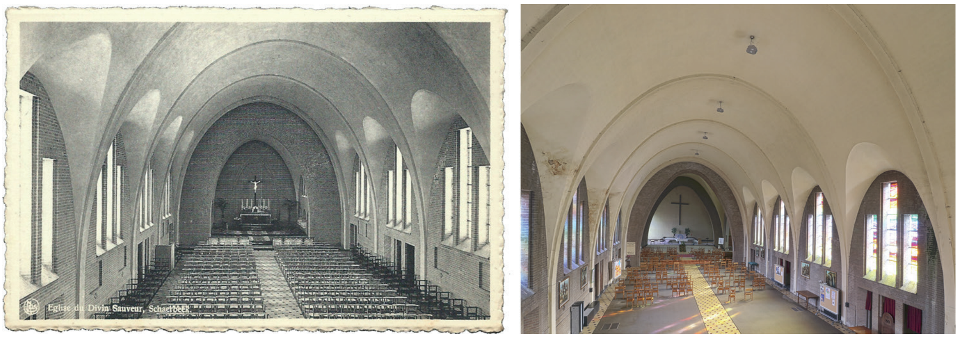


Figure 13. Church of Divin Sauveur; Left: Before the extension (Photo: Willy Balasse, in https://www.delcampe.net); right: After the extension (Photo: Authors, 2020).

to finish the church.[26] Two more contractors, Jean Mathieu d'Houtain l'Evêque and Van Pottelberg from Erebodegem, were asked to submit an offer in May. At this point the vaults had not been started, as we can see from the communication with the possible contractors: "you will no longer need to take into account the execution of the vaults or the execution of the plaster and coating already confirmed to a specialist, the firm Tignol and Joly of Brussels."[27] None of these contractors gave a satisfactory offer, so Homez tried to make De Knoop lower his offer.[28] In June, De Knoop was appointed as general contractor to finish the church, and the works started immediately.[29] The church was inaugurated on 6 May 1937.

The original design was a single nave, very similar to Sainte-Alix, with four bays, a choir, an apse, and two rooms on both sides, but as already mentioned, five bays were finally built. No transept was planned. The design for the church also included a tower that was not built (plates VII–IX). The church was extended in the 1960s by architect Jean Dehasse. The apse was replaced by a transept and a new apse was added (plate X). A *chapelle d'hiver* was added to the south.[30]

The Vaults of Divin Sauveur

The nave, with a span of 13.20 m, is covered by an oval barrel vault with lunettes, divided by oval arches springing from the pillars (with a span of 13.00 m, separated 6.00 m) in five bays and a *jubé*. The vault and the pillars are coated in a light tone, contrasting with the dark bricks of the walls, and giving the impression, as in Sainte-Alix, that the vaults spring from the floor. A brick oval arch, with a different geometry, gives access to the transept, covered by a cross vault. This brick arch replaced the one designed by Homez. The different design of the oval is clear (fig. 13). Behind the transept, the apse is covered by a barrel oval vault with two transverse arches.

Over the extrados, as in Sainte-Alix, there is a layer of mortar over the brick vault, and a wire mesh can be seen in some parts embedded in it, following Daussin's system (fig. 4). However, in the last bay before the apse, bricks can be seen (fig. 14, bottom left). They measure 300 × 150 mm. The dimensions are similar to the ones in Sainte-Alix, but the bricks in Divin Sauveur do not have a central groove. The transverse arches are made in reinforced concrete, as well as the structure of the roof (fig. 14, top), but with a design different from that used in Sainte-Alix.[31] The vaults built in the extension by Dehasse in the 1960s are built with a different technique, known as *steengaz*. This system consisted of a metallic wire mesh with ceramic pieces in the crossings. After appropriately shaping the wire hung from an upper structure, mortar or concrete was projected, obtaining a kind of reinforced concrete (fig. 14, bottom right) (Bot 2009, 148). This part of the building has not been analysed, but it is possible to see at first sight that not only the technique but also the geometry is quite different.

Figure 14. Church of Divin Sauveur; Top: Extrados of the vaults; bottom left: Last bay before the arch of the transept; bottom right: Extrados of the vaults in the transept (Photos: Authors, 2020).

The oval defining the transverse arches and the barrel vaults has seven centres, and it is very similar to the ovals in Sainte-Alix. In the longitudinal direction, it is possible to appreciate a slight curvature in the vault (fig. 12), more accentuated than in Sainte-Alix. This curvature contributes to the stability of the vault.

In the drawings, we can see how Homez drew the ovals of the lunettes (fig. 15). The barrel vault of the nave, and the elevation of the lunette, were previously defined. Afterwards, the plan view of the lunette was drawn by points at the intersection of these two curves. As we have seen for Sainte-Alix, this procedure was only used for the drawing, while during construction the lunette was defined by masons with only a groin template. The lunettes are slightly different in the different bays, probably built by different gangs.

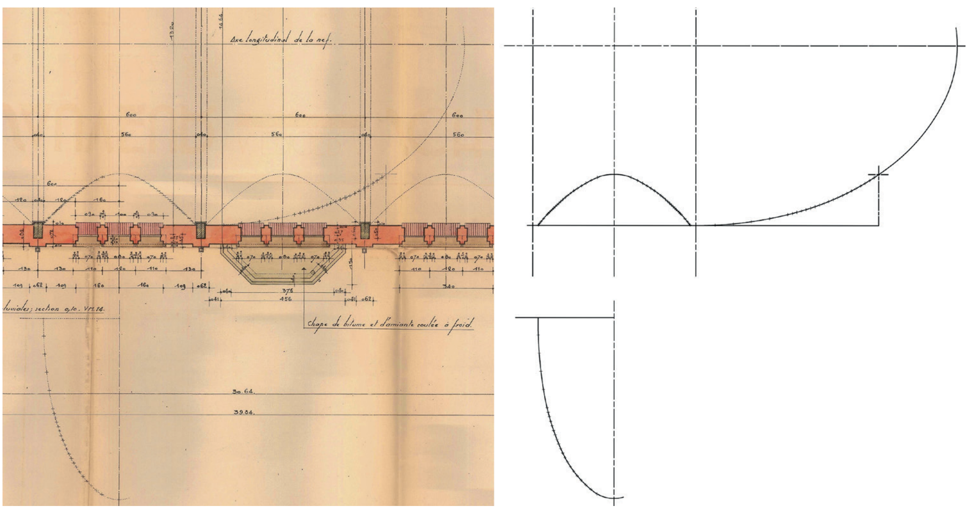


Figure 15. Detail of the drawing by Homez, 1935 (Archives de Schaerbeek); note the geometrical construction of the lunette redrawn on the right (Drawing: Authors, 2021).

The extension built in the 1960s eliminated the vault of the apse designed by Homez. This vault was very similar to the one in Sainte-Alix, a groin vault with two lunettes with a dimension of 8.50 × 7.50 m (plate VII).

The paint in these vaults hides the bonding of the bricks, but the great similarities with the vaults of Sainte-Alix suggest a similar construction process. In the Divin Sauveur church it was possible to take a sample of the mortar used in the joints of the vault. A XRD test was performed,[32] showing a gypsum level of more than 70% and providing evidence that the mortar was basically a gypsum mortar, with a small amount of sand.

A series of photographs made during the construction of the roof structure of this church show that the vaults were built once the roof was finished (Wibaut 2019, figs. 13–16). The rainy weather in Brussels could be a problem for vaults built with gypsum mortar.[33]

Sint-Theresia in Dilbeek

Architect Léonard Homez was commissioned to design this church in 1936. In the tender for the construction of the church, it was specified that separate submissions would be made for "General Works" and for the "Vaults and Coating."[34] The construction of the church was awarded to the contractors Frères Verstraete from Rumbeke, who included in their offer the construction of the vaults for a total amount of 787,750 francs.[35] The vaults and coating represented 12% of this amount, that is 94,488.55 francs.[36] Deletang (1939) noted the quality of the church despite its low budget, which according to him was 950,000 francs.[37] The works started by the middle of November 1937 and were finished in May

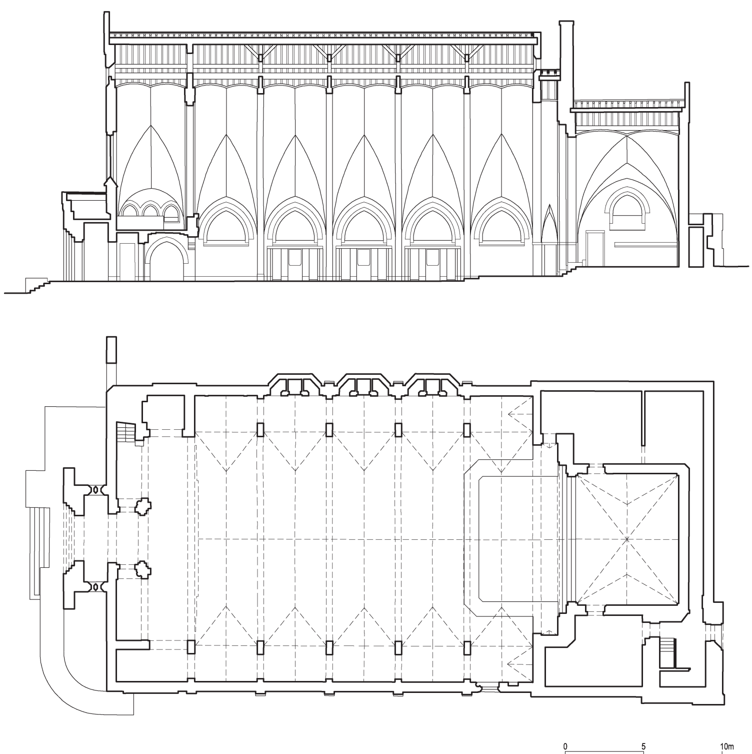


Figure 16. Sint-Theresia in Dilbeek (Drawing: Authors, 2021).

1939. The previously mentioned article in *Bâtir* in 1939 affirmed that the general contractor was Joseph de Knoop, and that the vaults were built by J. Tignol and A. Joly. However, the documentation kept at the Dilbeek Archive, the Archdiocese of Mechelen, and the Regina Caeili school provide no evidence of problems with Frères Verstraete, and probably this contractor was in charge of the construction during the whole process, commissioning the construction of the vaults to Tignol and Joly.

The Vaults of Sint-Theresia

The church has six bays (including that of the *jubé*), covered by a pointed vault with a span of 13.62 m and divided by transverse arches with a span of 13.00 m. One brick arch and a very narrow bay divide the nave and the apse, covered by a diamond vault (plates XI–XIV). The church does not have a transept. The general design is very different from the other two churches. In this church, Homez used pointed forms rather than ovals.

