

DIGITAL TECHNOLOGIES AS A TOOL FOR IDENTIFICATION THE AUTHORSHIP OF SACRED SCULPTURE



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Abstract. Latvian sculptures created before the mid-19th century are located mainly in churches, not in museum collections. The most serious obstacle to research of Latvian art in the given period is lack of pertinent documentary material. As a result, Latvian art historians have mostly studied the sculptures for which written sources are available. This article will offer solutions for further research in cases when written sources are limited or altogether unavailable. How much and what can be discovered using digitisation solutions?

The study of the sculptures of the Bīķernieki Church in Riga provides a paradigmatic case for further research with the help of digitisation. In 1967, when the congregation of the Bīķernieki Church was forced to abandon the church, the sculptures were transferred to museums. Today they can be seen in the exhibition of the Rundāle Palace Museum. The scant extant documentary evidence does not allow us to establish the authorship of the sculptures or the time of their creation with certainty.

The study discussed in the article shows the importance of digitisation in art history research. The current research is based on 3D models of the sculptures of the Bīķernieki Church obtained using 3D scanning technology. Supplementing them with high-resolution photographs and other digital solutions can confirm or, on the contrary, refute assumptions about their authorship and creation made by historians so far. The article outlines the methods used to identify stylistic influences on the sculptures of the Bīķernieki Church, suggesting that they may have been modelled after similar sculptures in Gdańsk (Danzig) and Dresden and even after certain antique sculptures. The graphic methods used in the research have made it possible to precisely identify the style of execution of a single sculptor in several churches in Riga.

Keywords: digitisation, Jakob Ernst Mayer, St. James Cathedral, St. John's Church, Bīķernieki Church

Introduction

In the context of Western European art history, the history of the sculptures created in Latvia until the middle of the 19th century is quite peculiar. Firstly, sculptures in Latvia then were created by immigrant artists, who brought with them craftsmanship and stylistic trends learned elsewhere. Secondly, most of the sculptures are found in the Lutheran churches. With the beginning of the Reformation in Livonia in 1525, the Duchy of Courland-Semigallia converted to Lutheranism and the construction of new churches began. By 1800, in addition to the existing 35 churches and 25 chapels, 63 new churches had been built [1]. The number of Catholic churches was considerably smaller. According to the statistics, 36 Catholic churches had been built by 1800. [2]. WWI, WWII and the Soviet occupation of Latvia did great damage to the church interiors. 20% of the Latvian Lutheran churches were damaged in WWI and 30%, in WWII. As a result of the atheistic campaign in the Soviet Union, many congregations were forced to leave their churches. Abandoned churches were demolished or converted to warehouses, workshops and gyms. During the Soviet period, 33% of the Latvian Lutheran churches were destroyed. Since the beginning of the 20th century, 60% of the Lutheran churches in Latvia had their interiors damaged or altogether destroyed [3]. Church archives and libraries were closed and destroyed thanks to the atheistic campaign [4]. As a result of all this damage and destruction, the number of artworks and historical documents that are still available for the study of Latvian art history was greatly diminished.

While art historians have identified some of the sculptors active in Latvia up to the middle of the 19th century, many sculptures created in that period remain authorless. They can be divided into two categories. The first category includes the sculptures about whose authors nothing is known, while the second category comprises those works about whose

authorship art historians have made various assumptions. In order to further expand art historical research, which includes these two categories of sculptures, it is necessary to develop innovative research methods that will lead to new discoveries and interpretations.

The aim of this article is to evaluate the importance of the digitisation of church interiors for further research, new discoveries and more accurate interpretations of sculptures.

