

Implementation of the Aristide Cavallé-Coll's Vatican project in Poland

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Introduction

Particular attention should be pay on the project from 1875 of monumental organ for the Basilica of Saint Peter in Rome made by the great French visionary of the symphonic organ, Aristide Cavaillé-Coll (1811-1899). This 124-stops colossus was to crown the work of Cavaillé-Coll and was “to complement the artistic achievements of the greatest masters of architecture, sculpture and painting, because music, the most religious of fine arts, did not have a worthy monument in this place”¹. Unfortunately, this project has never been implemented at its destination. However, at the beginning of the 21st century, around 130 years after the idea came into being, in the small village of Lichen Stary, located in the geographical center of Poland, in the largest Catholic temple of the country, the vision of Cavaillé-Coll materialized. In the years 2002-2007, the Polish company „Zakłady Organowe Zych” according to the concept of prof. Andrzej Chorosinski reproduced the sound of Aristide Cavaillé-Coll's organ in a monumental instrumentarium with 157 stops managed by a six-manual console.

This article describes in detail the design of Aristide Cavaillé-Coll's organ for the Basilica of Saint Peter in Rome, completed organ of the Basilica of Our Lady of Lichen in Poland and a comparative analysis of these two sound concepts.

Cavaillé-Coll's project for the Vatican Basilica

Cavaillé-Coll, after realizing the monumental instruments in the Parisian Basilicas Saint-Sulpice (100, 5M+P) and Notre-Dame (86, 5M+P), in the race for the title of the creator of the largest instrument in the world, he wanted to do this work in the most famous and the prestigious church of the world, as proof of the power of the idea of French symphonic organs.

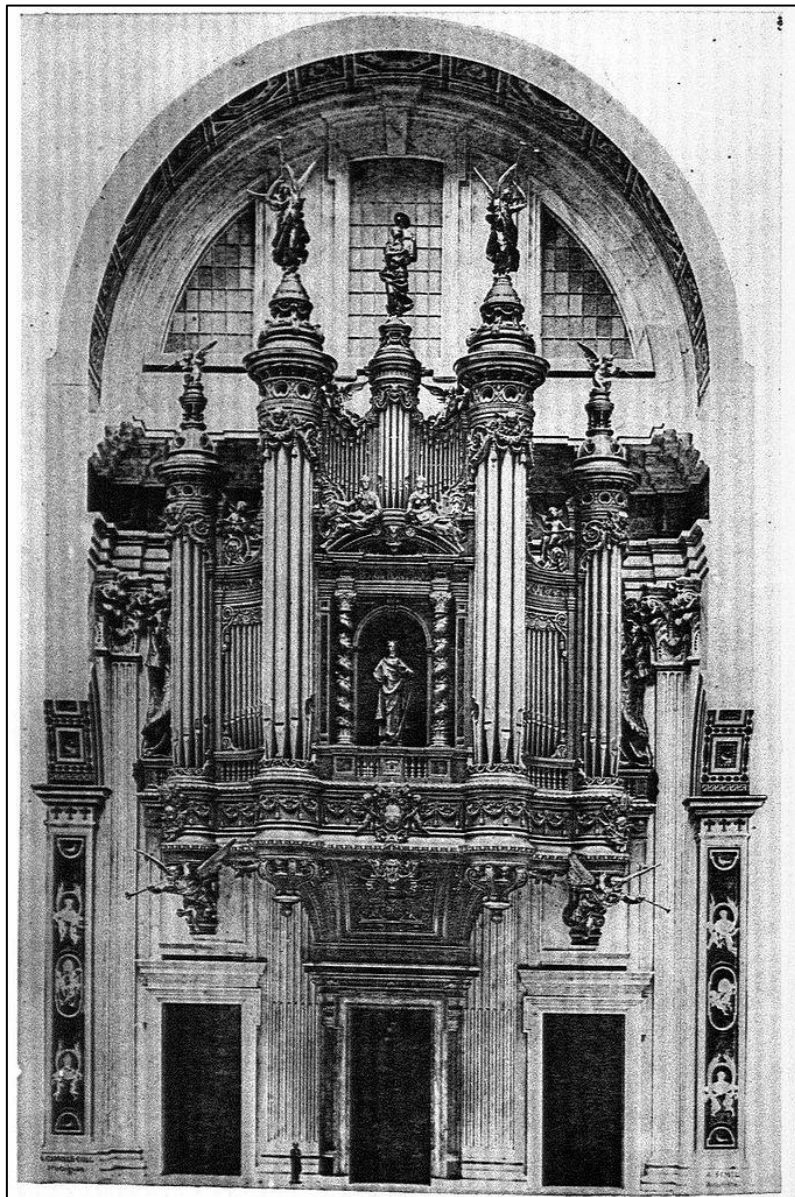
Circumstances of birth of the project

Cavaillé-Coll thought about constructing of this instrument already at the time when he designed the reconstruction of the organ in Saint-Sulpice, i.e. around 1860 (in 1862, the first official mentions of these plans appeared in the Paris-based newspaper “Le Monde”). The scale of such a venture was enormous, which is why the organ master did not stop at just designing the instrument only, but gathered around this idea a large group of patrons and protectors, among whom there was no shortage of aristocracy and world-renowned organists. The prospectus of the instrument was designed by a friendly architect, Alphonse Simil.

Cavaillé-Coll has three times tried to interest the Vatican's governors to implement his idea. The first attempt took place on November 6, 1875, when the publication „Projet d'orgue monumental pour la Basilique de Saint-Pierre de Rome”, in which he described his entire idea, sent to Pope Pius IX. Soon afterwards, in a private audience on December 22, 1875, he personally presented the project to the Pope, who accepted the idea with favourable interest, but eventually suspended its implementation. The second attempt was to send March 18, 1881 to the next Pope, Leo XIII, a petition reminiscent of the new organs. This request, together with a brochure on the project, was presented to the Pope by Bishop Cataldi, Prefect of the Holiness ceremony. This attempt brought more hope for the execution of the project, due to the upcoming exhibition of products of Catholic art and industry, which was planned for 1887 on the occasion of the priesthood jubilee of Pope Leo XIII. This exhibition, as the third attempt to bring the Pope's attention to the idea, mobilized Cavaillé-Coll to build a model of the instrument in the

¹ Cavaillé-Coll Aristide, „Projet d'orgue monumental pour la Basilique de Saint-Pierre de Rome”, Bruxelles, 1875.

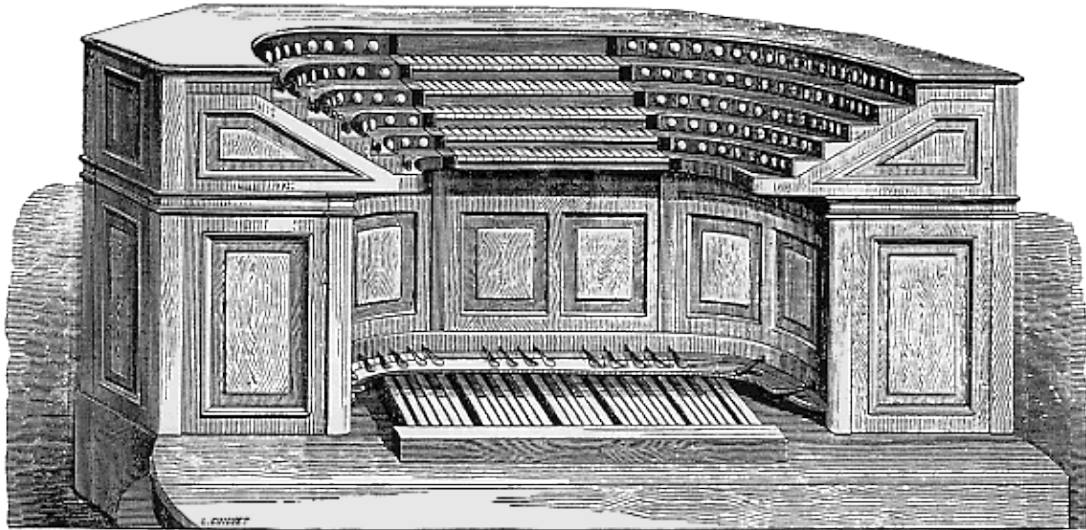
1:10 scale. This model was made and mounted in a workshop at rue du Maine 15 in Paris. Many prominent clergymen and people from the world of art and science came to admire the model. At the request of Cavallé-Coll, the French Ministère de l'Instruction publique, des Cultes et des Beaux-Arts set up a special commission at L'Académie des beaux-arts to study this model. The committee included: from the musical composition sections Ambroise Thomas, Charles Gounod, Ernest Reyer, Gilles Massenet, Camille Saint-Saens and Leo Delibes, from the sculpture section Pierre-Jules Cavelier and Louis-Ernest Barrias, and from the architecture section Charles Garnier, Léon Ginain, Questel, Daumet and Baron Haussmann. The third attempt to make the decision to build this instrument, extended to the finished model, took place in 1888 in front of Pope Leo XIII; unfortunately, it also did not have a positive effect. The instrument's model is placed to this day in the vaults of the Vatican Basilica. Finally, for his project Aristide Cavallé-Coll received the medal of Saint. Silvestre only.