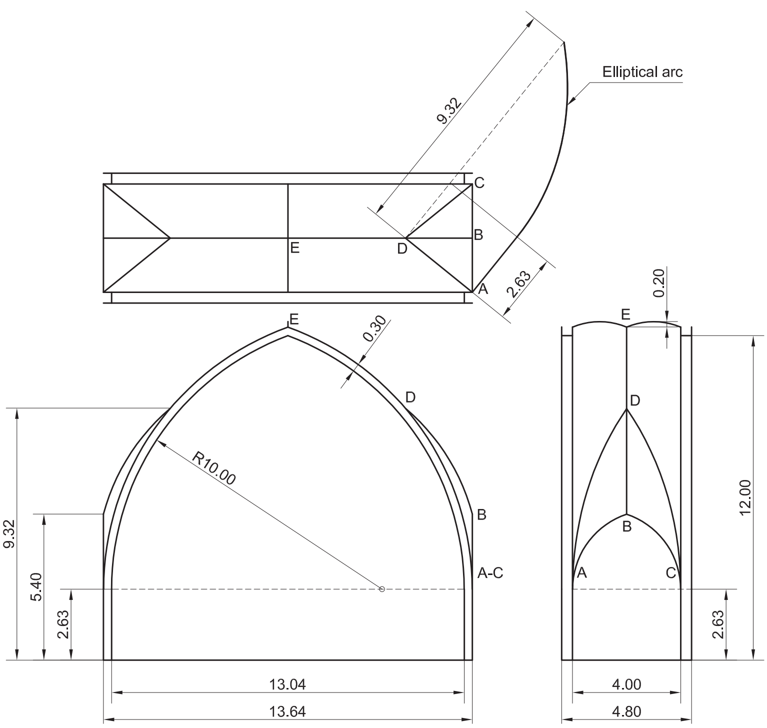


Figure 17. Geometry of the vault of the nave (Fuentes and Guerra-Pestonit 2020).

Access to the extrados of the vaults is only possible in the vault of the first bay, over the gallery (*jubé*), and in the vault of the apse, but not in the vaults of the nave. There is a wire mesh on the extrados of these two vaults. As in the other churches, the thickness is irregular, between 75 and 100 mm. The fillings have been measured in the vault of the apse, and have a height slightly over one third of the total height of the vault, a very low filling compared to traditional tile vaults, or with the filling measured in Sainte-Alix. Despite this internal coat, the bonding can be seen in the intrados, and the bricks have similar dimensions to the ones in Sainte-Alix and Divin Sauveur, 300 × 150 mm.

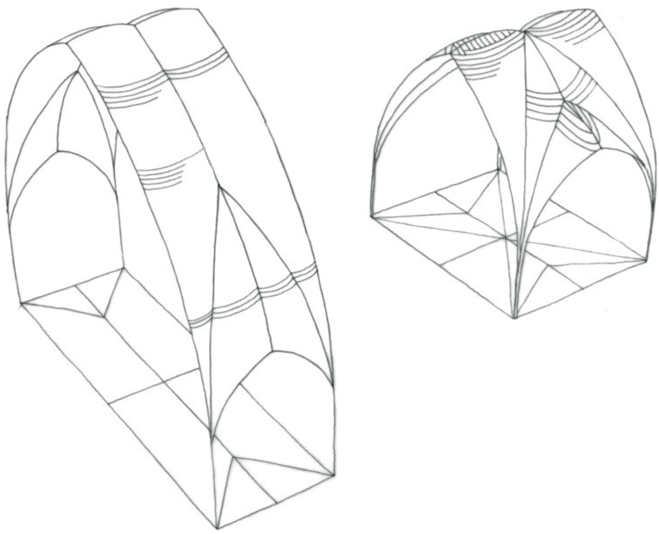


Figure 18. Sint-Theresia, bonding of the vaults. Left: Bay of the nave; right: Apse (Drawing: Authors, 2021).

An analysis of the geometry of the vaults has already been published in Fuentes and Guerra-Pestonit (2020). The nave is divided by transverse concrete pointed arches. Between the arches, the vault is formed by two symmetrical shells with double curvature, resembling two symmetrical patches of a toroid. At a height of 9.32 m over the floor level, three groins are added, forming symmetrical lunettes. Transverse arches are pointed arches, with a radius of 10.00 m.

The apse has a dimension of 8.37 × 6.55 m and is covered by a diamond vault (plate XIV).

The bonding can be seen through the inner coat. In the vault of the nave, the courses are parallel in the whole vault. In the vault of the apse, the bonding changes in each compartment, forming a double curvature surface (fig. 18)

Conclusions

Léonard Homez used tile vaults in the three churches analysed in this chapter and built in the 1930s. These vaults were built by specialist contractors J. Tignol and A. Joly, successors of Charles Daussin. The technique was well-known in Belgium at that time. Both Sainte-Alix and Divin Sauveur are single-nave churches and have a similar design of an oval barrel vault with transverse arches. The latter has a slight curvature in the longitudinal direction in comparison to the former, which has an almost straight ridge line. The curvature makes the vault more stable, and also easier to build. The design of the vaults in Sint-Theresia is completely different The transverse arches are pointed arches, and the vaults between these arches are not continuous. In addition, the transverse arches protrude further from the vault in Sint-Theresia. These characteristics produce a more compartmentalized space, emphasized with the lateral naves. The multiplication of the groins in Sint Theresia produces a different effect. Divin Sauveur and Sint-Theresia have a narrow "transition" bay and a brick arch in front of the transept, while in Sainte-Alix the brick arch is between the crossing and the apse.

The vaults in the three churches are built with a similar technique: tile vaults, with hollow bricks 45 mm thick. Over the vault, a wire mesh is embedded within a layer of mortar around 30 mm thick. This is precisely the system advertised by the contractor. However, we have not been able to identify the groin special pieces patented by Daussin.

In the church of Divin Sauveur it was possible to analyse a sample of the mortar, confirming that gypsum mortar was used. We can imagine that gypsum mortar was also used in the other two churches. The fast hardening of this gypsum allowed to build these vaults with no centering. The bonding of the bricks is modified in the different parts of the vault. The aim is to ensure that the vault is stable at all stages of construction, facilitating, therefore, the construction without centering. The scarce auxiliary means used for the construction of these vaults is remarkable. This was certainly the reason of the widespread use of tile vaults in this period.

Acknowledgements

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie grant agreement No 833030. We would like to thank the church fabrics and the Regina Caeli school for their time. At Divin Sauveur, Marcel Gilon shared his research and enthusiasm with us. Johan Van Linthoudt facilitated access to the church of Sint-Theresia and the documents kept in the church archive. Carlos Martín Jiménez shared his knowledge about the construction of tile vaults with us, guiding us in the construction sequences of the different vaults. Ine Wouters has helped us to translate the documents written in Dutch.

Notes

1. Tile vaults have been a focus of study for many scholars in recent decades. See for example the proceedings of an international symposium on tile vaults (Zaragozá, Soler and Marín 2012).

2. For the construction of the vaults in the Congo Museum, see Fuentes (2021c) in this book. For Auguste Fabre and his patents and projects, see Fuentes (2021b).

3. “Les recherches qui ont été faites depuis ces dernières années en ce sens ont toujours démontré que les voûtes de notre système contribuaient à produire une isolation thermique et une acoustique des meilleures, les matériaux employés étant creux.”

4. See for example the advertisement by Charles Daussin in the *L'index du Bâtiment* (1913, 78) and by Gairin and Brochon in *Annuaire du Commerce et de l'Industrie* (1920, 1828–29).

5. “Jusqu'à nos jours les voûtes légères construites en briques creuses n'avaient d'autres liaisons entre éléments que le mortier des assises, ce qui est insuffisant lorsqu'il s'agit de voûtes à grand portée. Pour satisfaire aux nécessités qui en découlent, nous avons recherché un dispositif de profil des briques nous permettant par le moyen du secours du béton armé d'obtenir l'indéformabilité des voûtes, condition essentielle de leur stabilité. Spécialement fabriquées et d'un format élégant ces briques avec la chape armée extrados constituent une construction monolithique parfaite.”

6. The layer of cement mortar, sometimes as thick as the brick vault itself, can work in compression, increasing the thickness of the vault, and therefore its stability.

7. Marcel Gilon, in his tireless efforts to research the history of his parish (Divin Sauveur), was in contact with Homez's daughter in-law and compiled some information about him (Gilon 2006).

8. A letter on 16 May 1936 from J. Maisson to Van Cauwembergh mentions Mr. and Mrs. Waucquez as donors to Sainte-Alix. Mrs. Segers was a donor to the Divin Sauveur church; see for example a letter from Homez to Van Cauwenbergh on 24 May 1935. Thanks to Gilon (2006), we know that Mrs. Segers was Pauline Waucquez, Jules Wacquez's sister. Both letters are kept in the Archive of the Archdiocese of Mechelen-Brussels.

9. On the use of reinforced concrete in the roof structure of Sainte-Alix and Divin Sauveur, see Wibaut 2019.

10. “L'architecte Léonard Homez possède cette lucidité, faite d'une vision claire des nécessités liturgiques et d'une parfait connaissance du métier. Dans ses oeuvres, loin de se contrarier, le sentiment et la technique s'épaulent et se complètent, pour se fondre dans l'Unité, laquelle est à la fois constructive et expressive, rationnelle et mystique (…). Du point de vue de l'acoustique, aussi bien que constructivement, les églises récentes de Léonard Homez sont des réussites.”

11. “Les voûtes nervurées en briques creuses d'une technique naturelle, à la fois rigides, légères, durables, sont exécutées sur simples gabarits d'angles, sans coffrages ni soutien.”

12. “Les voûtes légères des deux églises sont construites par la firme J. Tignol et A. Joly (…), d'après leur système bien connu brique et béton.”

13. Unknown sender to Ministry of Justice, 20 January 1936. Archive of the Archdiocese of Mechelen-Brussels.

14. "L'église avance lentement. On ne pourra y entrer avant juillet." J. Massion (abbé) to Van Cauwenbergh?, 2 April 1936. Archive of the Archdiocese of Mechelen-Brussels.

15. "La voûte sera entierement terminé au début de la semaine prochaine. On commencera alors les pavements." J. Massion (abbé) to Van Cauwenbergh?, 24 April 1936. Archive of the Archdiocese of Mechelen-Brussels.

16. J. Maisson to Monsieur le Chanoine, 15 June 1936. Archive of the Archdiocese of Mechelen-Brussels.

17. The participation of F. De Knoop as general contractor at Sainte-Alix is also mentioned in a letter from Homez to Monseigneur Van Cauwenbergh, dated on 20 April 1936, regarding the church of Divin Sauveur: "J'ai demandé à monsieur De Knoop, entrepreneur des travaux de l'Eglise de Sainte Alix, de revoir ses prix établis lors de sa soumission pour le Divin Sauveur."

18. In a previous paper (Fuentes and Guerra-Pestonit 2020), we had considered that forms or templates had been used under the groins of the different vaults. We based our argument on the geometrical definition of the constructed groins, which coincide very precisely with arcs of circumference. However, Carlos Martín, specialist in the construction of tile vaults, affirmed that this is not necessary. This would corroborate the economy of auxiliary means of this type of vault, as well as the need for specialized masons.

19. Letter from P. Legers to Monseigneur Van Cauwenbergh, 25 March 1935. Archive of the Archdiocese of Mechelen-Brussels.