Materials and Methods

The church of Bīķernieki, the construction of which began in 1765, was chosen as the subject of the study. According to the research of the architect Paul Kampe, the altar, which was consecrated in 1766, was made by the carpenter Karl Gottlob Appelbaum. In 1932, the Bīķernieki Church with all its furniture and furnishings was included in the list of monuments under state protection (Figure 1 on the left). After WWII, in 1967, the parish ceased to exist and the empty premises were demolished. On 23 July 1970, the authorities inspected the church as a protected monument and found that the interior of the church had been damaged, including the angel figures on the organ balcony and 4 vases on the barrier of the altar. All the artworks were removed from the church and handed over to the Rundāle Palace Museum (RPM) and the Sigulda Regional Research Branch of the Dole History Museum. The empty premises were used for storage, as well as for the stained-glass workshop "Māksla" (Figure 1 on the right). In 1989, the congregation regained the church and on 18 February held the first service after repossessing the church. Soon afterwards the renovation of the church began [5].

The preserved wooden sculptures have not been returned to the Bīķernieki Church so far and are currently in the Rundāle Palace Museum's exhibition "From Gothic to Art Nouveau". As a result of the research by the museum historians, the sculptures have been identified as the work of Jakob Ernst Mayer. In written sources, the sculptor's name appears in

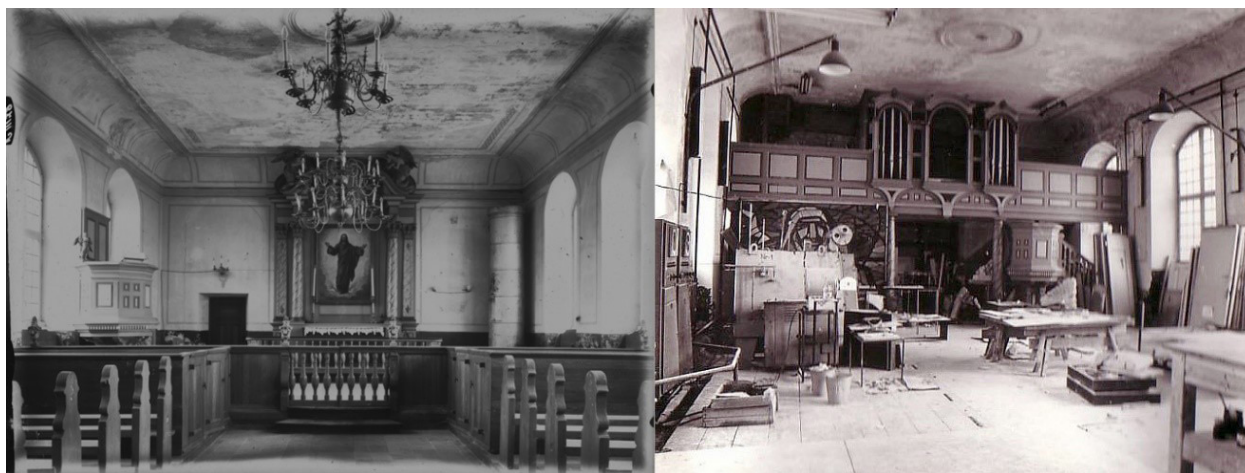


Fig. 1. Interior of the Bīķernieki Church. On the left, the church interior in the 1960s-70s [photo from RPM collection]. On the right, the interior after the congregation was disbanded [photo from <http://bikerudraudze.lv/bikeru-dievnam/>]




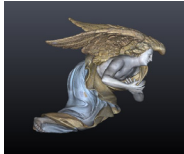
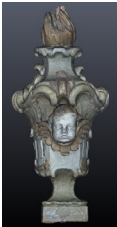



Fig. 2. Two sculptures from St Peter's Church [6]

connection with the altar of St John's Church in Riga, where he worked together with the aforementioned carpenter Karl Gottlob Appelbaum. The altar of St John's Church has survived to this day. According to Paul Kampe, the structure of the altar of St John's Church in Riga has similarities with the altar of the church in Bīķernieki. Both altars have angels in the concluding volutes. Paul Kampe saw similarities in the design of the angels' wings and in the folding of their vestments. [6]. The name of the sculptor is not mentioned in any other written sources. It is mentioned neither in the RPM archive documents, nor in the transcripts available at the RPM from the Latvian State Historical Archives, nor in the archive documents of the National Heritage Board of Latvia. Assuming that the two masters collaborated on the interior of more than one church, it can be suggested that the sculptures of the church in Bīķernieki may have been created by the sculptor Jakob Ernst Mayer.