Picture 1. The project of organ case by Alphonse Simil for the monumental organ of Aristide Cavallé-Coll for the Basilica of Saint Peter in the Vatican - version from 1888.

Source: Cécile Cavallé-Coll und Emmanuel Cavallé-Coll, "Aristide Cavaille-Coll: Ses origins, sa vie, ses oeuvres", Fischbacher, Paris 1929/2000, p. 137a.

The failure to implement the project is a conglomerate of several factors, including: 1) tense political relations between France and Italy; due to the fact that the facade of the Basilica of St. Peter is the border between the Vatican State and Italy, the Italian side was opposed to placing „on its territory” border, element (the organ) hostile country, which was then Italy for France 2) reluctance by the Vatican architects to interfere in the appearance of the inner side of the facade a Basilica, an architectonically perfect work by Michelangelo Buonarotti; 3) indecision of successive Popes and the Roman Curia regarding the entrusting of such work to an organ master from outside Italy, and 4) no need for the Roman curia to have such a monumental instrument inside the Basilica.



Picture 2. The project of the console for the monumental organ of Aristide Cavallé-Coll for the Basilica of Saint Peter in the Vatican.

Source: http://hydraule.org/bureau/biblio/cavaille/proj_rom/console.htm [2017/12/29]

Description of the project

The project described a monumental instrument with 124 stops and 8,366 pipes distributed on five manuals and pedalboard in the following seven sections (Roman numerals correspond to the keyboards in the console): I. Grand-Orgue and I. Grand-Chœur, II. Bombarde, III. Positif, IV. Récit-expressif, V. Solo-expressif and Pédale. The instrument, together with the case, was to weigh about 220.5 tons, which implied the necessity of using a specially designed steel structure to maintain such a heavy weight, in a situation where the architect of the Basilica did not plan so much load on the walls.

The size of the instrument determined the necessity of eliminating human power to supply wind to the entire air system. It was foreseen that „an air blower instrument could be operated by a hydraulic motor or any other steam engine or gas, depending on the capacity of the place”². The playing comfort for the organist was to be provided by Barker's levers and the Jeux de Combinaisons pneumatic system, enabling by the use of 22 pedals as many as 4,194,303 combinations. The keyboards were to be made of oak, ivory and ebony veneer as well as rosewood. The pedalboard would be made of oak. The register buttons were to be finished with porcelain medallions. The counter was to be placed under the central arch of the organs in an elegant furniture housing, so that the organist could see the main altar directly. Great emphasis

² Cavallé-Coll Aristide, „Projet d'orgue monumental pour la Basilique de Saint-Pierre de Rome”, Bruxelles, 1875.

was placed on the presence of harmonic stops and the quality of the pipes, emphasizing the thickness of their walls, which directly affects the sound quality.

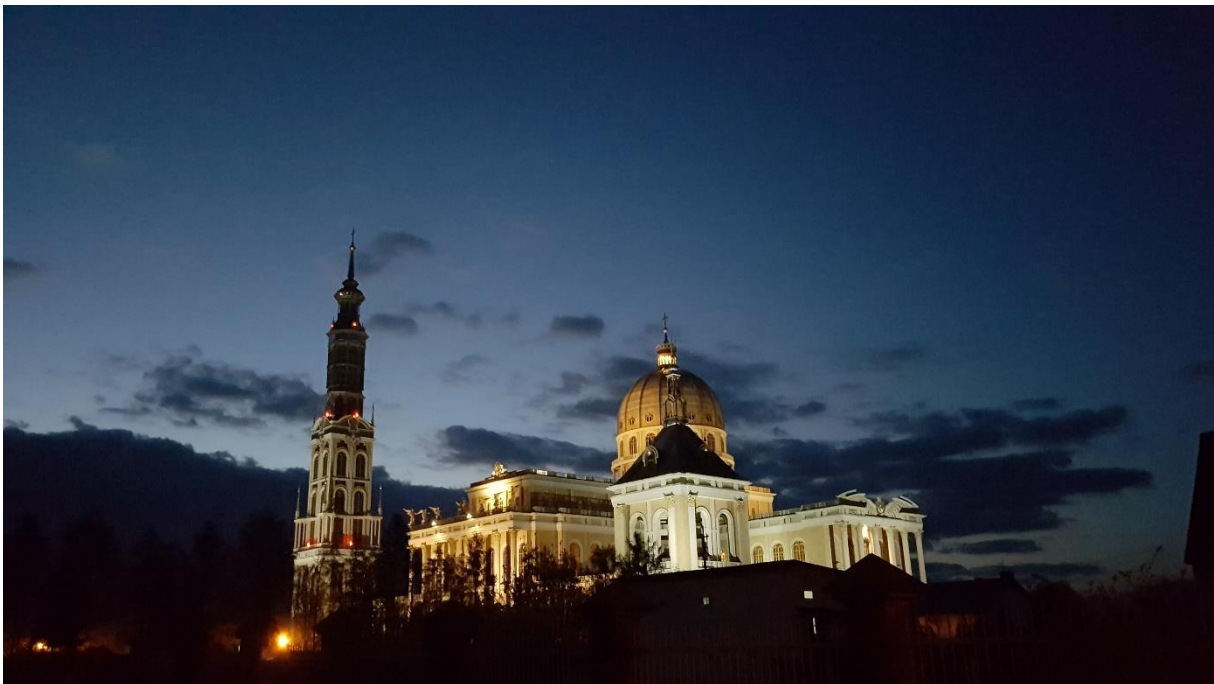
<p>I Grand-Orgue C–c⁴ <i>Jeux de Fonds</i> 1. Montre front 16’ 2. Bourdon 16’ 3. Montre 8’ 4. Diapason 8’ 5. Flûte Harmonique 8’ 6. Virole de Gambe 8’ 7. Bourdon 8’ 8. Dulciana 8’ 9. Grosse Quinte 5 1/3’ 10. Prestant 4’ 11. Octave 4’ 12. Flûte 4’ <i>Jeux de Combinaisons</i> 13. Quinte 2 2/3’ 14. Doublette 2’ 15. Grande Fourniture IV 16. Grosse Cymbale V 17. Fourniture III 18. Cymbale IV 19. Basson 16’ 20. Trompette Harmon. 8’ 21. Basson 8’ 22. Clairon 4’</p>	<p>I Grand-Chœur C–c⁴ <i>Jeux de Fonds</i> 1. Basse Acoustique 16’ 2. Grosse Flûte Harmon. 16’ 3. Diapason 8’ 4. Violoncelle 8’ 5. Flûte Harmonique 8’ 6. Unda Maris 8’ 7. Prestant 4’ 8. Flûte Octaviane 4’ 9. Octavin 2’ <i>Jeux de Combinaisons</i> 10. Grand Cornet V 8’ 11. Sesquialtera III 8’ 12. Tuba Magna 16’ 13. Tuba Mirabilis 8’ 14. Quinte Trompette 5 1/3’ 15. Clairon 4’ 16. Clairon Doublette 2’</p>	<p>II Bombarde C–c⁴ <i>Jeux de Fonds</i> 1. Principale Basse 16’ 2. Quintatön 16’ 3. Flûte Harmonique 8’ 4. Flûte Conique 8’ 5. Kéraulophone 8’ 6. Bourdon 8’ 7. Grosse Flûte 4’ 8. Octave 4’ <i>Jeux de Combinaisons</i> 9. Grosse Tierce 3 1/5’ 10. Nazard 2 2/3’ 11. Septième 2 2/7’ 12. Octavin 2’ 13. Grosse Cornet V 16’ 14. Bombarde 16’ 15. Trompette 8’ 16. Clairon 4’ Solo/II Bombarde 16’</p>	<p>III Positif C–c⁴ <i>Jeux de Fonds</i> 1. Violon Basse 16’ 2. Bourdon 16’ 3. Diapason 8’ 4. Flûte Traversière 8’ 5. Cor de Nuit 8’ 6. Salicional 8’ 7. Voix Angélique 8’ 8. Flûte Douce 4’ 9. Dulciana 4’ <i>Jeux de Combinaisons</i> 10. Quinte 2 2/3’ 11. Doublette 2’ 12. Plein Jeu V 8’ 13. Cor d'Harmonie 16’ 14. Trompette harmon. 8’ 15. Cromorne 8’ 16. Basson et Hautbois 8’ Récit/III</p>
<p>IV Récit-expressif C–c⁴ <i>Jeux de Fonds</i> 1. Bourdon 16’ 2. Corni Dolci 16’ 3. Flûte Harmonique 8’ 4. Flûte à Pavillon 8’ 5. Virole de Gambe 8’ 6. Voix Céleste 8’ 7. Dulciana 4’ 8. Flûte Octaviane 4’ <i>Jeux de Combinaisons</i> 9. Octave 4’ 10. Flageolet 2’ 11. Cornet V 8’ 12. Musette 8’ 13. Voix Humaine 8’ 14. Basson 16’ 15. Trompette Harmonique 8’ 16. Clairon Harmonique 4’ Trémolo</p>	<p>V Solo-expressif C–c⁴ <i>Jeux de Fonds</i> 1. Soubasse 16’ 2. Flûte Conique 16’ 3. Diapason 8’ 4. Flûte Traversière Harmonique 8’ 5. Quintatön 8’ 6. Flûte Octaviane 4’ <i>Jeux de Combinaisons</i> 7. Nazard 2 2/3’ 8. Doublette 2’ 9. Tierce 1 3/5’ 10. Larigot 1 1/3’ 11. Septième 1 1/7’ 12. Piccolo 1’ 13. Cor Anglais 16’ 14. Clarinette 8’ 15. Trompette Harmon. 8’ 16. Violon Harmonique 4’ Trémolo</p>	<p>Pédale C–f¹ <i>Jeux de Fonds</i> 1. Principale Basse 32’ 2. Montre 32’ 3. Gros Bourdon 32’ 4. Basse Acoustique 32’ 5. Grosse Flûte 16’ 6. Contre-Basse 16’ 7. Violon-Basse 16’ 8. Soubasse 16’ 9. Grosse Quinte 10 2/3’ 10. Grosse Flûte 8’ 11. Diapason 8’ 12. Violoncelle 8’ 13. Bourdon 8’ <i>Jeux de Combinaisons</i> 14. Grand Tierce 6 2/5’ 15. Grosse Quinte 5 1/3’ 16. Septième 4 4/7’ 17. Octave 4’ 18. Contre Bombarde 32’ 19. Bombarde 16’ 20. Quinte Bombarde 10 2/3’ 21. Trompette 8’ 22. Clairon 4’</p>	<p>Grand-Orgue/I Grand-Chœur/I Bombarde/I Positif/I Récit/I Solo/I Grand-Orgue 16’ Grand-Orgue/Pédale Grand-Chœur/Pédale Bombarde/Pédale Positif/Pédale Récit/Pédale Solo/Pédale</p>