20. Homez to Van Cauwenbergh, 22 May 1935. Archive of the Archdiocese of Mechelen-Brussels.

21. Homez to Van Cauwenbergh, 24 May 1935. Archive of the Archdiocese of Mechelen-Brussels.

22. Homez to Van Cauwenbergh, 14 June 1935. Archive of the Archdiocese of Mechelen-Brussels.

23. This approval was given under the conditions that (1) Mrs. Segers would pay the first bills up to 400,000 francs, so the priest would have time to collect more money; and (2) the contractor would undertake not to take legal action against them in the event that the municipal administration of Schaerbeek continues to create difficulties "in an arbitrary manner with regard to the authorisation to start work." Van Cauwenbergh to Homez, 15 June 1935. Archive of the Archdiocese of Mechelen-Brussels.

24. Letter from Armand Neeckx, lawyer, to the Archbishopric of Malines, 27 November 1935. Archive of the Archdiocese of Mechelen-Brussels.

25. Van Cauwenbergh to Van der Meersch, 24 April 1936. Archive of the Archdiocese of Mechelen-Brussels.

26. Homez to Van Cauwenbergh, 27 April 1936. Archive of the Archdiocese of Mechelen-Brussels.

27. "il n'y a plus lieu de tenir compte ni de l'exécution des voûtes ni de la exécution des enduits et crépis déjà confirmées à un spécialiste, la firme Tignol et Joly de Bruxelles." Letter to Mr. Van Pottelberg et fils, 6 May 1936. Archive of the Archdiocese of Mechelen-Brussels.

28. "Je convoque l'entrepreneur, M. De Knoop, et j'insiste pour qu'il réétudie son prix et le ramène au plus bas possible." Homez to Van Cauwenbergh, 30 May 1936. Archive of the Archdiocese of Mechelen-Brussels. According to Gilon (2006), contractor De Knoop was the brother of Alphonse De Knoop, parish priest at Divin Sauveur from 1936 to 1953.

29. Homez to Van Cauwenbergh, 6 June 1936. Homez to De Knoop, 6 June 1936. Mechelen Archives.

30. For this extension, see Gilon (2006).

31. For the roof structure, see Wibaut (2019).

32. The test was carried out in the Unidad de Técnicas Geológicas, CAI de Ciencias de la Tierra y Arqueometría, Facultad de Ciencias Geológicas, Universidad Complutense de Madrid.

33. See Fuentes (2021c) for the mutiple references to this problem during the construction of the Congo Museum.

34. "les remises de prix pourront se faire indépendamment pour le 'Gros-Oeuvre' et pour les 'Voûtes et Enduits.'" A. Steppe and F. de Ruyper, Construction d'une Église dédiée à Sainte Thérèse de l'Enfant Jésus, á ériger au lieu dit Moortebeek, Commune de Dilbeek. Adjudication. Province de Brabant: Imprimerie R. Louis, 1st October 1937. Consulted at Dilbeek Archive.

35. Proces verbaal van opening der anbiedingen neergelegd voor de bouwwerken der nieuwe Heilige Theresiakerk (onderdak breggen van de gewelven en bezettingswerken). [Official report of the opening of tenders submitted for the construction of the church of Saint-Theresa (including vaults and coating)], 22 October 1937. Kept at Dilbeek Archive.

36. Tableau des soumissions de l'église de Sainte-Thérèse de l'Enfant Jesus à Moortebeek, Dilbeek, signed by the architect on the 20 October 1937. Kept at the Archive of the Archdiocese of Mechelen-Brussels.

37. "Une église aussi unifiée et pure que celle-ci satisfait également à la raison et au sentiment. Ferme et lumineuse, nuance et nette, elle offre à nos méditations un bel exemple d'équilibre humain, malgré son importance, elle n'engagea qu'un budget de neuf cent cinquante mille francs" (Deletang 1939, 471).

References

Annuaire du Commerce et de l'Industrie. 1920. Brussels: Mertens & Rozez.

Bot, P. 2009. *Vademecum. Historische Bouwmaterialen, Installaties en Infrastructuur*. Uitgeverij Veerhuis: Alphen aan de Maas.

Coomans, Thomas. 2014. "Églises, couvents et chapelles. Évolution et signification d'un patrimoine multiple dans le paysage culture de Bruxelles." *Bruxelles Patrimoines* 13: 6–34.

Daussin, Charles. 1907. Briques spéciales pour la construction de voûtes légères et système de voùtes, Ministère de l'Industrie et du Travail, Royaume de Belgique, patent no. 187959, filed November 9, 1907, and issued November 30, 1907 (Archives Générales du Royaume 2 - dépôt J. Cuvelier, Brevets Belges).

——. 1908. Briques spéciales pour la construction de voûtes légères et système de voûtes, patent no. 395858, République Française, filed October 31, 1908, and issued January 8, 1909. Accessed March 1, 2019. https://worldwide.espacenet.com/.

——. 1908. Gratstein für Kloster- und Kreuzgewölbe, German Patent no. 221816, filed November 8, 1908, and issued May 10, 1910 (German Patent and Trademark Office).

Deletang. 1939. "Eglises nouvelles. Sainte-Thérèse de l'Enfant Jésus, à Dilbeek. Sainte-Alix, à Jolibois (Woluwé-Saint-Pierre). Architecte: Léonard Homez." *Bâtir: Revue mensuelle illustrée d'architecture, d'art et de décoration* 84: 469–471.

Demanet, Armand. 1847. *Cours de Construction Professé* à *l'École Militaire de Bruxelles (1843–1847)*. Brussels: Société Typographique Belge.

Fabre, Auguste. n.d. *Voûtes d'églises en simili-pierre*. Paris: René Blamon et cie.

Fuentes, Paula and Rosa Ana Guerra-Pestonit. 2020. "The Vaults of Saint Therese in Dilbeek (Belgium): Tradition and Innovation in Tile Vaults in the 20th Century." In *Iron, Steel and Buildings. Studies in the History of Construction,* edited by J. W. P. Campbell et al., 651–663. Cambridge: Construction History Society.

Fuentes, Paula. 2021a. "The construction of tile vaults in Belgium 1900–1940: Contractors and Patents." *Construction History Journal* 36 (1): 97–121.

——. 2021b. "Auguste Fabre and the construction of tile vaults in France. The Industrialization of a Traditional Technique." *International Journal of Architectural Heritage.* https://doi.org/10.1080/15583058.2021.1894504.

——. 2021c. "The Congo Museum in Tervuren: The Birth of Tile Vaulting in Belgium." In *Brick Vaults and Beyond: The Transformation of a Historical Structural System*, edited by P. Fuentes and I. Wouters, 167–229. Madrid: Vrije Universiteit Brussel; Instituto Juan de Herrera.

Gilon, Marcel. 2006. *Divin Sauveur! 'une église dans les champs, une église en ville.'* Unpublished.

——. 2008. *Divin Sauveur! 75 ans plus tard…*, t. 2. Unpublished.

Huerta, Santiago. 2021. "Tile Vaults in post-war Germany." In *Brick Vaults and Beyond. The Transformation of a Historical Structural System*, edited by P. Fuentes and I. Wouters, 289–369. Madrid: Vrije Universiteit Brussel; Instituto Juan de Herrera.

Inventaire du Patrimoine Architectural. Région de Bruxelles-Capitale / Brussels Hoofdstedelijk Gewest. Inventaris van het Bouwkundig Erfgoed. 2010–12. "Divin Sauveur, Église. Église du Divin Sauveur Avenue de Roodebeek 267." Accessed February 3, 2021. http://www.irismonument.be/fr.Schaerbeek.Avenue_de_Roodebeek.267.html

L'index du bâtiment 1913: Annuaire illustré renseignant tous les matériaux produits et spécialités des plus importantes firmes de Belgique. 1913. Antwerp: De Vos & Van der Groen.

Sussenaire, E. 1908. Nouveau système de voûtes légères en briques creuses, patent no. 212780, Ministère de l'Industrie et du Travail, Royaume de Belgique, filed December 19th, 1908, and issued December 31st, 1908 (Archives Générales du Royaume 2 - dépôt J. Cuvelier, Brevets Belges).

Tignol and Joly. n.d. *Voûtes légères d'églises*. Advertisement Booklet.

Vos, N. de. 1879. *Cours de construction donné de 1864 à 1874.* Brussels: Libraire Polytechnique de Decq. & Duhent.

Wibaut, Romain, Thomas Coomans and Ine Wouters. 2018. "Hidden Modernity: Reinforced Concrete Trusses in Brussels Parish Churches (1935–40)." In *Building Knowledge, Constructing Histories, Proceedings of the Sixth International Congress on Construction History*, vol. 2, edited by I. Wouters et al., 1375–1381. Leiden: CRC Press, Taylor and Francis Group.

Wibaut, Romain. 2019. "Au-dessus des voûtes, la modernité. Conception et construction des charpentes en béton armé dans les églises bruxelloises (1935–1940)." *Bruxelles Patrimoines* 30: 39–51.

Zaragozá, Arturo, Rafael Soler and Rafael Marín, eds. 2012. *Construyendo bóvedas tabicadas. Actas del Simposio Internacional sobre Bóvedas Tabicadas, Valencia 2011*. Valencia: Universitat Politècnica de València.

Plates

Plate I. Church of Sainte-Alix in Woluwe-Saint-Pierre, plan view (Homez 1934; Archives de Woluwe-Saint-Pierre).