In the 1760s, the sculptor Jakob Ernst Mayer created vases and other decorative elements for the Riga Town Hall and two figures of the apostles for St Peter's Church in Riga (Figure 2) [7]. These works have not survived.

In order to examine the relationship of the sculptor Jakob Ernst Mayer to the church in Bīķernieki and St. John's Church in Riga, this research will refer to the following

Table 1. Digital materials used

No	Description	Image
1	An angel from the organ balcony at the Bīķernieki Church.	
2	An angel from the altar in the Bīķernieki Church. Personal archive of S. Bitko	
3	A depiction of an angel's head on a decorative vase from the Bīķernieki Church. Personal archive of S. Bitko	
4	Angel's head with wings from the Bīķernieki Church. Personal archive of S. Bitko	
5	Angels from the altar in St John's Church in Riga. Personal archive of S. Bitko	
6	A sculpture on the lectern of St John's Church. Personal archive of O. Spāritis	

digital materials:

- 3D models of the sculptures of the church in Bīķernieki, created by the author of the article by means of 3D scanning. All 3D models are available at: <https://arthistorylatvia.org/3d-modeling-bikernieki-church/>
 - Photographic images of St. John's Church in Riga
- According to the digital visualizations, the sculptures can be divided into 4 stylistic groups:
- Type 1 – angel from the organ balcony in the Bīķernieki

Church (Table 1. Row 1)

- Type 2 – angel from the altar in the Biķernieki Church (Table 1. Row 2)
- Type 3 – angels from the altar in St John's Church in Riga (Table 1. Row 5)
- Type 4 – angel's head on a decorative vase and angels' head with wings from the Biķernieki Church and St John's Church lectern (Table 1, Rows 3, 4, 6)

After the general stylistic comparison of the sculptures of angels, it can be noted that the similarity between the sculptures is only noticeable in the sculptures of type 4; therefore, additional research and analysis is required:

1. Sculpture studies in other churches in Riga, as the quality of the images of the no longer extant sculptures in St Peter's Church (Figure 2) is not high enough to enable definite conclusions about their authorship or relation to similar sculptures.

2. In order to analyse Mayer's carving style and to identify possible stylistic influences on it as precisely as possible, the sculptures provisionally attributed to him in other countries should be studied in depth. In the course of his research of pertinent archival material, Paul Kampe has pointed out that the sculptor came from Gdańsk. Kampe also suggests that Jakob Ernst Mayer may be identified with the sculptor Jakob Mayer, who in 1740, together with Paul Mayer, created the 6 figures of the Apostles for the Dresden Catholic Cathedral. The sculptures are made after models by the sculptor Mattielli [7].

Results and Discussion




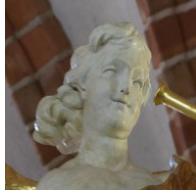
Type 1 - angel from the organ balcony in the Biķernieki Church

Among Riga's churches, we should mention St James Cathedral, where the organ façade has been preserved to this day. It is now known that in 1760 a new organ was commissioned from the organ builder Heinrich Andreas Contius and consecrated in 1763 [8]. Information about the woodcarver of the organ is lacking. There are 4 angels in the organ façade of St. James Cathedral. Two of them are in the lower row, closer to the viewer, and two near the timpani in the upper row. A visual comparison shows that the angels in the top row (Table 2. Row 2) bear a clear resemblance to the angels of Type 1 (Table 2. Row 1) [5]. Their distinctive facial features, such as the dimpled cheeks and the small snub nose as well as their smiles and curly hair make them different from the other carved angels of the same period.

A review of the surviving sculptures in Gdańsk reveals possible stylistic similarities in the modelling of the facial features of the angels in the St James Cathedral in Riga and the sculptures of the organ façade of St John's Church (now St John's Centre) in Gdańsk (Table 2. Rows 3, 4). The detailed digitisation of the organ façade allows the sculptures to be studied in close-ups. The organ façade of St John's Church was created between 1760 and 1761 by Johann Heinrich Meissner, who was a leading sculptor in the Baltic Sea region. [14]. Both organ façades were made in the same period, and the task of future research is to identify the master under whose guidance J. H. Meissner had learned his skills. It is possible that the sculptor who made the Type 1 angels in Riga also studied with the same master, which explains the similarity in the modelling of the sculptures' facial features.