Table 1. Project of the specification of unrealized organ of Aristide Cavallé-Coll for the Basilica of Saint Peter in Rome.

Source: Ebrecht Ronald, “Cavallé-Coll’s Monumental Organ Project for Saint Peter’s, Rome. Bigger Than Them All”, Lexington Books, USA, 2013, pp. 116-117.

The instrumentarium of the Basilica in Lichen Stary, Poland

Lichen Stary is a small village with a community of around 1,500. After the World War II Marian Priests developed there the cult to Holy Mary, Mother of God, thanks to the small oil painting from XVIII century. The permanently increasing amount of pilgrims visiting the village could not fit in the small local church containing the picture. Marian Priests decided to build great Basilica to worship Mary and fit all pilgrims there. The idea of building the great Basilica have been materialized between 1992-2002: the capacity of the Basilica is 300,700 m³; the usable area is 23,000 m², the length of the nave is approx. 139 m, the width of the transept with uneven shoulder lengths is approx. 144 m.³ After this step there was a need to equip the interior with liturgical elements, including pipe organ.



Picture 3. The Basilica in Lichen Stary, Poland.

Source: Michal Szostak.

Circumstances of birth of the instrumentarium

The spiritus movens of the pipe organ's creation in the Basilica was a great lover of organ music and the creator of the shrine in the shape in which it is widely known, Rev. Eugeniusz Makulski MIC, currently a senior custodian. In mid-2002, when the construction of the entire structure of the Basilica was about to end, Rev. Makulski decided to finalize the process that would lead to the building of a pipe organ in this monumental interior. Assumptions of Rev. Makulski was as follows: organ must be exceptional and worthy of this place; it must have at least 100 stops with beautiful and noble sound and architecture; at least part of it must be ready as of June 14, 2003.⁴

³ Jędrzejewski Krzysztof, „Przewodnik po Sanktuarium Lichenskim”, Zakład Gospodarczy „Dom Pielgrzyma”, Lichen 2014, p. 181.

⁴ „Organy Lichenskie”, Wydawnictwo Zakład Gospodarczy „Dom Pielgrzyma”, Lichen 2007, p. 22.

After analysing of all the organ builders' offers, the Marian Priests had to make a final decision on who to entrust the implementation of this work to. The choice was not obvious, because the instrument is not often built in such an unusual place. The task of building an instrument in the Lichen Basilica was entrusted to the Polish company „Zakłady Organowe Zych” according to the concept, design and author's supervision of prof. Andrzej Chorosinski. The signing of the contract for the construction of the first part of the organ, i.e. the instrument for the Western gallery, took place on August 21, 2002. From that day, the actual process of creating the instrumentarium began.



Picture 4. The interior of the Basilica in Lichen Sary.

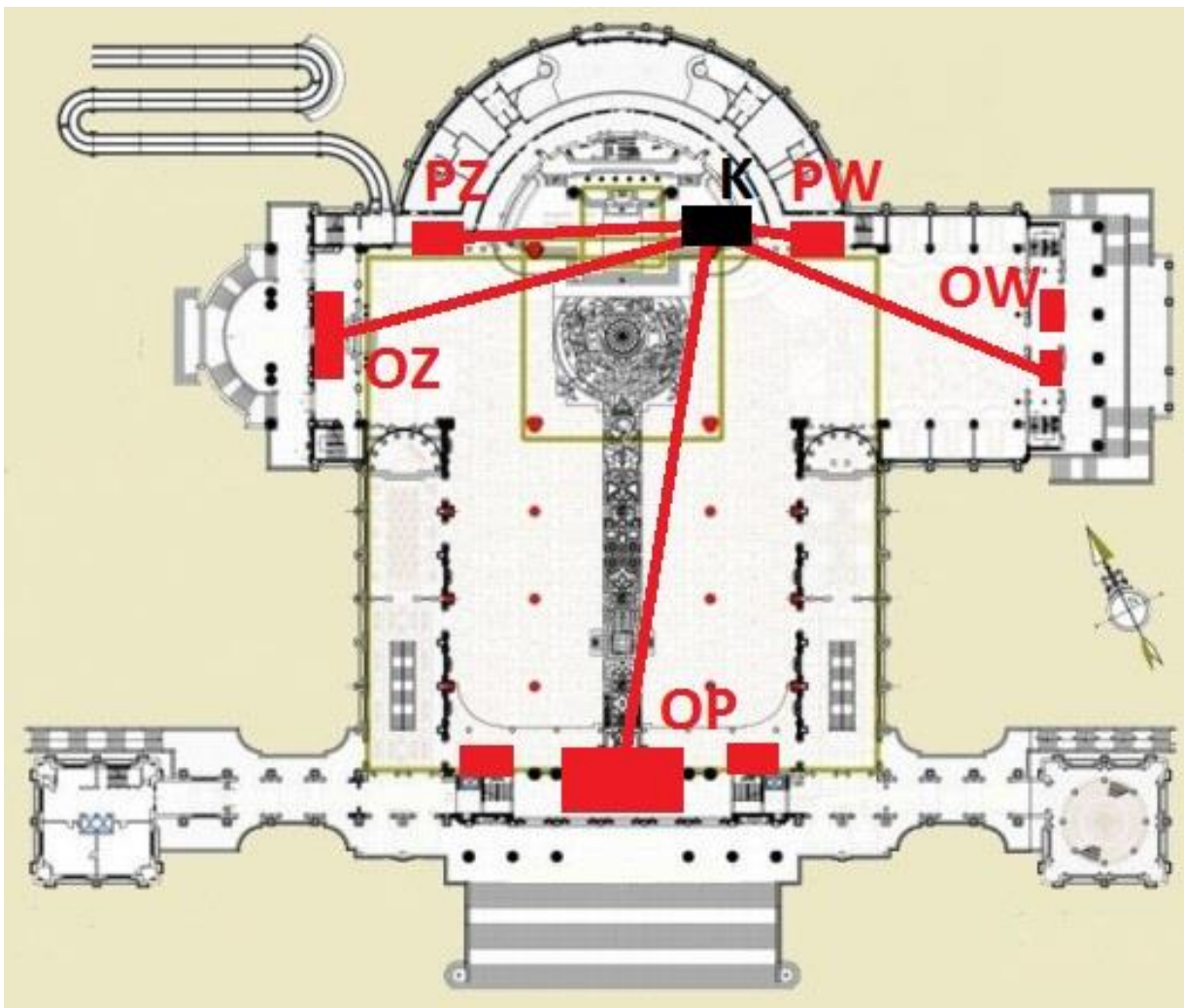
Source: Michal Szostak.