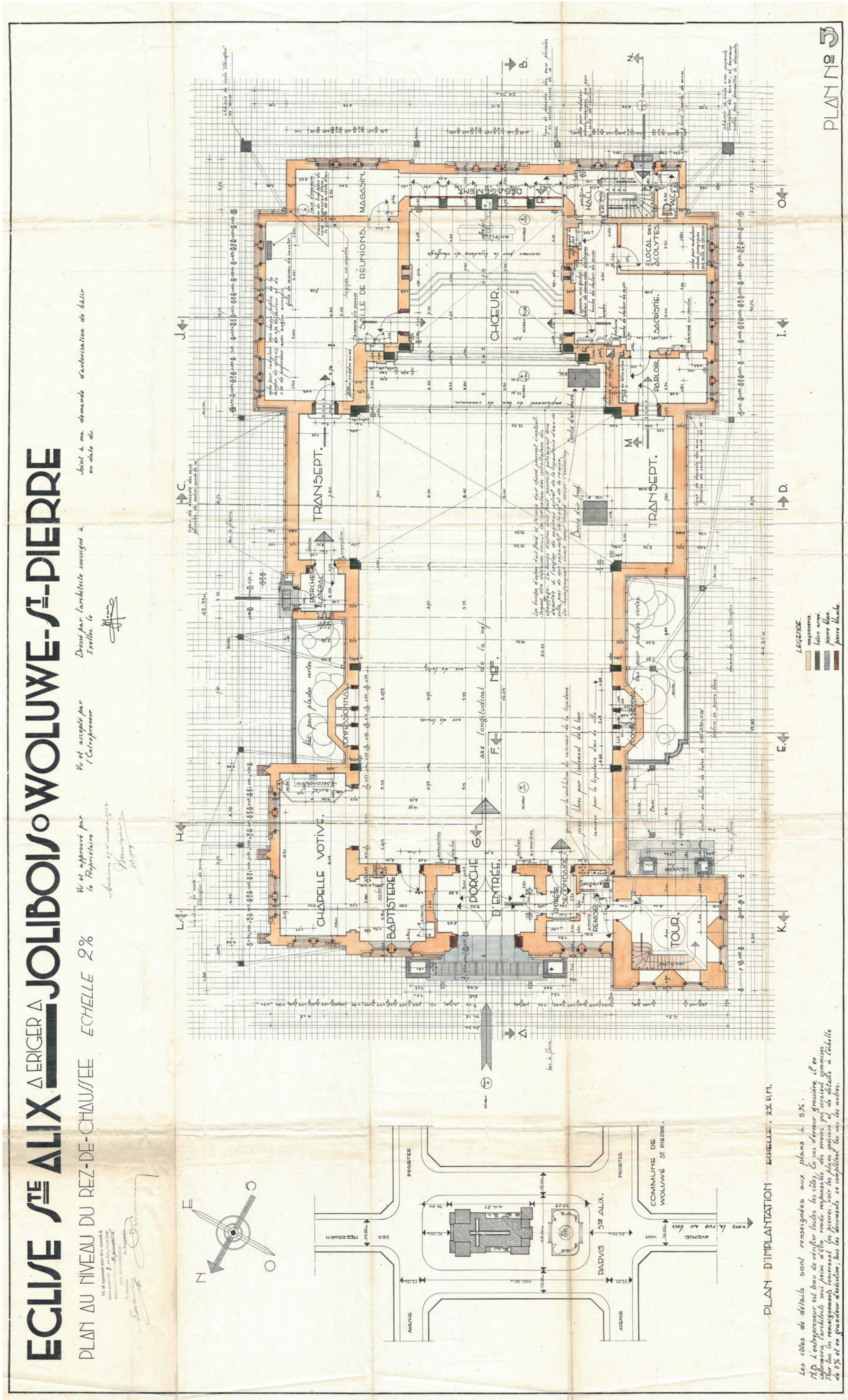

EGLISE Ste ALIX A ERIGER A JOLIBOIS o WOLUWE-St-PIERRE
PLAN AU NIVEAU DU REZ-DE-CHAUSSEE
ECHELLE 2%
PLAN No 3
CHAPELLE VOTIVE
BAPTISTERE
PORCHE D'ENTREE
TOUR
REMISE
NEF
TRANSEPT.
CHOEUR.
SALLE DE REUNIONS.
MAGASIN.
DEGAGEMENT
HALL
W.C.
LOCAL DES ACOLYTES.
SACRISTIE.
PARLOIR
PORCHE LATERAL
CONFESSIONNAL
PLAN D'IMPLANTATION ECHELLE 2% o
PARVIS Ste ALIX
COMMUNE DE WOLUWE St PIERRE
LEGENDE

Plate II. Church of Sainte-Alix in Woluwe-Saint-Pierre, longitudinal section (Homez 1934; Archives de Woluwe-Saint-Pierre).

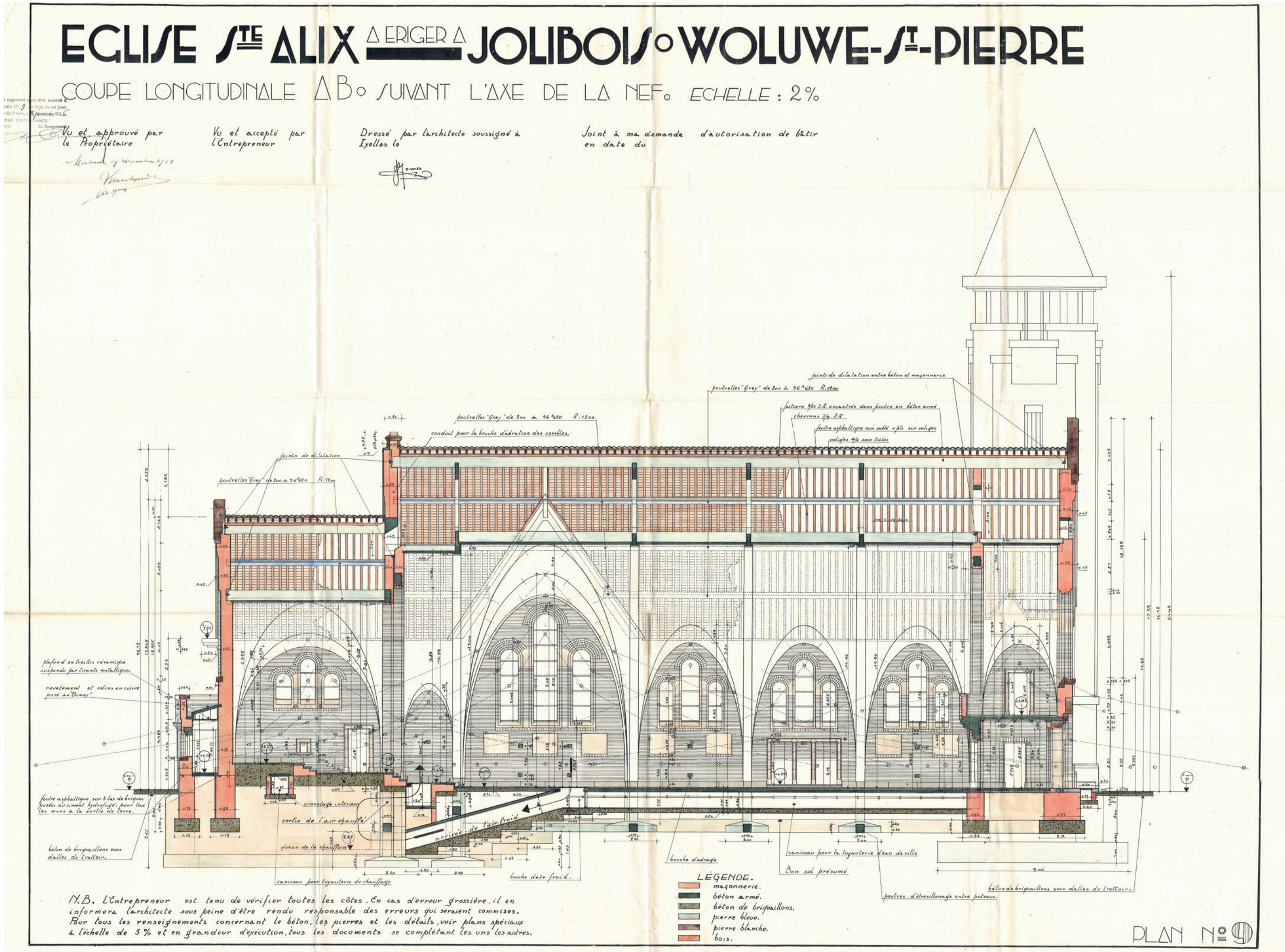

EGLISE Ste ALIX A ERIGER A JOLIBOIS o WOLUWE-St-PIERRE
COUPE LONGITUDINALE AB o SUIVANT L'AXE DE LA NEF o ECHELLE : 2%
Vu et approuvé par le Propriétaire
Vu et accepté par l'Entrepreneur
Dressé par l'architecte soussigné à Ixelles le
Joint à ma demande d'autorisation de bâtir en date du
joints de dilatation
poutrelles "Grey" de 200 à 56 k 630 R. 1200
conduit pour la bouche d'aération des combles.
joints de dilatation entre béton et maçonnerie
chevrons 7/9 S.R.
plafond en treillis céramique suspendu par tirants métalliques
revêtement et solins en cuivre posé au "Dimex".
cimentage intérieur
sortie de l'air chauffé
gîtage de la chaufferie
bouche d'air froid.
caniveau pour tuyauterie du chauffage
bouche d'aérage
caniveau pour la tuyauterie d'eau de ville
Bon sol présumé
poutres d'étrésillonnage entre poteaux.
béton de brigaillons sous dalles du trottoir.
LEGENDE.
maçonnerie.
béton armé.
béton de brigaillons.
pierre bleue.
pierre blanche.
bois.
N.B. L'Entrepreneur est tenu de vérifier toutes les côtes. En cas d'erreur grossière, il en informera l'architecte sous peine d'être rendu responsable des erreurs qui seraient commises. Pour tous les renseignements concernant le béton, les pierres et les détails, voir plans spéciaux à l'échelle de 5% et en grandeur d'exécution, tous les documents se complétant les uns les autres.
PLAN No 9

Plate III. Church of Sainte-Alix in Woluwe-Saint-Pierre, cross-sections (Homez 1934; Archives de Woluwe-Saint-Pierre).