In determining stylistic influences, only sculptures of type 1 have been examined, without taking into account other ornaments and sculptures on the organ façade. At the moment, nothing is known about the visual appearance of the organ façade of the Biķernieki Church. The parish

Table 2. Analysis of Type 1 sculptures

No	Description	Image
1	An angel from the organ balcony of the Riga Biķernieki Church. Personal archive of S. Bitko	
2	An angel from the organ façade of St James Cathedral in Riga. Personal archive of S. Bitko	
3	An angel from the organ façade of St James Cathedral in Riga. Personal archive of S. Bitko	
4	An angel from the organ façade of the St John's Centre in Gdańsk. Image from St. John's Centre, Gdańsk https://centrumswjana.pl/wirtualnyspacer/spacer.html	

chronicles state only that a new organ was installed in 1875. According to the photographs of the 1960s, there were two sculptures of angels on the organ balcony, which had been moved there from the old façade, according to the practice of the time [13].

Type 2 - angel from the altar in the Biķernieki Church

Paul Kampe has found a correspondence between the Type 2 and Type 3 angel wings. Even though the two sets of wings are similar, the Type 2 angel wings are much closer to the real bird wings in appearance [Table 3. Row 3], while the Type 3 wings are more stylized [Table 1. Row 5]. Wings of angels in Latvian sacral sculpture are made in different styles. Mostly they are stylized and none of them exactly corresponds to the classical (bird) depiction of wings. For this reason, the two angels are divided into different types and discussed separately.

Attention should be paid not only to the wings of the Type 2 sculpture, but also to the profile of the angel's face, which is based on antique models. In the Latvian churches and in the sculpture created before the 19th century in general, this is the only sculpture based on an antique model. In order to explain the appearance of such a classical model in a Latvian church, it is necessary to use the materials obtained from research into the possible sites of the master's activity and influence in Gdańsk and Dresden. The most striking example of an angel's wings and profile can be seen in the sculptural relief of The Hill Gate (also known as The High Gate) in Gdańsk (Figure 3) by Willem van den Blocke [9].

From the 16th to the early 17th century, the largest sculpture workshop in Gdańsk was owned by the sculptor Willem van den Blocke, who worked with artists from the Netherlands. During this period, Gdańsk art was strongly influenced by Classical art, which came to Gdańsk from Italy through the work of Dutch artists. Later, German sculptors took over the workshop, but this did not mean a radical change in style. The workshop continued to operate in its usual manner, maintaining its links with antique art. [10] References to antique art can be traced not only in Gdańsk, but also in Dresden in the workshop of the Italian sculptor Mattielli Lorenzo. The most striking example from the workshop is the sculptural group of archangels at St Michael's Church in Vienna, dated 1724/25 (Figure 4)[11]. It shows archangels with both classical wings and antique face profile modelling.



Fig. 3. The Hill Gate in Gdańsk [9]



Fig. 4. The Archangel Group. St Michael's Church in Vienna [personal archive of S. Bitko]

Table 3. Analysis of Type 2 sculptures

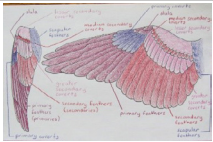
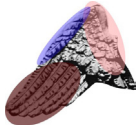
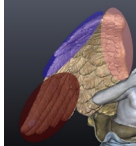