With such a great and unusual undertaking, the company of Mr. Dariusz Zych had to rely on sound plans for the sound instrument concept to avoid disappointments and acoustic surprises at the final stage of this work. The starting point for the development of the whole concept was for prof. Chorosinski unrealized project of Aristide Cavallé-Coll for the Basilica of Saint Peter in the Vatican. Based on the analysis of the measurement of the acoustic parameters of the Basilica prof. Chorosinski began to construct the sound concept of the whole and the composition of stops. The fact that the Lichen Basilica has five galleries (one in the main nave, two in the West and East aisles and two galleries in the sanctuary), gave rise to the concept of creating a spatial sound unit composed of five elements. The Vatican project of Aristide Cavallé-Coll in the layer of sound matter has been placed in the Southern, Western and Eastern parts. The whole was completed with two Chancel Positives on two small balconies at both presbytery gables, where the apse connects to the main nave. The measurements of the stops, as well as the construction of multi-row stops, were individually developed by prof. Chorosinski. After completing the design work of the entire instrument, it was possible to start the implementation works.

The company „Zakłady Organowe Zych”, as the general contractor of the instrumentarium, made all the design works, organ cases, windchests, key and register actions, wooden stops and wooden resonators of reeds, as well as assembly of all elements, intonation and tuning. Subcontractor companies that were commissioned by the general contractor to carry out the assigned work sections were: „KOART Krzysztof Cieplak” (steel structures made of stainless

steel), „Otto Heuss GmbH” from Lich, Germany (consoles, electronics, Zimbelstern, tubular bells), „Aug. Laukhuff GmbH & Co. KG „from Weikersheim, Germany (Western organ prospect pipes), „Jacques Stinkens Orgelpijpenmakers BV” from Zeist, the Netherlands (prospect pipes from the South organ), „Süddeutsche Orgelpfeifenfabrik Roland Killinger GmbH” from Freiberg on the River Neckar, Germany (reeds for Western organ, Eastern and Western Positives), „Orguian Lda.” from Avidos, Portugal (reeds to the Southern organ), Ryszard Chacinski from Kobylka near Warsaw (metal labial stops). Decorative elements and decorations of all organ cases were carved in wood by Janusz Regulski and Tomasz Kusnierz from Sochaczew near Warsaw, and then gilded in the goldsmith's workshop of Henryk Kwiatkowski from Poznan.

All assembly, intonation and tuning works were completed before July 2, 2006, so that during the solemn Mass at 12.00 pm, when the famous painting of Our Lady of Lichen was introduced to the Basilica, a fully prepared instrument could be heard. A few dozen thousand pilgrims from all over the world took part in the ceremony of transferring the image.



Picture 5. The deployment of individual organ sections inside the Lichen Basilica.

Source: Own elaboration. Legend: K = the main console; PZ = the Western Chancel Positive; PW = the Eastern Chancel Positive; OW = the Eastern Organ; OP = the Southern Organ; OZ = the Western Organ.

A month later, on August 1, 2006, there was a technical and artistic reception of the whole work made by a commission consisting of representatives of the Congregation of Marians, organ

builders, organists and musicologists, who expressed very positively about the work done. The acceptance protocol was signed by members of the commission composed of: Rev. Wiktor Gumienny MIC - custodian of the Lichen Shrine, prof. Ulrich Grosser - German conductor and organist, prof. Roberto Padoin - organist and professor at the Conservatory B. Marcello in Venice, Rev. Ph.D. Jacek Paczkowski - chairman of the music and church singing committee of the Kalisz Diocese, Rev. Ph.D. Mariusz Klimek - director of the Church Music Study of the Torun Diocese, Siegfried Sauer - organ builder from Germany, Adam Klarecki - organist of the Wloclawek cathedral, Jacek Łukasik, Robert Grudzien - organist, Jaroslaw Adamiak - then organist of the Lichen Shrine. After the technical and artistic reception, only works related to the decoration of prospectuses were in progress. The dedication and official putting into service of the whole instrumentarium took place on the first anniversary of the transfer to the Basilica the famous painting of Our Lady of Lichen on July 2, 2007 during Mass at 12.00 pm, and this event was headed by Bishop Wieslaw Alojzy Mering.

Description of the instrumentarium

The instrumentarium of the Basilica of Our Lady of Lichen have 157 real stops, 12,323 pipes and 5 parts (in the chronology of the formation): the Western Organ, the Southern Organ (located in three organ cases on the same gallery above the main entrance), the Eastern Organ, the Eastern Chancel Positive and the Western Chancel Positive. The Southern and Western Organs are fully independent instruments and have their own consoles. The Eastern Organ and both Chancel Positives do not have their own consoles and can only be operated from the main console. The organist playing from the main console has 11 independent sound sections. The key action is mechanical-electric, while the stop action is electric; windchests are of the type flap and bolt, and the alloys of pipe metals contain tin up to 85-90%. All parts of the instrument have a range of C-c⁴ for keyboards and C-g¹ pedalboards. The graphical layout of the all parts of the instrumentarium presents Picture 5.

The Southern Organ

The basic instrument of the whole instrumentarium of the Lichen Basilica is the Southern Organ, which contains the main sections of the entire sound ensemble. The Southern Organ is the second in chronological order instrument built in the period from mid-2003 to 2005. This 81-stops instrument with four manuals and pedalboard has a typical sound arrangement for the nineteenth-century French symphonic: Grand-Orgue, Positif, Récit-expressif and the Pédale section. The addition is a high-pressure Solo section placed on the Manual IV. In each section we will find a full set of basic stops (Jeux de Fonds) in the form of principals, flutes and strings and stops - according to Aristide Cavallé-Coll's nomenclature - combined (Jeux de Combinaisons) in the form of aliquots, mixtures, cornets and reeds.

The console is built centrally in the organ case and placed on a multi-stage elevation. Registers are placed on both sides of the manuals: on the left side for the Pédale and Grand-Orgue sections, on the right side for the Positif, Récit-expressif sections and above them for the Solo section. The stop action is electric, while the key action is mechanical (for majority of the Grand-Orgue, Positif, Récit-expressif and Pédale windchests) and electric (for parts of the Grand-Orgue, Positif, Récit-expressif and Pédale windchests and double flaps for low keys, and the entire Solo section). All couplers are electric. The Récit-expressif section is enclosed in the swell box supported by a foot lever with an electrical action; next to the control pedal of the swell box there is a crescendo roller with the possibility of a smooth change of the dynamics of the sound. The player sits with his back to the main altar, and has digital memory of the Setzer type for programming several thousand stops combinations.



Picture 6. The Southern Organ in Lichen Basilica.

Source: Michal Szostak.



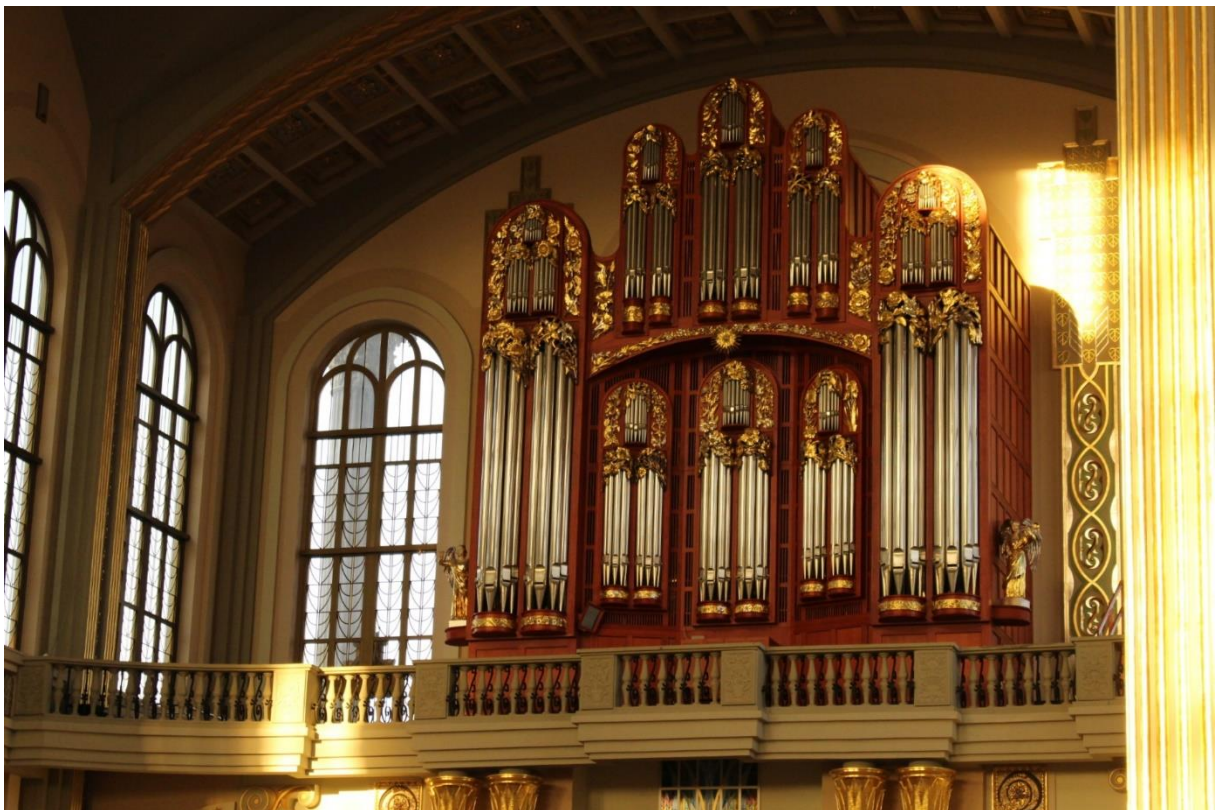
Picture 7. The console of the Southern Organ in Lichen Basilica.