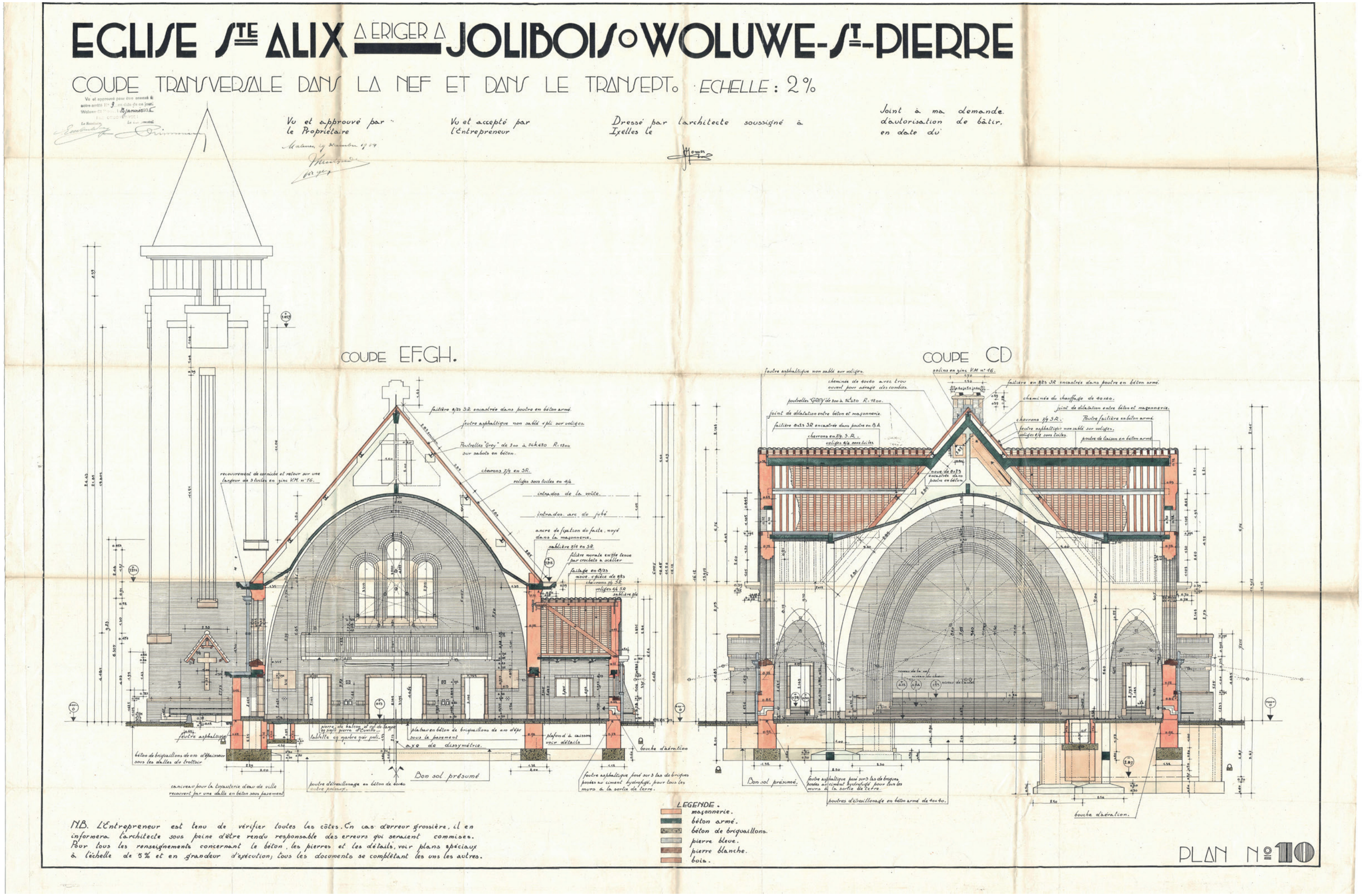

EGLISE Ste ALIX A ERIGER A JOLIBOIS o WOLUWE-St-PIERRE
COUPE TRANSVERSALE DANS LA NEF ET DANS LE TRANSEPT. ECHELLE : 2%
Vu et approuvé par le Propriétaire
Vu et accepté par l'Entrepreneur
Dressé par l'architecte soussigné à Ixelles le
Joint à ma demande d'autorisation de bâtir, en date du
COUPE EF.GH.
COUPE CD
Bon sol présumé
LEGENDE.
maçonnerie.
béton armé.
béton de briquaillons.
pierre bleue.
pierre blanche.
bois.
N.B. L'Entrepreneur est tenu de vérifier toutes les côtes. En cas d'erreur grossière, il en informera l'architecte sous peine d'être rendu responsable des erreurs qui seraient commises.
Pour tous les renseignements concernant le béton, les pierres et les détails, voir plans spéciaux à l'échelle de 5% et en grandeur d'exécution; tous les documents se complétant les uns les autres.
PLAN No 10

Plate IV. Church of Sainte-Alix in Woluwe-Saint-Pierre, plan view and longitudinal sections (Orthophotographs: Authors, 2021).

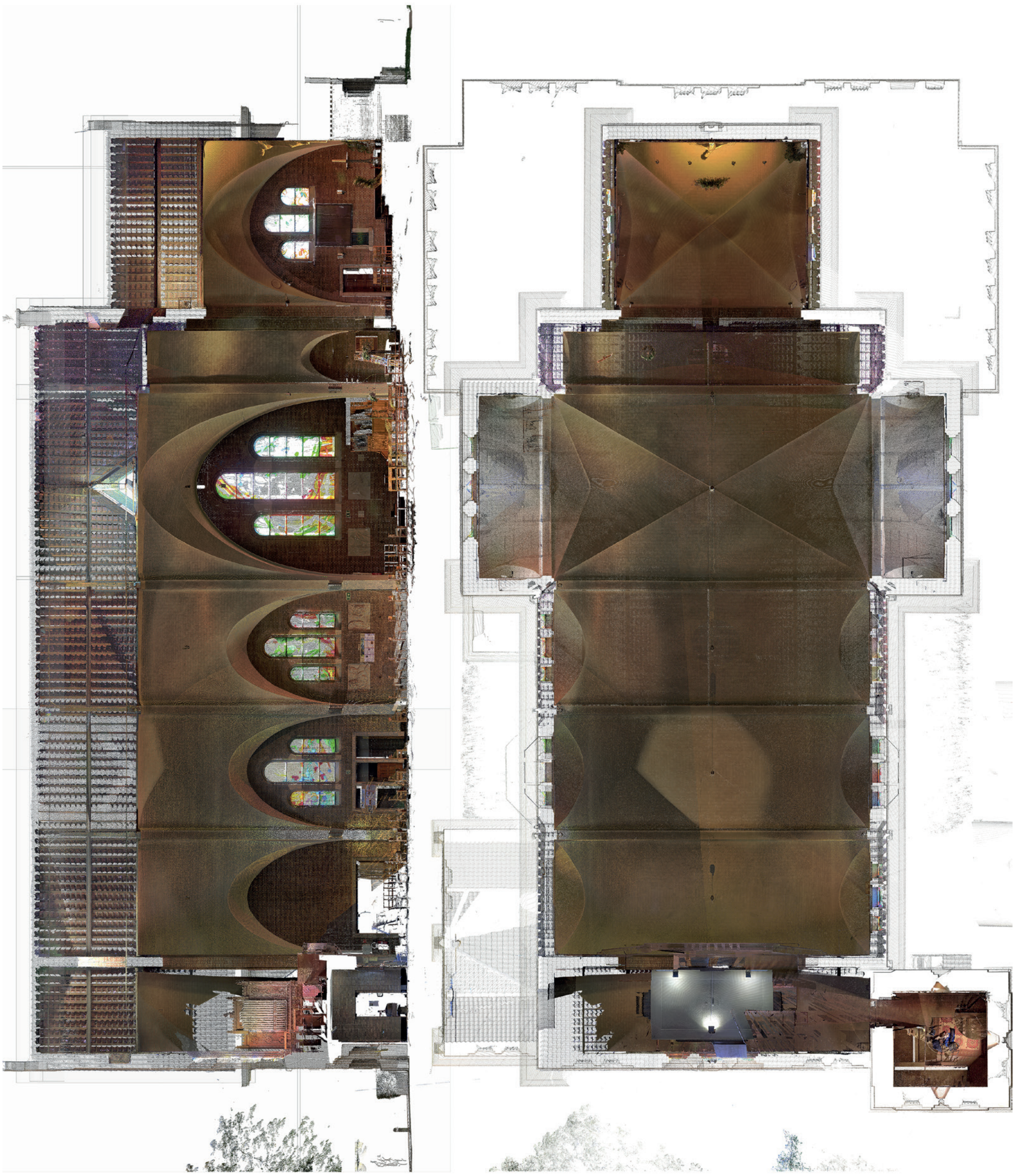


Plate V. Church of Sainte-Alix, vault of the crossing (Photo: Authors, 2019).

Plate VI. Church of Sainte-Alix, vault of the apse (Photo: Authors, 2019).

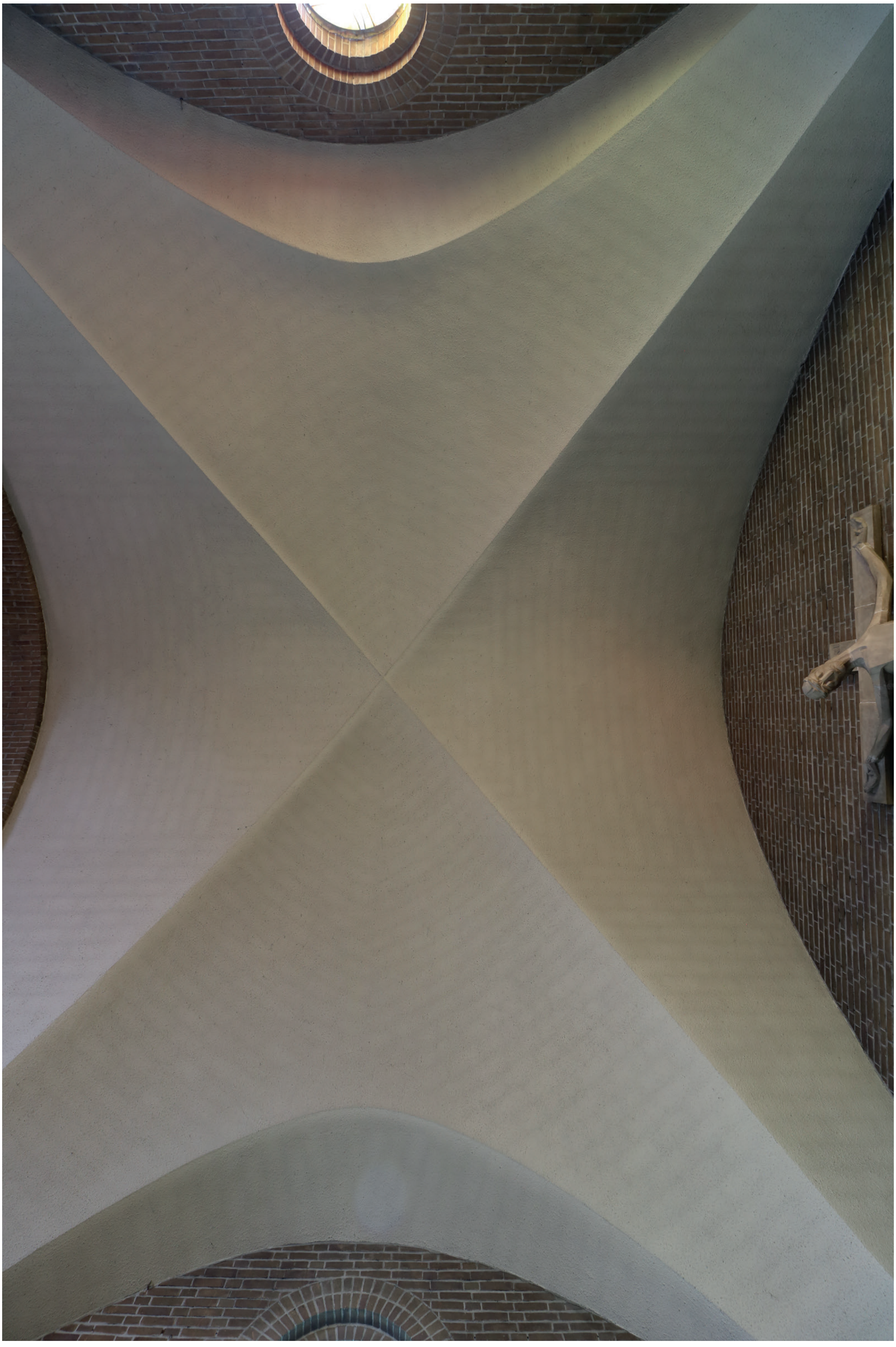


Plate VII. Church of Divin Sauveur in Schaerbeek, plan view (Homez 1935; Archives de Schaerbeek).

