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# **The Bells of Warsaw:** **reconstructing the soundscape of the city**

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## CONTENTS

1	Introduction	2
2	Research Problems	4
3	Research Questions	5
4	Bells in the Nowe Miasto	6
4.1	Kościół Parafialny Nawiedzenia N.M.P., ul. Przyrynek	6
4.2	Kościół św. Franciszka, ul. Franciszkańska	7
4.3	Kościół Parafialny św. Jana Bożego, ul. Bonifraterska	8
4.4	Kościół Rektoralny św. Benona, Rynek Nowego Miasta	8
4.5	Klasztor Sióstr Benedektynek-Sakramentek	8
4.6	Kościół Akademicka św. Jacka, ul. Freta	9
4.7	Kościół Rektorski św. Ducha, ul. Freta	10
4.8	Katedra Polowa Wojska Polskiego, ul. Długa	11
5	Bells in the Stare Miasto	12
5.1	Kościół św. Marcina, ul. Piwna	12
5.2	Sanktuarium Matki Bożej Łaskawej, ul. Świętojańska	13
5.3	Kościół Archikatedralny św. Jana Chrzciciela, ul. Świętojańska	14
5.4	Zamek Królewski, plac Zamkowy	16
6	Bells Along the Krakowskie Przedmieście	16
6.1	Kościół Akademicki św. Anny	16
6.2	Kościół Seminarjny Wniebowzięcia	17
6.3	Kościół Wizytek	17
6.4	Kościół Parafialny św. Krzyża	18
7	Bells outside the above areas	19
7.1	Kościół Parafialny św. Augustyna, ul. Nowolipki, Muranów	19
8	Principles of pentatonic bell harmony	20
9	Conclusions	21
10	Recommendations	23
	Bibliography	24

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# 1 Introduction

This report forms the conclusion of the introductory stage of a research project investigating the problem of central Warsaw's many silent or missing bells. The investigation carried out in 2013 and 2014 was supported financially by a research grant from the Instytut Muzyki i Tańca (of the Ministry of Culture and National Heritage) under the third iteration of its innovation scheme 'Blank Pages of Music'.

Although much of the fieldwork took place in the summer of 2013 the idea for the project did not begin there; its roots go back many years. The author's interest in the problem of Warsaw's bells goes back to the winter of 1981-82, shortly after arriving in the city for the first time, and to the composition of a work for solo piano containing pentatonic bell harmonies in the Central European, Catholic tradition.<sup>1</sup> It was inspired in part by the curious absence of bell sounds in the capital of one of the most devoutly Catholic countries in the world. The composition was thus a kind of artistic compensation for the lack of bell sounds. Since that first period of two years living and composing in Warsaw I have returned regularly to visit the city for short periods and to live in the Nowe Miasto for several extended periods. Many of these visits have coincided with important religious festivals when one would hope and expect to hear bells ringing. But to my ears, attuned to the sounds of bells in other European cities, Warsaw has remained muted, even silent. One can be passive and accept the situation, as a product of Poland's tragic history and as a consequence of the anti-religious and anti-clerical attitudes of the PRL, or one can be proactive and try to change and improve the situation in the era of the Third Republic.

This research project reflects that desire to be proactive and to seek changes and improvements. The report itself cannot solve the problems of infrastructure, but it can help to explain the nature of the problem, to document the situation that currently exists (both positive and negative), and to propose specific musical ways in which the bell soundscape of Warsaw could be reconstructed and enhanced.

Bells are musical instruments. They are among the largest and loudest musical instruments created by man. It is strange, then, that most of the writing about bells in Poland considers them only as visual objects, with little or even no reference to the sounds they make individually or in collections. This is because the writing is usually done by art historians or architectural conservationists, and not by musicians. The relevant volumes in the otherwise excellent series 'Catalogue of [Polish] Art Treasures', for example, make occasional comment about the architectural characteristics and visual appearance of certain bell towers, but make no comments at all about bells, their existence or absence, or their sounds.<sup>2</sup>

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<sup>1</sup> *Jede Irdische Venus* (1982), for solo piano, in three movements. The work was premiered by myself in a concert of the Polish Composers' Union at the Chopin Academy of Music on 20 May 1982.