Source: Michal Szostak.

The Southern Organ consists of three separate organ cases placed on the same gallery on the axes of the main and side naves, and is located on a 20 ton steel structure. The cases, from the architectural side, refer and creatively develop the project of the organ case built in the years 1999-2003 by the company Schoenstein & Co. at the Conference Center in Salt Lake City in the USA; however, it does not reflect the arrangement of the sonic sections located inside the organ cases, however, it consists of a great majority of speaking pipes. The main case contains all of the sound elements of the sections Grand-Orgue, Positif, Récit-expressif, Solo and most of the Pédale section. In the side cases there are windchests for several pedal stops (divided into sides C and Cis). Each side case has its own small blower and a separate air system. The air system of the main Southern Organ's section is fed by three electric blowers: the first blower feeds sections Grand-Orgue, Positif and Pédale, the second blower feeds the Récit-expressif section and the third blower feeds the high-pressure Solo section.

In the Southern Organ there are the tallest open wooden pipes of the whole instrumentarium, which belong to the Pédale section stop Subkontrabas 32' with the principal sound characteristics. The tallest of them measures 10 m in height. In this section there is also the second stop of 32', i.e. Contrabombard - it belongs to the group of reeds and has the tallest resonators among all reeds here. The instrument also contains the largest tin pipes from all of the Lichen instrumentarium; they are located in the central organ case; the largest of them has a length of 783 cm, a diameter of 31 cm and weighs 150 kg.

The Western Organ

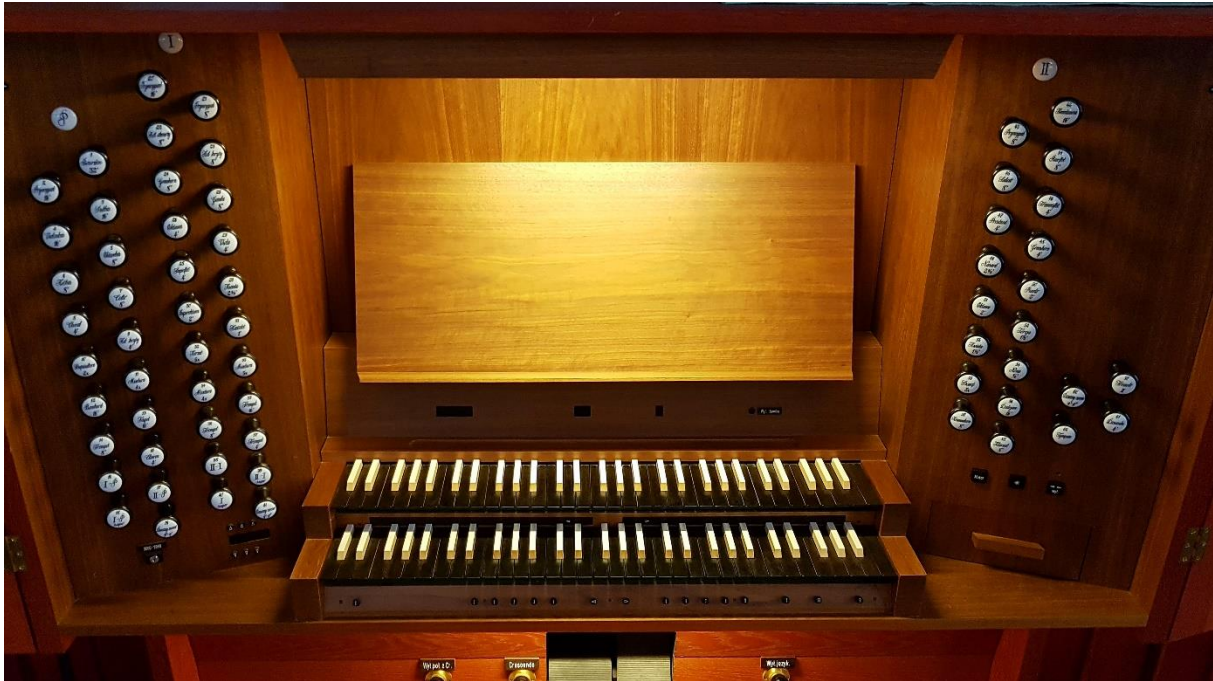


Picture 8. The Western Organ in Lichen Basilica.

Source: Michal Szostak.

The Western Organ placed on the gallery topping the left arm of the Basilica transept above the Pieta Porch, were built between August 2002 and June 2003. This two-manual instrument with a pedal section includes 51 real stops enriched with Zimbelstern and the Tympan imitating the

sound of a storm (Pédale d'Orage). Registers are placed on both sides of the manuals: on the left side for the Pedal and the Hauptwerk sections, on the right side for the Schwellwerk section and additional devices. The instrument has a mechanical (for parts of windchests) and electric (for parts of windchest and duplicated flaps for low keys) key action and the electric stops action. All couplers and octave connectors are electric. The Schwellwerk is enclosed in a swell box managed by a foot lever with an electric transmission, next to which there is a crescendo roller. The console, on a small elevation, is centrally integrated into the organ case. The player sits with his back to the main altar and has Setzer digital memory available for programming several thousand stops combinations.



Picture 9. The console of the Western Organ in Lichen Basilica.

Source: Michal Szostak.

The specification of Western Organ is very rich and, for this number of stops, is slightly non-standard divided between the two manuals only and pedal sections. Initially, it was planned that this instrument had three manuals with pedalboard, however, due to the constraints imposed by the architect of the Basilica, Mrs. Barbara Bielecka, dimensions of the organ case, it was decided to limit the number of manual sections while maintaining a wealth of stops. In each section there is a full pyramid of principals (in the Hauptwerk - beginning from 16', in Schwellwerk - from 8', in the Pedal section - from 16') enriched with flute stops (all types), string and reeds. In the Pedal section there is one stop 32' - a wooden, covered Bourdon with flute sound characteristics, whose largest pipes measures circa 5 meters in height. All sections have aliquot stops ($2 \frac{2}{3}'$, $1 \frac{3}{5}'$, $1 \frac{1}{3}'$, $\frac{8}{9}'$) and at least one mixture (in Hauptwerk there are two mixtures and cornet). This instrument is predestined for performing Baroque pieces, however - thanks to a large number of basic stops (as many as 11 manual stops, i.e. 30% of them, is eight-foot), also romantic and symphonic pieces sound great on it. In the Western Organ are also placed Tubular Bells with a scale from g to g².

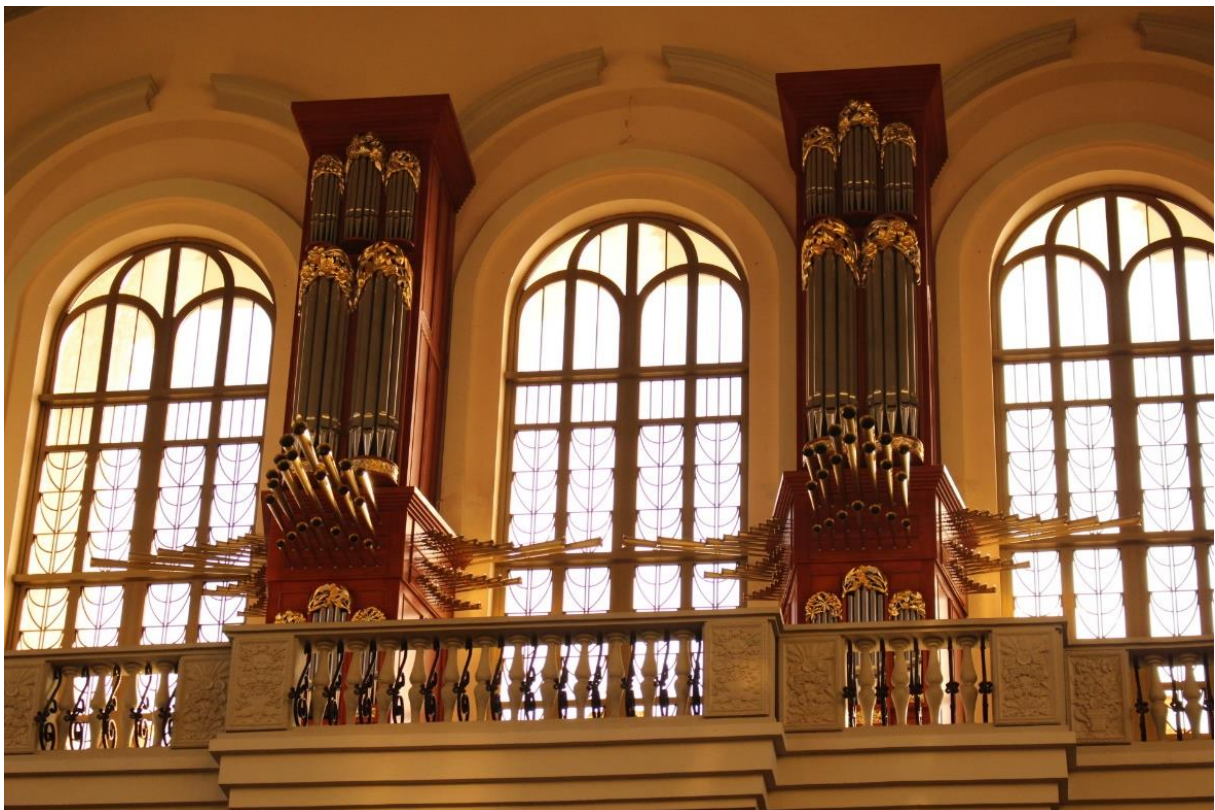
The system of pipe fields in the organ case reflects the arrangement of the sound sections inside the instrument. In the central part of the case (three double fields - each crowned with a group of small pipes) we see the Hauptwerk, the Schwellwerk above it (another three double fields - each crowned with a group of small pipes, a wooden shutter of the swell box located just behind the prospectus), and two symmetrical pedal towers - left side C, right side Cis. The organ case