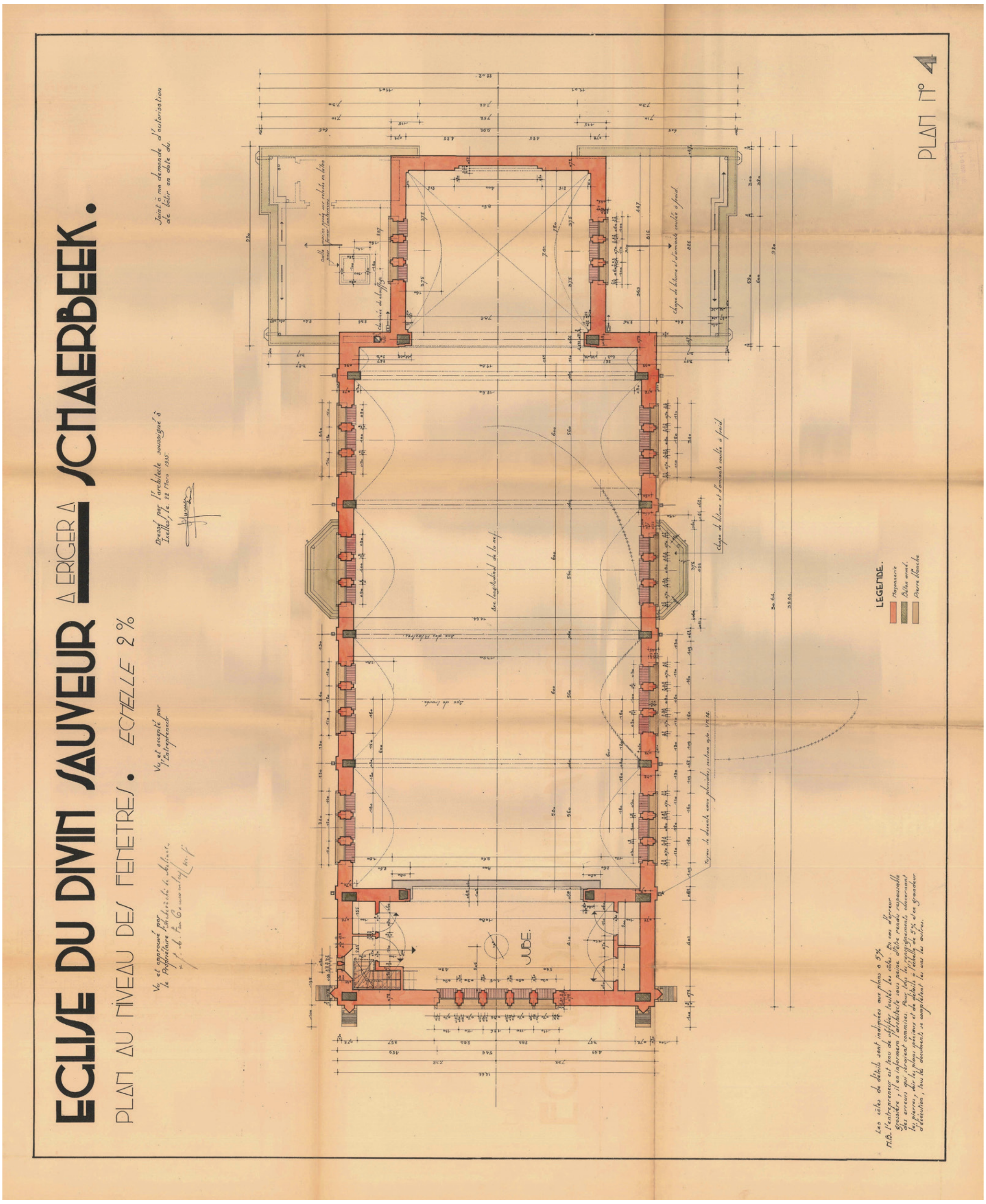

EGLISE DU DIVIN SAUVEUR A ERIGER A SCHAERBEEK.
PLAN AU NIVEAU DES FENETRES. ECHELLE 2%
PLAN N° 4
LEGENDE.
JUBE

Plate VIII. Church of Divin Sauveur in Schaerbeek, longitudinal section (Homez 1935; Archives de Schaerbeek).

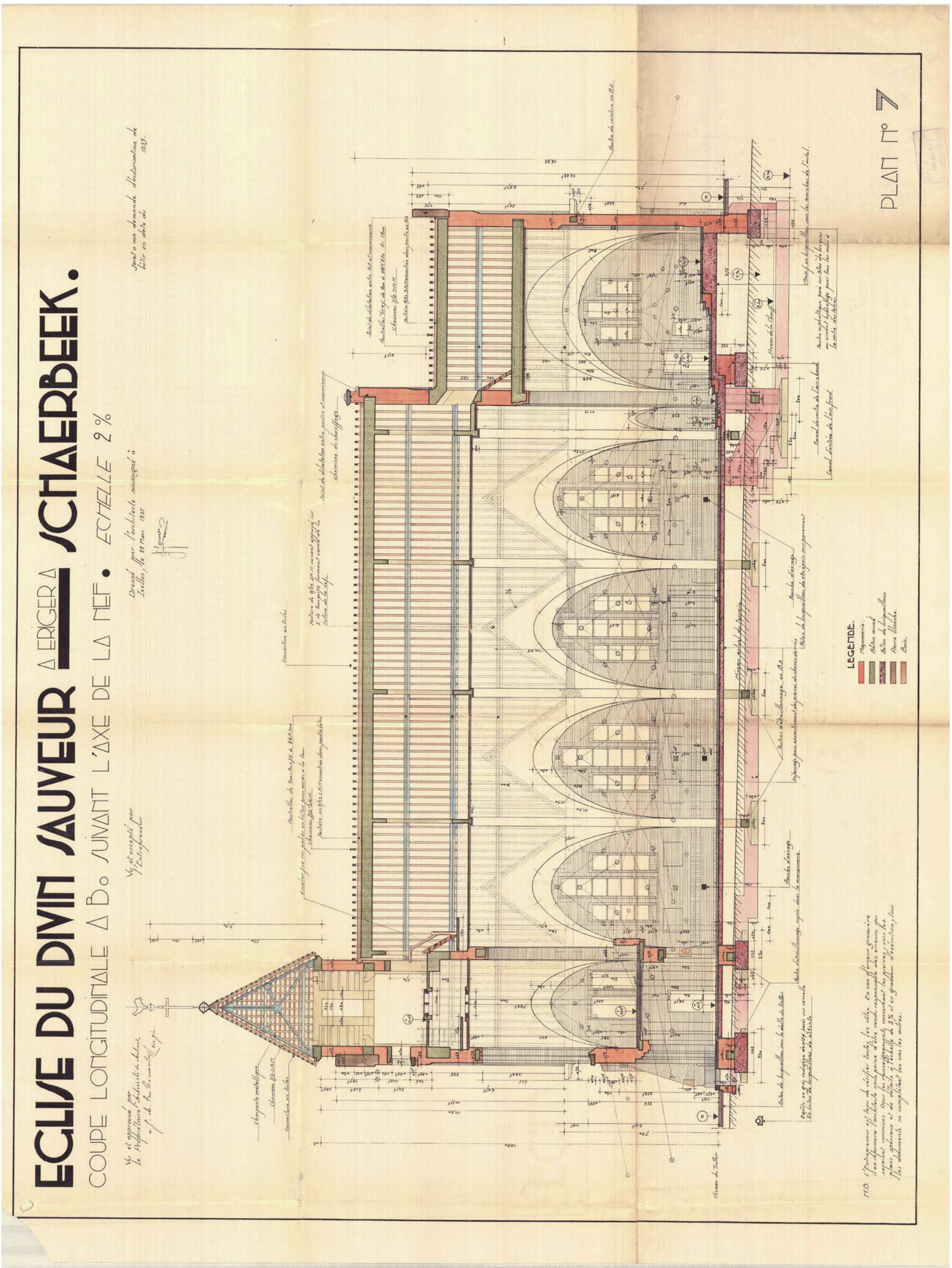

EGLISE DU DIVIN SAUVEUR A ERIGER A SCHAERBEEK.
COUPE LONGITUDINALE A B. SUIVANT L'AXE DE LA NEF.
ECHELLE 2%
PLAN N° 7
LEGENDE.

Plate IX. Church of Divin Sauveur in Schaerbeek, cross-sections (Homez 1935; Archives de Schaerbeek).

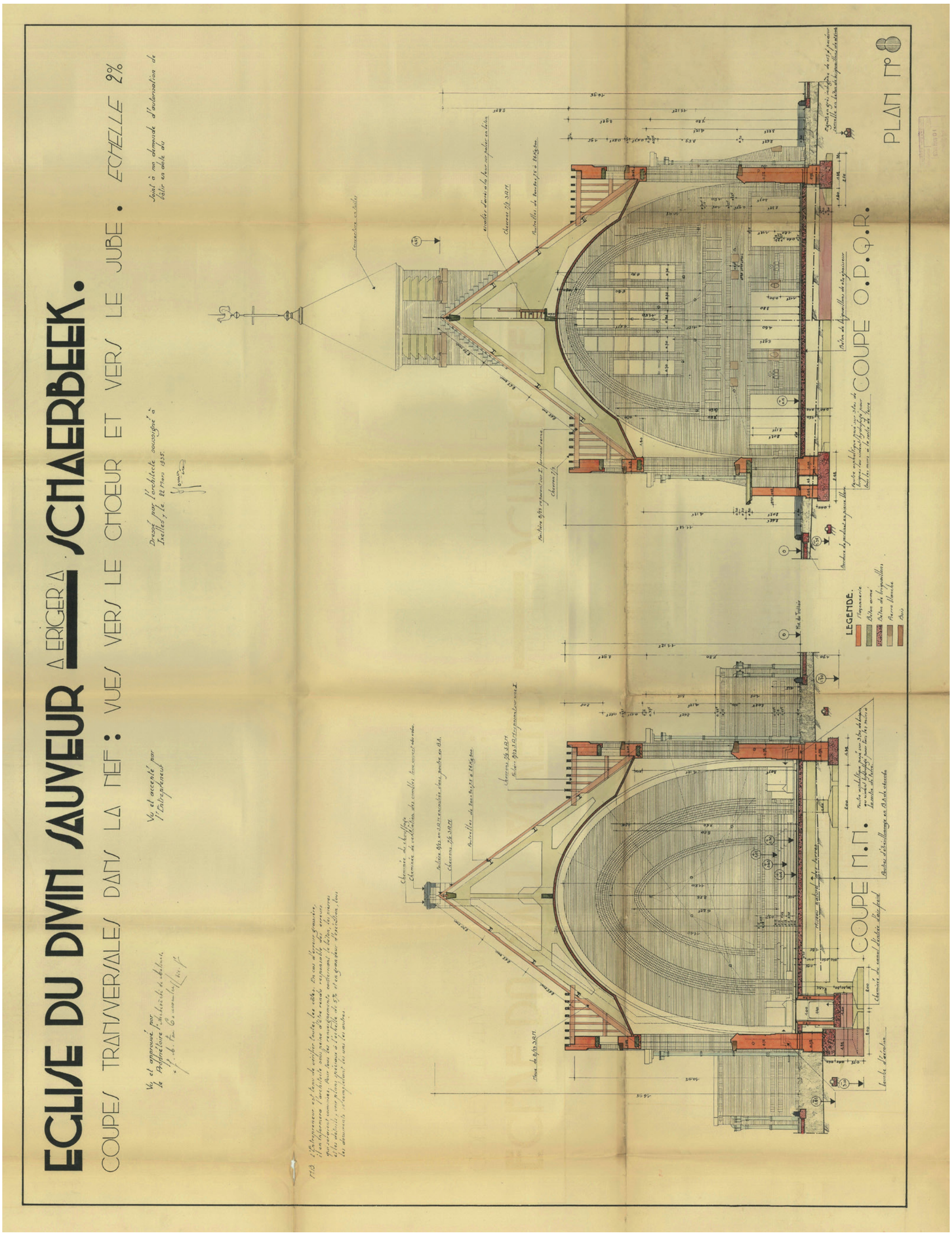
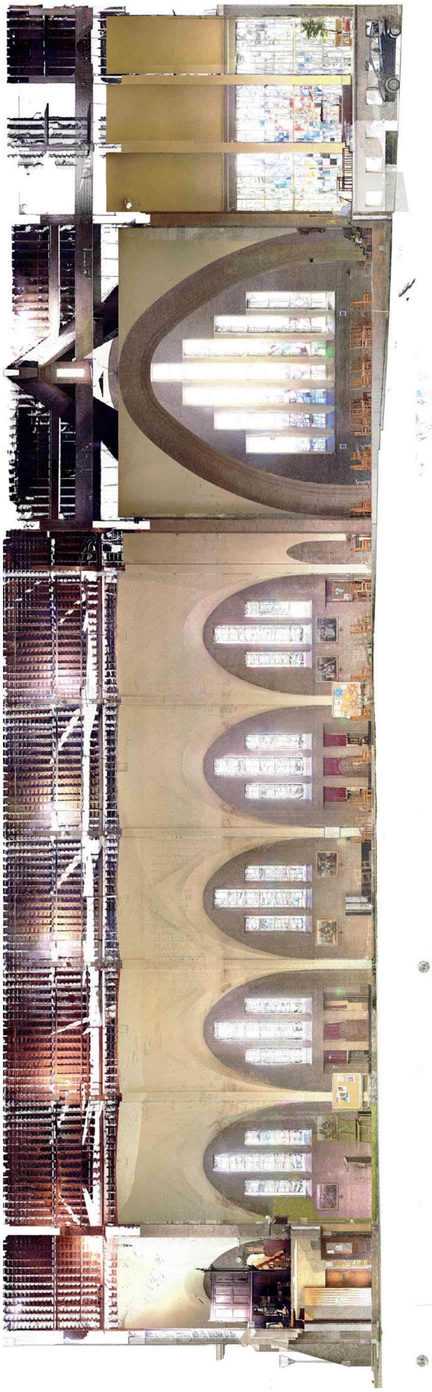