No	Description	Image
1	Drawing of a bird's feathers. Image from https://rolling-harbour.com/2018/02/09/wing-feathers-draw-a-bird-day/	
2	A fragment of an angel's wing from the High Gate relief. Image complemented with colour markers. Image from source [9]	
3	Fragment of a wing from the altar angel of the Bīķernieki Church. Image complemented with colour markers. Personal archive of S. Bitko	
4	Head of Singing or Talking Dionysus (Roman copy after an original from 270 –250 BC, Altes Museum, Berlin). Image complemented with a red contour line. Personal archive of S. Bitko	
5	Profile image of the altar sculpture from the Bīķernieki Church. Image complemented with a red contour line. Personal archive of S. Bitko	
6	Fragment of a sculpture of St Venantius (1742). Image from source [12]	

Table 4. Analysis of Type 3 sculptures

No	Description	Image
1	Fragment from the altar angel of St John's Church in Riga. Personal archive of S. Bitko	
2	Head of St Rosalia of Palermo. Image from source [12]	
3	Head of St Rosalia of Palermo. Image from source [12]	

Stylistic similarities with the Type 2 angel are also evident in the sculptures in the Dresden Cathedral, which were created between 1741 and 1747. At present, there is uncertainty about the attribution of some of these sculptures to Jacob and Paul Mayer. Detailed close-up photographs of each sculpture are available on the internet [12]. Among all the sculptures examined here, the use of the antique profile is most evident in the sculpture of St. Venantius (1742) (Table 3. Row 6), while the profiles of the other sculptures are in a different style.

For a detailed analysis of the wings and their correspondence to the classical wing model, a drawing of a bird wing structure has been examined (Table 3. Row 1). It shows the feather groups with primary feathers in dark red, secondary coverts in pink, primary coverts in blue and secondary feathers in the middle part of the wing. The same colour markers are used for the wing structure of the Type 2 angel (Table 3. Row 3) and the angel from the High Gate relief (Table 3. Row 2).

The graphic technique of contour line was used to precisely identify the similarities between the facial profiles of the angels and those of the antique sculptures. Initially, the contour line of the profile was drawn on a photograph of an antique sculpture (Table 3. Row 4). Without changing the proportions of the contour line, it was superimposed 1:1 on a photograph of a Type 2 angel (Table 3. Row 5). There are slight differences in the chin, which may depend on the individual style of each sculptor, while the profile of the forehead and nose match completely.

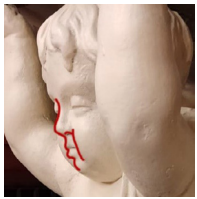




Type 3 – angels from the altar in St John's Church in Riga

When visually examining the facial features of the Type 3 sculptures (Table 4. Row 1), it can be noticed that they are very different from the others. Stylistic similarities can be found in the sculptures of the Dresden Cathedral, especially that of St Rosalia of Palermo (1742). The nose of the sculpture is sharply outlined and the sculpture is depicted with half-closed eyes (Table 4. Row 2). The earlobes are much thicker than in the other sculptures of the same type (Table 4. Row 3). The author of this article has not yet identified sculptures with such facial modelling details in other Latvian churches.

Type 4 – angel heads on a decorative vase and an angel head with wings from the Bīķernieki Church and St John's Church lectern

In order to reveal the similarities among the Type 4 sculptures more precisely, the graphic technique of contour lines has been used. The basic contour line is drawn on the profile of the sculpture on the lectern of St. John's Church in Riga (Table 5. Row 1). The contour line marks the most prominent facial features of the angel, such as the profile of the nose,

Table 5. Analysis of Type 4 sculptures

No	Description	Image
1	Profile image of the sculpture on the lectern of St John's Church in Riga. Image from personal archive of O. Spārtis. Original image complemented with a red contour line.	
2	Profile of the decorative vase from the Riga Bīķernieki Church. Original image complemented with a red contour line. Personal archive of S. Bitko	
3	Profile of the winged head from the Riga Bīķernieki Church. Original image complemented with red contour line. Personal archive of S. Bitko	
4	Decorative vases and winged heads from the Riga Bīķernieki Church. The image is supplemented with red control marks. Personal archive of S. Bitko	
5	The coat of arms of Saxony and Poland. Image from source [12]	