pipes belong to the Principal 16' from the Hauptwerk section and the Principal 16' from the Pedal section (each of these stops has its own pipes). The whole organ weigh a total of 30 tons.

The consecration of the Western Organ took place on June 14, 2003 at 12.00 pm and was headed by Bishop Roman Andrzejewski. The inaugural concert was performed by prof. Andrzej Chorosinski. The event, which was very popular with the media, brought many outstanding guests from the world of organ music from Poland and abroad.

The Eastern Organ

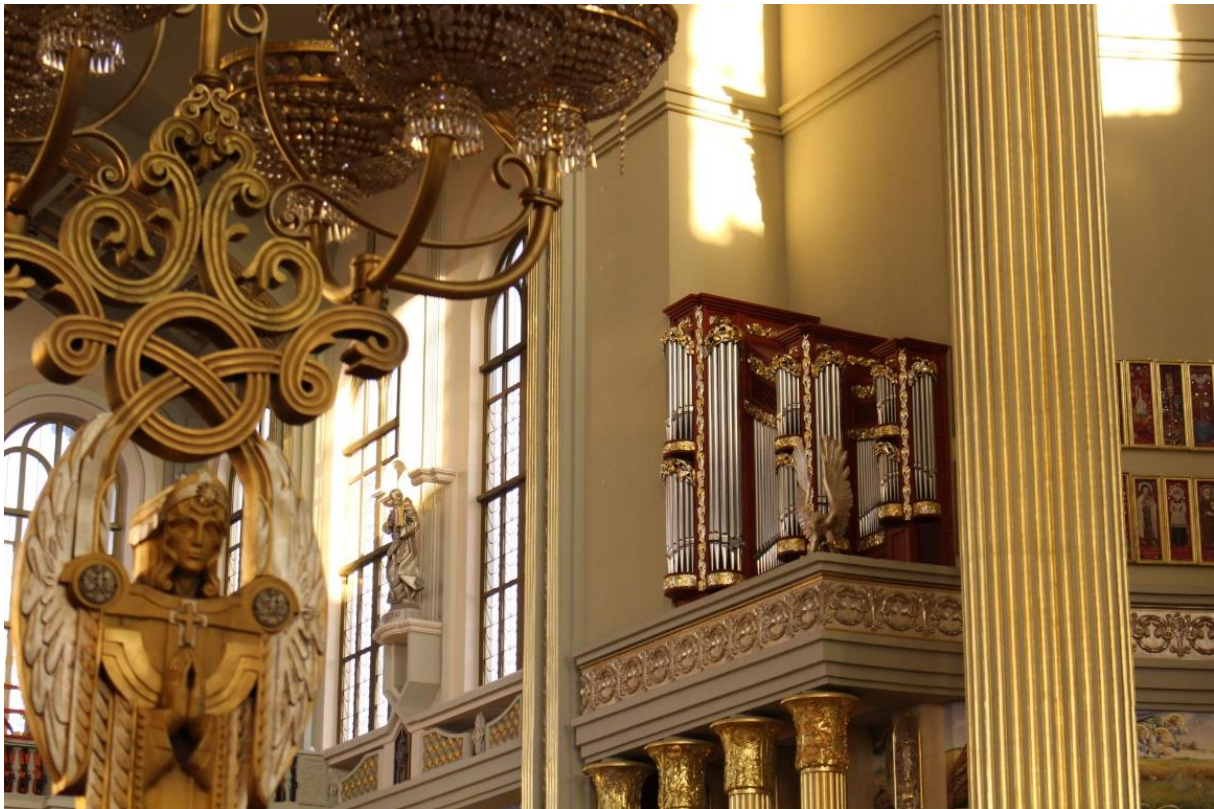
Eastern organ, built in the period from September 2005 to 2006, are two twin towers with trapezoidal bases placed between high windows on the Eastern gallery which topped the right arm of the transept of the Basilica over the Four Evangelists Porch. The instrument has 8 real stops; the key and stop action are electric, and the windchests - flap and bolt. Looking from the center of the Basilica, the left tower contains two windchests, placed one above the other, with C side pipes, while the right tower - two windchests, placed one above the other, with the Cis side pipes. The external structure of the organ cases reflects the internal arrangement of windchests for labial pipes. Each case has two main pipe fields separated by horizontal resonators of the Trumpets (16', 8' and 4') and one small field of pipes at the very top, which only play an aesthetic role (silent pipes). Both towers are supplied by one blower, which is placed in the left tower; the channel supplying air to the right tower runs along the gallery floor. The whole instrument is supplied with air under high pressure. As a result of this treatment, the strength of eight stops of the Eastern Organ is equivalent to the strength of 51 stops along with superoctaves couplers of the Western Organ. This instrument does not have a separate console, and it can be operated from the main console only, assigning it, according to the player's wishes, to each of the six keyboards and pedalboard.



Picture 10. The Eastern Organ in Lichen Basilica.

Source: Michal Szostak.

The Western Chancel Positive



Picture 11. The Western Chancel Positive in Lichen Basilica.

Source: Michal Szostak.

Built in 2006, the Western Chancel Positive, with seven real stops (plus *Nachtigall*), has an electric key and stop actions. The whole, with the blower, is enclosed in a monoblock case - a mirror image of the Eastern Chancel Positive. This instrument does not have a separate console. It can be managed from the main console only, assigning it, according to the wishes of the player, to each of the six keyboards and pedalboard. This section - richly equipped with string stops - perfectly matches the ethereal voices of the *Récit-expressif* section of the Southern Symphonic Organ. With proper registration, it gives the impression of the listeners' surroundings with vibrating „heavenly voices” (*Vox Coelestis*).

The Eastern Chancel Positive

In 2006, the Eastern Chancel Positive with the early Baroque composition with eight real stops, an electric key and stop action was also built. The whole, along with the blower, is enclosed in a monoblock case that is a mirror image of the Western Chancel Positive. This instrument does not have a separate console. It can be operated from the main console only, assigning it according to the wishes of the player to each of the six keyboards and the pedalboard. The disposition of the instrument refers to the side manual of the early Baroque Flemish organs. This section sounds well with the Western Baroque Organ. With proper registration and changing of manuals during the play, it can produce dialogue sections, *concertino* and *tutti* - the way of playing characteristic for instrumental concerts of the Baroque era.



Picture 12. The Eastern Chancel Positive in Lichen Basilica.

Source: Michal Szostak.

The whole instrumentarium

On the basis of the criterion of organ classification in terms of their size (i.e. number of rows of pipes and auxiliary devices managed from one console), published by me in 2017 in Polish⁵ and English⁶ literature on the subject, the instrumentarium of the Basilica of Our Lady of Lichen is the largest instrument in Poland, the fourth in Europe and the thirteenth in the world. Among sacral (all religions) buildings only it is the tenth largest instrument in the world and has the largest console in the world among classified instruments in sacred buildings. The console of the Lichen organ is also the largest console among Polish organs and is one of the largest European and world consoles⁷.

⁵ A) Szostak Michal, "Wielkie organy Bazyliki w Licheniu w zestawieniu z największymi organami świata", in: „Wokół nowych organów w kościele NSPJ w Tarnowie”, ed.. Pasternak Pawel, Biblos, Tarnow 2017, ISBN 978-83-7793-504-0 and B) Szostak Michal, "Lichenskie organy na tle największych instrumentów Polski, Europy i świata", "Zakład Gospodarczy Dom Pielgrzyma", Lichen Stary 2017, ISBN 978-83-64126-14-7.