EGLISE DU DIVIN SAUVEUR A ERIGER A SCHAERBEEK.
COUPES TRANSVERSALES DANS LA NEF : VUES VERS LE CHOEUR ET VERS LE JUBE. ECHELLE 2%
COUPE M.N.
COUPE O.P.Q.R.
LEGENDE.
PLAN N° 8

Plate X. Church of Divin Sauveur in Schaerbeek, plan view and longitudinal section (Orthophotographs: Authors, 2021).



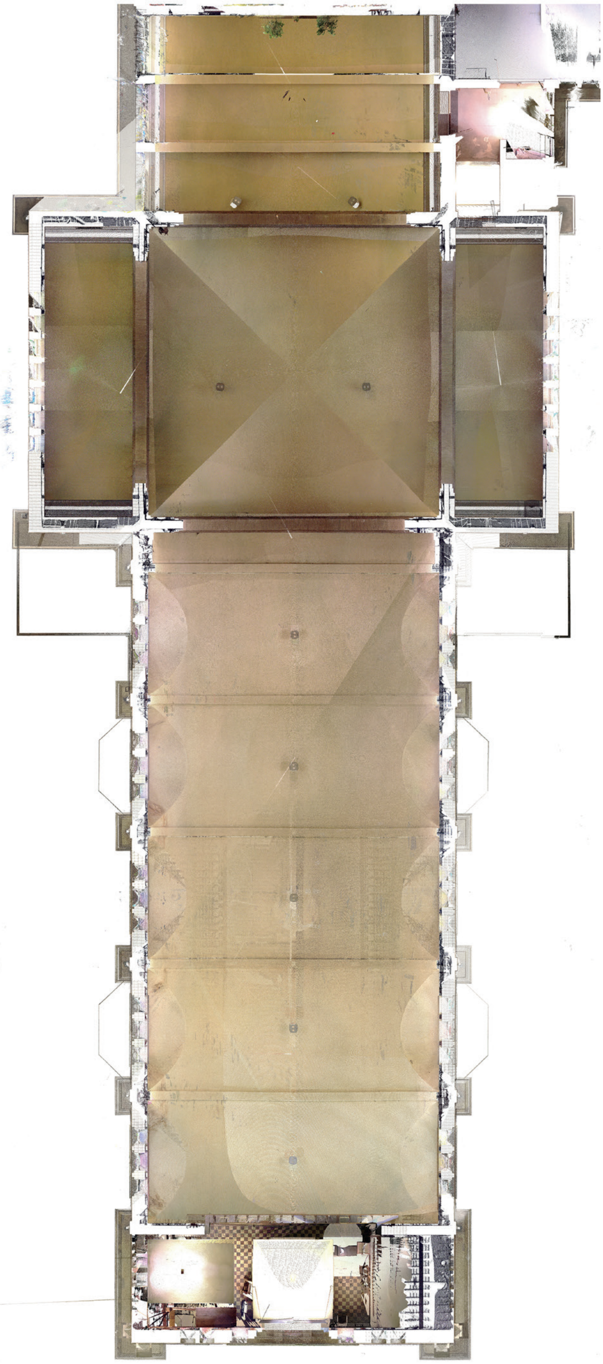


Plate XI. Church of Sint-Theresia in Dilbeek, plan view (Homez n.d.; Archives School Regina Caeli).

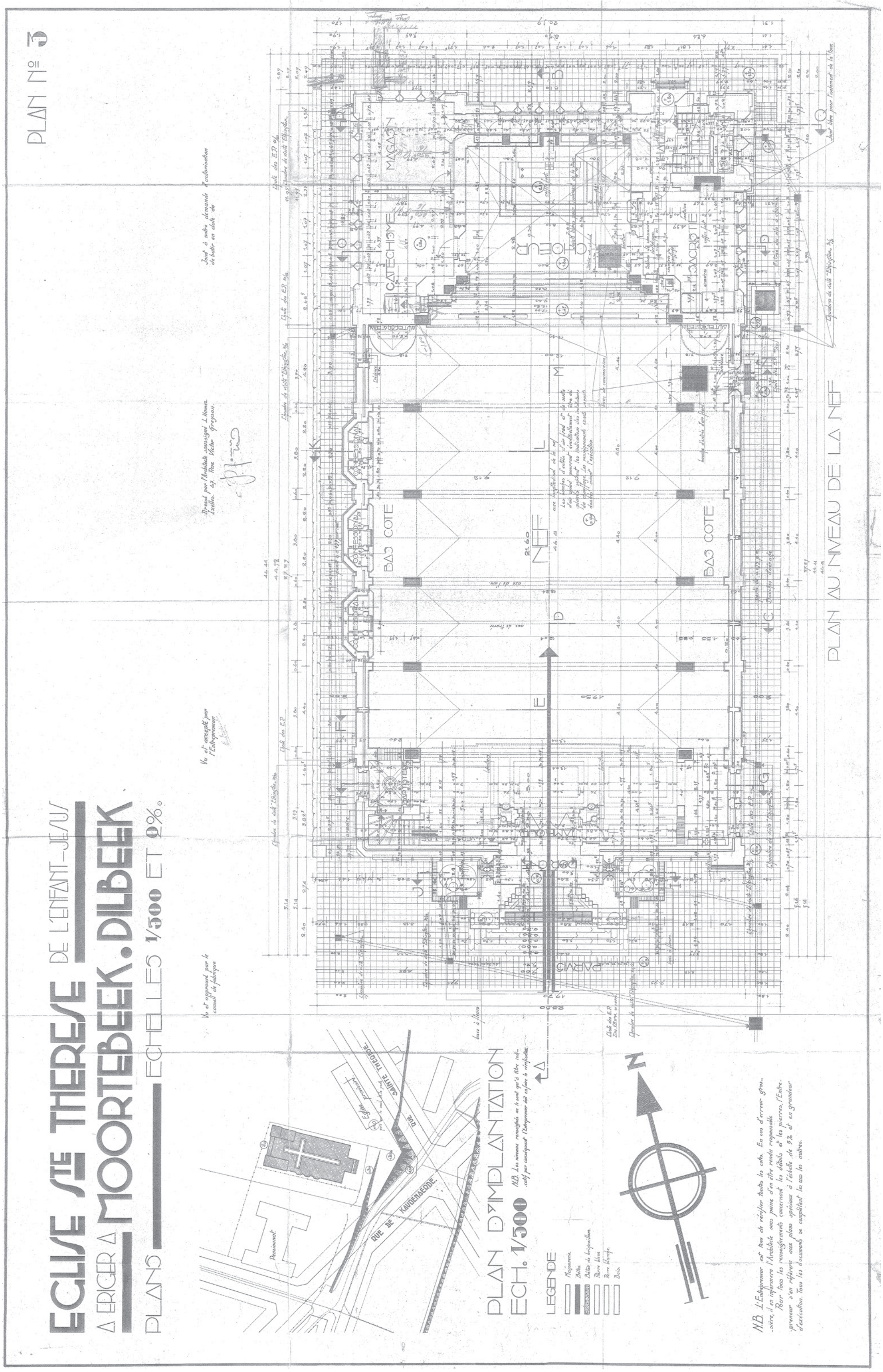

EGLISE STE THERESE DE L'ENFANT-JESUS
A ERIGER A MOORTEBEEK . DILBEEK
PLANS
PLAN N° 3
PLAN AU NIVEAU DE LA NEF
PLAN D'IMPLANTATION
ECH. 1/500
LEGENDE
NEF
BAS COTE
BAS COTE
CATECHISME
MAGASIN
SACRISTIE
PARVIS
N

Plate XII. Church of Sint-Theresia in Dilbeek, longitudinal section (Homez n.d.; Archives School Regina Caeli).