mouth and chin, with an additional line drawn for the cheeks. Without changing the proportions of the contour line, it is superimposed on the profile image of the winged head from the Bīķernieki church (Table 5. Row 3), resulting in an exact match. On the other hand, no match was found when the contour line was used to examine the profile image of the face of the decorative vase sculpture (Table 5. Row 2), which may be explained by the size of the sculptures. The winged head depicted on the vase is many times smaller than the other two sculptures. For this reason, an additional examination was carried out by making control marks on the inner and outer corners of the eyes, the centre of the nose, the centre of the upper and lower lip (Table 5. Row 4). The control marks were made on the profile of the winged head from the Bīķernieki Church and, without changing the proportions, they were moved to the profile of the sculptural face of the vase. In this case the proportions are completely consistent. The stylistic influences of the type 4 sculptures can be seen in the Saxon and Polish coat of arms (Table 5. Row 5) by Mattioli Lorenzo above the main entrance to the Dresden Cathedral [12]. The resemblance is most apparent in the round cheeks and the folds around the mouth, which give the impression of a sad facial expression.

Conclusions

The study reveals the potential of digital technologies in the study of art history. In the 20th century, the historian Paul Kampe could only make assumptions about artworks based on written sources or personal observations, which were impossible to verify without digital solutions because they were too far away from the viewer. The best examples are

the sculptures of the Dresden Cathedral. They are situated on the roof of the building and each sculpture is about 3.5 metres high, so even if the viewer is on the roof of the Cathedral it is impossible to see the details. Similarly, the altar sculptures of St John's Church in Riga are far from the viewer. The stylistic analysis of the angels of types 2, 3 and 4 confirms the assumption made by Paul Kampe that the sculptor Jakob Ernst Mayer can be identified with Jakob Mayer who, together with Paul Mayer, created the 6 apostles for the Dresden Cathedral in 1740.

While it is possible to divide the sculptures chosen for the current research into 4 stylistic groups, it is not yet possible to determine the exact number of sculptors who worked on them. Even though Jakob Ernst Mayer has been placed in the centre of the current study, this does not mean that he worked alone on the commissioned works in Riga. The different styles of the sculptures and varying degrees of craftsmanship with which these were executed suggest that several sculptors worked on them in Riga, and that their styles may have been influenced by the sculptors and their works from Gdansk and Dresden. The analysis of the Type 1 sculptures reveals that it is possible to continue making new discoveries in art history despite the lack of written sources from the relevant period in Latvia. As the study shows, digital technologies have made it possible to discover the works of one sculptor in several churches, such as the Riga Bīķernieki Church and St James Cathedral.

The graphical method of using contour lines or control marks that can be superimposed upon similar images can be used to show that:

- the existence in Latvia of sculpture based on antique art models, such as the altar angels of the Riga Bīķernieki Church.
- one and the same author's style of execution can be identified in different sculptures in different churches in Riga, such as the decorative vases and the angel's winged head of the Bīķernieki Church and the sculpture on the lectern of St John's Church.

Research in art history should use high-quality digital technologies and materials to achieve the most accurate results. 3D models are particularly useful for digital analysis, because by comparing the 3D model with photographs taken from a particular angle, the 3D model can be rotated to match the photograph 1:1.

The methods discussed in this study can be used to continue the study of Latvian sacral sculpture even in cases where extensive documentary sources have not survived.

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Kopsavilkums

Pētnieciskais raksts atklāj digitālo risinājumu nozīmi mākslas vēstures pētniecībā, gadījumos, kad dokumentārie avoti iztrūkst vai ir saglabājušies fragmentāri.

Rakstā izmantoti 3D modeļi, kas iegūti no Biķernieku baznīcas skulptūrām, izmantojot 3D skenēšanas tehnoloģiju. Papildinot tos ar augstas izšķirtspējas fotoattēliem un digitāliem risinājumiem, var apstiprināt vai tieši pretēji noraidīt līdz šim izteiktus pētnieku pieņēmumus, kas dokumentāri nav pierādīti. Pētījumā izmantotas grafiskas metodes, ar kurām var precīzi noteikt gan viena autora rokrakstu vairākās Rīgas baznīcās, gan stilistiskās ietekmes.