⁶ Szostak Michal, „The World’s Largest Organs”, w: „The Organ Magazine”, No 382, November 2017 - January 2018, ISSN 0030-4883, pp. 12-28.

⁷ Szostak Michal, "Lichenskie organy na tle największych instrumentów Polski, Europy i świata", "Zakład Gospodarczy Dom Pielgrzyma", Lichen Stary 2017, ISBN 978-83-64126-14-7, pp. 109-111.



Picture 13. The main console of the instrumentarium in Lichen Basilica.

Source: Michal Szostak.

THE SOUTHERN ORGAN I. Grand-Orgue	THE SOUTHERN ORGAN II. Positif	THE SOUTHERN ORGAN III. Récit-expressif	THE SOUTHERN ORGAN Pédale
1. Bourdon 16'	1. Violon 16'	1. Bourdon 16'	1. Subcontrabasse 32'
2. Montre 16'	2. Flûte Harmonique 8'	2. Rurflet 8'	2. Subbass 16'
3. Montre 8'	3. Diapason 8'	3. Flûte Traversiere 8'	3. Contrabasse 16'
4. Flûte Harmonique 8'	4. Salicional 8'	4. Montre 8'	4. Violonbass 16'
5. Gamba 8'	5. Flûte 4'	5. Gamba 8'	5. Quintbass 10 2/3'
6. Kopula 8'	6. Prestant 4'	6. Voix Celeste 8'	6. Flûte 8'
7. Dolce 8'	7. Viole 4'	7. Flûte Traversiere 4'	7. Flûtebass 8'
8. Quinte 5 1/3'	8. Quinte 2 2/3'	8. Prestant 4'	8. Octavbass 8'
9. Flûte 4'	9. Sesquialtera 3x	9. Viola 4'	9. Cello 8'
10. Prestant 4'	10. Piccolo 2'	10. Nasard 2 2/3'	10. Choral 4'

11. Salicet 4'
 12. Tierce 3 1/5'
 13. Quinte 2 2/3'
 14. Doublette 2'
 15. Gr. Fourniture 4x
 16. Mixtur 4x
 17. Gr. Cymbel 5x
 18. Cymbel 4x
 19. Bombard 16'
 20. Fagot 16'
 21. Trompet 8'
 22. Hautbois 8'
 23. Clairon 4'
 IV-I
 III-I
 II-I

11. Plein Jeu 5x
 12. Scharf 3x
 13. Dulcjan 16'
 14. Cromorne 8'
 15. Clarinette 8'
 16. Jannhorn 8'
 Tremolo
 IV-II
 III-II

11. Doublette 2'
 12. Cornet 5x
 13. Fourniture 4-5x
 14. Basson 16'
 15. Trompet 8'
 16. Hautbois 8'
 17. Vox Humana 8'
 18. Clairon Harm. 4'
 Tremolo
 IV-III

IV. Solo

1. Flauto Major 8'
 2. Gamba 8'
 3. Keraulophon 8'
 4. Cornet 5x
 5. Tuba Mirabilis 8'

11. Sesquialtera 3x
 12. Ocarina 2'
 13. Hintersatz 5x
 14. Mixtur 4x
 15. Contrabombard 32'
 16. Bombard 16'
 17. Quinttrompet 10 2/3'
 18. Trompet 8'
 19. Clairon 4'
 IV-P
 III-P
 II-P
 I-P

THE WESTERN ORGAN

I. Hauptwerk

1. Prinzipal 16'
 2. Holzflöte 8'
 3. Bourdon 8'
 4. Octave 8'
 5. Gemshorn 8'
 6. Gambe 8'
 7. Szpicflet 4'
 8. Oktave 4'
 9. Viola 4'
 10. Quinte 2 2/3'
 11. Superoctave 2'
 12. Flageolet 1'
 13. Cornet 5x
 14. Mixtur 5x
 15. Mixtur 4x
 16. Trompet 16'
 17. Trompet 8'
 18. Trompet 4'
 II-I
 Super I

THE WESTERN ORGAN

II. Schwellwerk

1. Quintadena 16'
 2. Rohrflöte 8'
 3. Prinzipal 8'
 4. Salicet 8'
 5. Traversflöte 4'
 6. Prestant 4'
 7. Gemshorn 4'
 8. Nasard 2 2/3'
 9. Piccolo 2'
 10. Oktave 2'
 11. Terz 1 3/5'
 12. Larigot 1 1/3'
 13. None 8/9'
 14. Scharf 5x
 15. Dulcian 16'
 16. Krummhorn 8'
 17. Clarinette 8'
 18. Tubular Bells
 Tremolo

THE WESTERN ORGAN

Pedal

1. Bourdon 32'
 2. Subbass 16'
 3. Prinzipal 16'
 4. Violonbass 16'
 5. Fletbass 8'
 6. Oktavbass 8'
 7. Cello 8'
 8. Bourdon 4'
 9. Choral 4'
 10. Sesquialtera 2x
 11. Mixtur 4x
 12. Bombard 16'
 13. Fagott 16'
 14. Trompet 8'
 15. Clairon 4'
 II-P
 Super I-P
 I-P
 Zimbelstern
 Tympan

THE ESSTERN ORGAN

1. Gedeckt 8'
 2. Diapason 8'
 3. Prestant 4'
 4. Oktave 2'
 5. Cymbel 3-4x
 6. Tuba Magna 16'
 7. Tuba Mirabilis 8'
 8. Clairon 4'

THE WESTERN CHANCEL POSITIVE

1. Voce Umana 8'
 [labial, 2x]
 2. Gamba 8'
 3. Aeolina 8'
 4. Vox coelestis 8' [1x]
 5. Prinzipal 4'
 6. Fugara 4'
 7. Harmonia Aeth. 3x
 Nachtigall [nightingale]

THE EASTERN CHANCEL POSITIVE

1. Gedeckt 8'
 2. Prinzipal 4'
 3. Hohlfloete 4'
 4. Quintade 4'
 5. Dezchen 2'
 6. Zimbel 3x
 7. Regal 8'
 8. Zink 4'
 Tremolo

Tremolo

Table 2. The specification of the instrumentarium of the Lichen Basilica available in the main console.

Source: Own elaboration.

The organist playing from the main console has a total of 11 fully independent sound sections: 9 sections on the scale of manual and 2 sections on the pedalboard scale. They can be placed almost freely on six manuals and one pedalboard, and with the help of switches assigning individual sections of the instrument to the individual main console keyboards, they can efficiently shuffle them causing countless sound possibilities. The distribution of stops in the main console, divided into individual sections of the entire instrumentarium, is presented in Table 2.

The monumental main console is located in the sanctuary of the Basilica. The lowest manual keyboard has the deepest key movement, while the top keyboard - the shortest key movement; the manual keyboards - going from the lowest to the highest - are inclined at an increasing angle. The main console is connected to all sections via a wired computer network and MIDI system. For each of the main console's keyboards and pedalboard, it is possible to assign each section of the Western Organ, the Eastern Organ, the Western Chancel Positive, the Eastern Chancel Positive and IV Manual of the Southern Organ. The sections Grand-Orgue, Positif, Récit-expressif and Pédale from the Southern Organ can be assigned only to the manual I, II, III and pedalboard on the main console (plus standard section couplers within the Southern Organ). The console is equipped with two tilt pedals to control two swell boxes (right one - to Schwellwerk of the Western Organ, left one - to the Récit-expressif of the Southern Organ). On the left side of the expressive pedals, there is a crescendo roller with two pre-programmed possibilities (smooth or stepwise) of change the dynamics of the whole instrumentarium. The console is equipped with a separate Setzer memory system, it has a switch-off of all reeds, as well as Tutti and General Tutti switches and a cancelation of all settings. The console was made in the workshop of „Otto Heuss GmbH” and in itself is an outstanding work of organ-master art.

The comparison of the Lichen instrumentarium and the Cavallé-Coll's Vatican project

The comparison of the entire instrumentarium of the Lichen Basilica in relation to the Cavallé-Coll's project for the Vatican Basilica will be made on the basis of symphony organ features: orchestral stops (harmonic stops, free-heating stops, high-pressure stops, aliquot stops), swell box and other way of changes of the dynamics.

Orchestral stops

Orchestral stops appearing in the project of the Vatican organ and in the Lichen organ are compared on the basis of the so-called „orchestral quartet”, which presupposes the occurrence of principal, flute, string and reed choirs in individual sections, extended by the analysis of mixed voices.

Five out of seven (71%) Vatican organ sections have a full „orchestral quartet” appearing in at least one choir within any given degree; the vast majority of the elements of the „orchestral quartet” appear in many choirs within each section; two of the seven (29%) sections have a

single gap in the „orchestral quartet”: the Bombarde and Solo-expressif sections lack a string choir. Eight out of eleven (73%) Lichen organ sections have a full „orchestral quartet” appearing in at least one choir within any given degree; the vast majority of the elements of the „orchestra quartet” appear in many choirs within each section; three out of eleven (27%) sections have a single gap in the „orchestral quartet”, i.e. in the section of the Eastern Organ and the the Eastern Chancel Positive section there is no string choir, and in the Western Chancel Positive section the reed choir is missing.