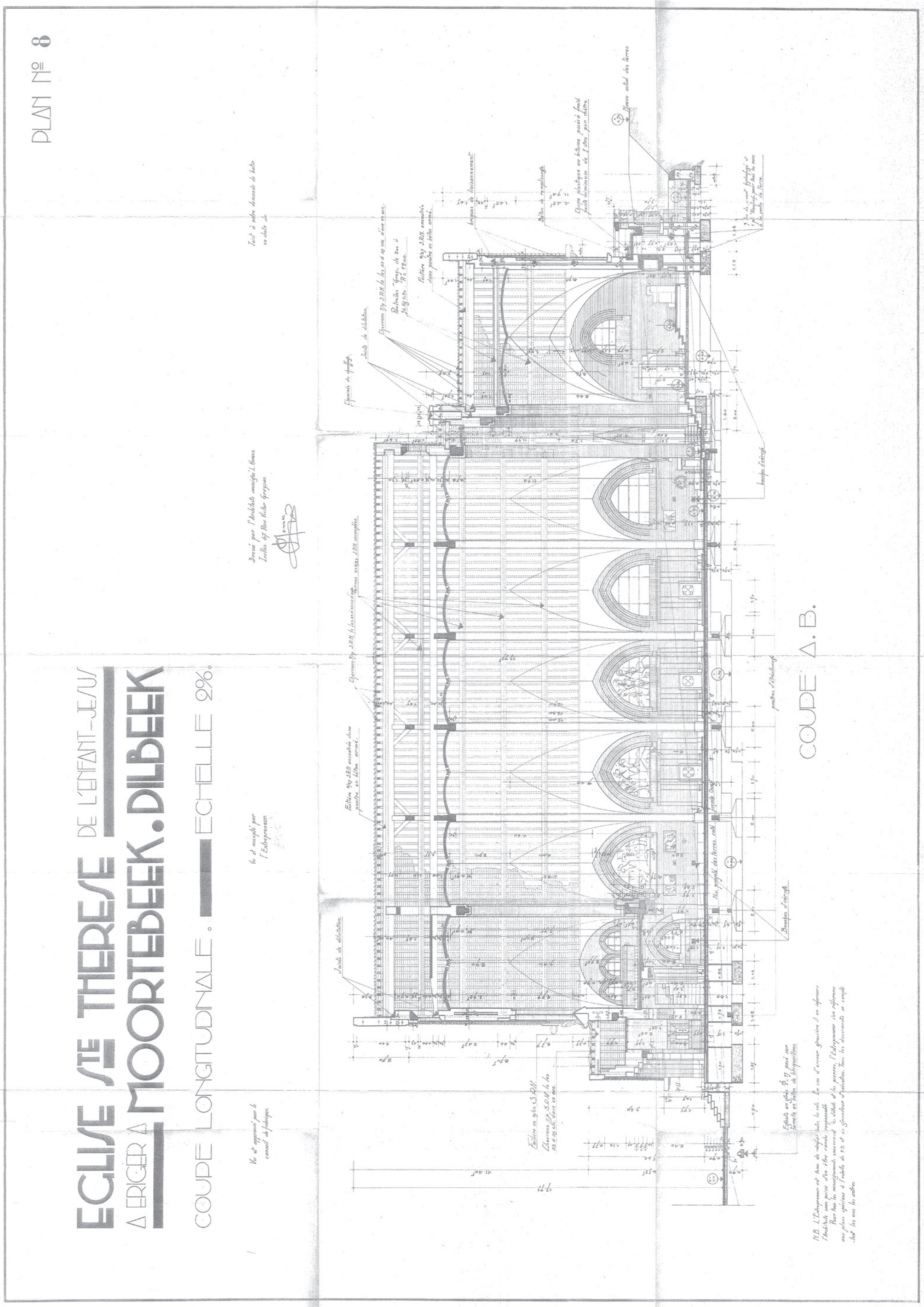

PLAN N° 8
EGLISE STE THERESE DE L'ENFANT-JESUS
A ERIGER A MOORTEBEEK . DILBEEK
COUPE LONGITUDINALE . ECHELLE 2%.
COUPE A. B.

Plate XIII. Church of Sint-Theresia, plan view and longitudinal section (Orthophotographs: Authors, 2021).

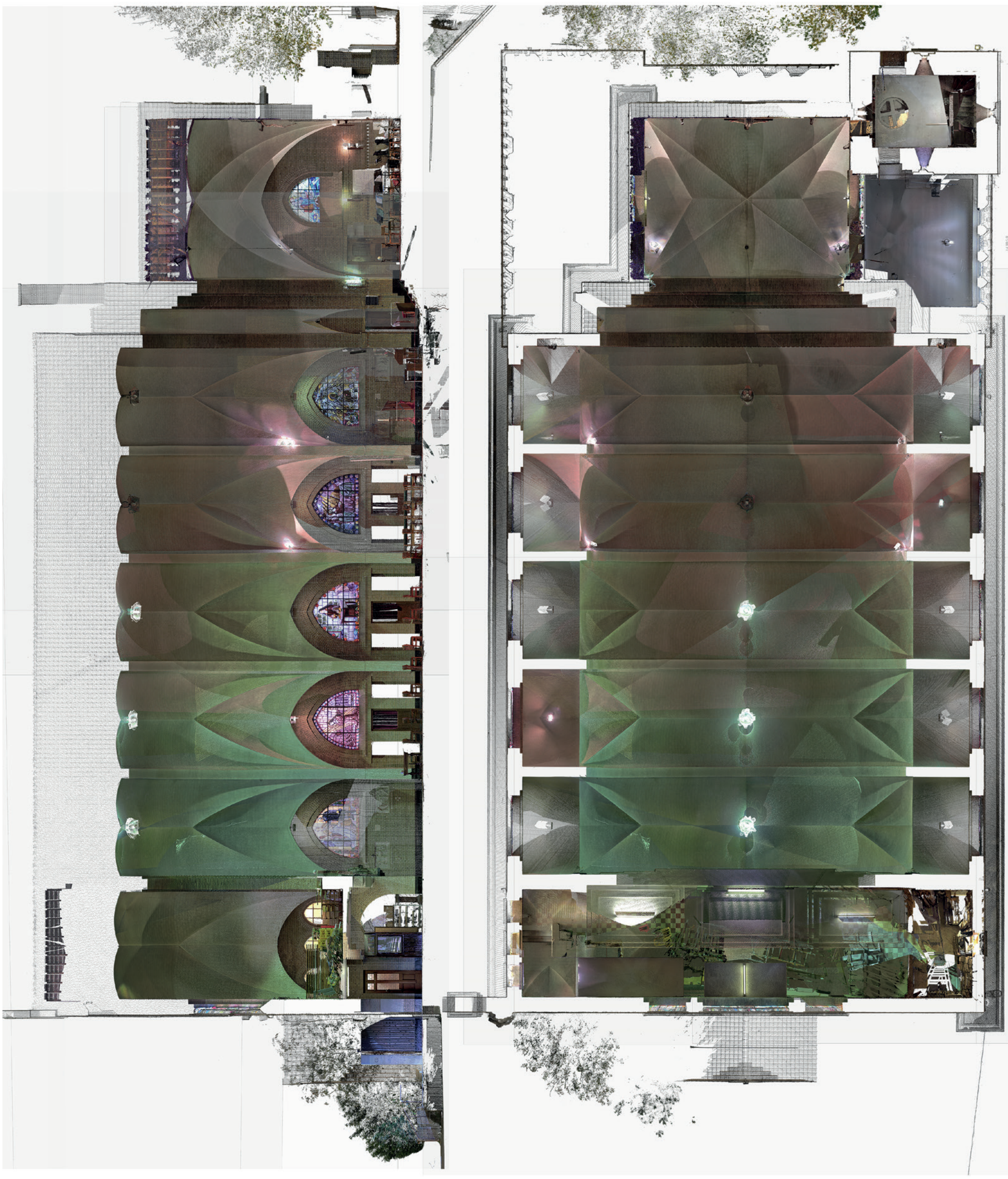
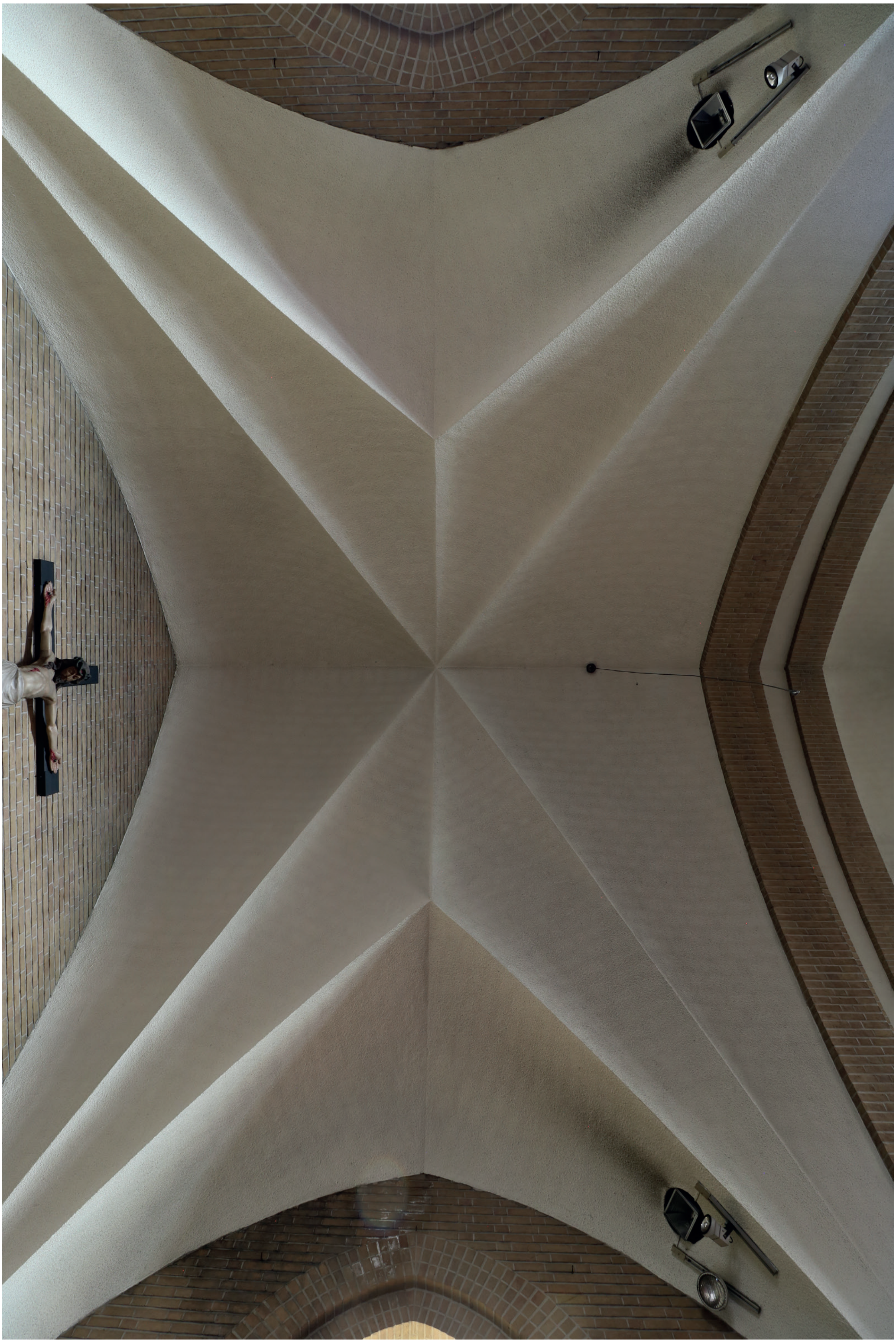


Plate XIV. Church of Sint-Theresia, vault of the apse (Photo: Authors, 2019).



Brick Vaults and Beyond

The Transformation of a Historical Structural System from 1750 to 1970

Edited by Paula Fuentes and Ine Wouters

INSTITUTO JUAN DE HERRERA
VRIJE UNIVERSITEIT BRUSSEL

The project *Brick Vaults and Beyond: The Transformation of a Historical Structural System (1830–1930)* has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie grant agreement No 833030.

Editors: Paula Fuentes and Ine Wouters
Copyediting: William Hatherell and Sara E. Wermiel
Cover illustration: Construction of the dome of the Royal Museum for Central Africa (HP.1968.10.6-52, collection RMCA Tervuren; Charles Girault archives)
ISBN: 978-84-9728-587-2
Depósito legal: M-12734-2021
Layout and printing: Gracel Asociados S.L.L.

Contents