Anomalies at the specification of the Lichen instrumentarium in relation to symphonic instruments of Cavallé-Coll are as follows: 1) in the form of pre-symphonic or even „foreign” stops to French circles, because the name and character of the sound referring to German Baroque organs, i.e. Scharf 3x from the Positif section and from the Pédale section: Sesquilatera 3x, Ocarina 2', Hintersatz 5x and Mixture 4x; the rationale for the use of these extensions is to enable playing of pre-romantic music, where the independence of the sections was an important factor: for the French Golden Age - independence of the Grand-Orgue and Positif sections, and for the German Baroque - the independence of the Hauptwerk, Positiv and Pedal sections; 2) when treated alone, the typically Baroque specification of the Eastern Chancel Positive section, is not reflected in the works of Cavallé-Coll; however, treated in conjunction with the Western Chancel Positive section, which is richly filled with 8-foot stops, it can be compared with Solo sections intended for leading a clear melodic line.

In the Vatican project, there are 16 harmonic stops (constituting $16/124 = 13\%$ of the entire sound unit). There are 4 harmonic stops in the Lichen organ (constituting $4/157 = 3\%$ of the whole sound band).

In the Vatican project, there are three free-heating stops representing $3/124 = 2.4\%$ of the entire sound unit. In the Lichen organ, there are also three free-heating voices, representing $3/157 = 1.9\%$ of the entire sound band.

In the Vatican project, there are 5 high-pressure stops (constituting $5/124 = 4\%$ of the entire sound unit). There are 13 high-pressure stops in the Lichen organ ($13/157 = 8\%$ of the whole sound unit).

In the Vatican project, there are 15 aliquot stops constituting $15/124 = 12\%$ of the entire sound band. There are 11 aliquot stops in the Lichen instrumentarium constituting $11/157 = 7\%$ of the whole sound unit.

In the Vatican project, there are 9 mixed stops (constituting $9/124 = 7.3\%$ of the entire sound unit). All stops in the project of the Vatican organ have a total of 39 ranks, which gives an average of $39/9 = 4.3$ choirs for one statistical multi-row stop. There are 21 mixed stops in the Lichen organ ($21/157 = 13.4\%$ of the entire sound unit). All the stops of the Lichen organ have a total of 83 choirs, which gives an average of $83/21 = 3.9$ choirs per statistical mixed stop.

Comparative characteristics of the sections

The Grand-Orgue section (22 stops) and Pédale section (22 stops) of the Vatican project were reproduced in principle in the Lichen instrumentarium in the Grand-Orgue section (23 stops) and the pedalboards sections of the Southern Organ (19 stops) and the Western Organ (15 stops) - both in the context of labial stops and the battery of reeds (appearing in the Southern Organ in the choirs: 32', 16', 10 2/3', 8', 4'). The differences in the Pédales sections concern: 1) a different number of low-speaking stops (four labial 32' stops in the Vatican project, two 32' in Lichen, four 16' stops in the Vatican, six 16' stops in the Lichen); 2) broadening the scale of labial stops in the Lichen organ up (by the stops of 2' and the mixture); 3) a greater number of

aliquot stops in the Vatican (5) in relation to the Lichen (2); 4) lower pitch of aliquot stops: in the Vatican the third sounds as $6 \frac{2}{5}'$, in the Lichen as $1 \frac{3}{5}'$.

The Positif section of the Vatican organ has been largely reproduced in the Positif section of the Southern Organ in Lichen. The majority of labial stops and amount of reeds are the same.

The Récit-expressif section of Vatican organ has been largely reproduced in the Récit-expressif section of the Southern Organ in Lichen. The majority of labial stops, reeds and the Tremolo effect are the same.

The Grand-Chœur section of Vatican organ has been somewhat limited to basic voices (Diapason 8', Flute 8', Prestant 4', Octavin 2') extended by Cymbel 3-4x and placed in the section of the Eastern Organ. The Vatican five-ranks reed section (16', 8', $5 \frac{1}{3}'$, 4', 2') has been limited in Lichen to 16', 8' and 4' but with horizontal resonators.

The echoes of the Vatican Bombarde section can be found in: 1) Solo section of the Southern Organ in the form of Keraulophone 8' and Grosse Cornet 5x; in the Lichen version it is extended by Flauto major 8' and Gambe 8' and English sounding Tuba Mirabilis 8' with resonators curved towards the main altar and placed just behind the organ case, and 2) in the Hauptwerk section of the Western Organ (labial stops 16', 8', 4', $2 \frac{2}{3}'$ and reeds 16', 8', 4').

In turn, the Vatican section of Solo appears in the Lichen section of Schwellwerk in the Western Organ in the field of labial stops (16', 8', 4', $2 \frac{2}{3}'$, 2', $1 \frac{3}{5}'$, $1 \frac{1}{3}'$) and reeds (16', 8').

In summary, all 7 sections of the Vatican instrument were located in 9 sections located in three main parts of the Lichen instrumentarium, i.e. the Southern (5 sections), the Western (3 sections) and the Eastern (1 section) Organs. The sections of the Lichen Chancel Positives are an original addition to the Vatican project.

The distribution of individual sound sections in the Vatican instrument is in line with the principles that Cavallé-Coll has carried out in his great symphonic instruments. The primary section is the Grand-Orgue, which along with the complementary sound section of Grand-Chœur, was placed on the first keyboard. On the second keyboard there is the Bombarde section. Positif above it, and the Récit-expressif section on the fourth keyboard. At the very top, on the fifth keyboard, the Solo-expressif section was placed. The arrangement of the sound sections of the Lichen instrumentarium is more flexible. For each of the main console's keyboards and pedalboard, it is possible to assign each section of the Western Organ, the Eastern Organ, the Western Chancel Positive, the Eastern Chancel Positive and IV manual of the Southern Organ. The sections Grand-Orgue, Positif, Récit-expressif and Pédale of the Southern Organ can be assigned only to the manual I, II, III and pedalboard in the main console (plus standard section couplers within the Southern Organ).

Elements influencing the dynamics of sound

Two sections of the Vatican project have been planned in swell boxes: Récit-expressif and Solo-expressif - both supported by two separate pedals with full smooth motion range and mechanical action. There are also two sections placed in the instrumentarium in Lichen: the Récit-expressif from the Southern Organ and the Schwellwerk from the Western Organ. Here, too, both swell boxes are operated from the main console with two separate pedals with a full range of smooth motion (the action is electrical).

Cavallé-Coll used in the Vatican project the division of stops of each section into the groups of Jeux de Fonds and Jeux de Combinaisons. An additional element realizing this vision were keyboard couplers (Récit-expressif to Positif, Récit-expressif to Grand-Orgue, Positif to Grand-

Orgue, Grand-Orgue to Pédale, Positif to Pédale, Récit-expressif to Pédale), lower octave connectors (octaves graves) and upper octave connectors (octaves aiguës). The Lichen instrumentarium has all possible couplers, i.e. in the main counter, we can assign any set of sections (separately and together) on any keyboard and pedalboard. The main console is equipped with an electronic memory system that allows to remember thousands of stops combinations and assign sections to individual keyboards at any time. The Lichen instrumentarium has upper octave connectors (octaves aiguës) within one section only, i.e. the Hauptwerk of the Western Organ. From the point of view of the tone power of each part of the instrumentarium, these upper octave connectors for the Hauptwerk section of the Western Organ were necessary in order to balance the strength of the whole Western Organ sound in comparison to the strength of the Eastern Organ sound.

Conclusion

The uniqueness of history is surprising: the project from 1875 by one of the greatest organ builders of all times intended for the largest Catholic temple in the world is 130 years later realized - in the sound composition - in the largest Basilica of Poland, a country that did not even exist on the maps of Europe at a time when Aristide Cavallé-Coll lived. The activities of the committee of building the Vatican authorities, to which Cavallé-Coll invited many great personalities from the world of politics, aristocracy, culture and art with great composers of the nineteenth century, did not manage to materialize the project, which only a single priest in a poor country with the support of millions pilgrims offering their small donations for this purpose did. Really, history can amaze...

At the end of this article I would like to add that three CDs with organ music have been recorded so far on the instrumentarium of the Lichen Basilica. In 2003, prof. Andrzej Chorosinski recorded a CD with organ literature, which was the first recording of the sound of the Western Organ. In 2007, a Belgian organist of Polish descent, prof. Karol Golebiowski, recorded the second album with organ literature, on which the sound of the entire instrumentarium of the Basilica was recorded. In 2017 on the Southern Organ I had the pleasure to record the third album „Ave Regina Caelorum”, including improvisations on Gregorian and Polish Marian themes in two great romantic cyclic forms: organ symphony and symphonic poem.

As the leading organist of the Basilica, I cordially invite you to Poland to Lichen Stry, where you can hear the sound of the greatest project of Aristide Cavallé-Coll, made at the beginning of the 21st century in the largest Polish sacral interior.