<sup>2</sup> Jerzy Łoziński and Andrzej Rottermund (eds.): *Katalog Zabytków Sztuki. Miasto Warszawa. Część 1: Stare Miasto* (Warszawa: Polska Akademia Nauk, Instytut Sztuki, 1993). Maria Kałamajska-Saeed (ed.): *Katalog Zabytków Sztuki. Miasto Warszawa. Część 2: Nowe Miasto* (Warszawa: Polska Akademia Nauk, Instytut Sztuki, 2001)

There is a very valuable ongoing series of books about 'lost bells' being published in stages by the Ministry of Culture and National Heritage, and it is compiled and edited by musicians and music historians, led by prof. dr. hab. Jerzy Gołos.<sup>3</sup> So far it offers a great wealth of detail about wartime losses of bells in the regions of Kraków, Rzeszów, Poznań, Katowice and Częstochowa. Unfortunately, however, it has not yet covered the lost bells of Warsaw. The short introductions to each volume, in Polish and English, provide valuable information on the different types of bell and how they were installed and operated. For the musician interested in the sounds, however, there is an unavoidable sense of disappointment in learning that an editorial decision was made to exclude information about musical pitch.<sup>4</sup> It is precisely the information about musical pitch that is so crucial to an understanding of how Warsaw's collections of bells may have sounded in the past, and how they might sound in the future.

The idea of reconstructing the bell soundscape of a city is not unique, so there are some good examples of how the challenge can be approached. Perhaps the best example is that of the city of Frankfurt-am-Main. The mediaeval centre of Frankfurt was mostly destroyed by Allied bombing raids in 1944, so there were many churches and religious foundations to be reconstructed during the post-war period. The main differences between the post-war rebuilding of Frankfurt and the equivalent rebuilding of Warsaw's Old Town were: the absence/presence of communist anti-religious and anti-clerical attitudes and policies; and the presence/absence of Marshall Aid funds to support the reconstruction of infrastructure. The process of reconstructing the bells proved to be a very long one, and was not completed until 1986. For that year, the city of Frankfurt commissioned a large book documenting the whole process, together with gramophone recordings of the reconstructed and renovated bells in all the main churches of the city centre.<sup>5</sup> The book is exemplary in detailing every stage of the process and every aspect of each original bell and each new bell, including the precise musical pitch and the spectrum of harmonic overtones. The book also explains an important stage of the long-term planning that took place in 1954, with a harmonic 'sound map' of the city designed by Dr. Paul Smets of Mainz. This chart of the inter-relationships of musical pitch - between the bell collections of ten of the city centre churches, including the Cathedral - is an inspiring example of the approach that could be adopted for the belated reconstruction of Warsaw's collections of bells.<sup>6</sup> It crystallizes the concept of a city's bells being considered as a whole, rather than as a random collection of unrelated sounds.

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<sup>3</sup> Jerzy Gołos: *Straty Wojenne: Zabytkowe Dzwony utracone w latach 1939-1945 w granicach Polski po 1945*, ed. Jerzy Gołos i Agnieszka Kasprzak-Miler, Tom 1, Wojewódzkie Krakowskie i Rzeszowskie (Poznań: Ministerstwo Kultury i Dziedzictwa Narodowego, 2000). Tom 2 (Tomasz Łuczak), Województwo Poznańskie (Poznań: Ministerstwo Kultury i Dziedzictwa Narodowego, 2006). Tom 3 (Przemysław Nadolski), Województwo Śląskie, Część I Diecezja Katowicka wraz z częścią diecezji Częstochowskiej (Katowice: Ministerstwo Kultury i Dziedzictwa Narodowego, 2008).

<sup>4</sup> "Ponieważ dokumentacja będąca podstawą naszego Katalogu rzadko uwzględnia ton dzwonu, rezygnujemy z tej pozamaterialnej kategorii opisowej" (As the documentation in our Catalogue very infrequently mentions the pitch of the bell, we have discarded this particular non-material category of description). Gołos, *op.cit.*, pp.16/28.

<sup>5</sup> Konrad Bund (ed.): *Frankfurter Glockenbuch* (Frankfurt-am-Main: Verlag Waldemar Kramer, 1986)

<sup>6</sup> Paul Smets: 'Übersicht über das Tonsystem des Frankfurter Großen Stadtgelautes' (1954), reproduced in the *Frankfurter Glockenbuch*, p.431.

It provokes one to think in terms of a collection of pitch sets and sub-sets. Just as all cities contain individual buildings and complex architectural relationships (of proportions and aesthetics) between them, so one starts to think of bell sounds in the same way; they are not only particular to each church, but they also create complex sonic relationships between churches, as the sounds radiate and are reflected along streets, across squares, and over roofs. This is not to suggest that a future Warsaw project should simply copy the Frankfurt example. Obviously, there are important differences, but the overall principles could be transferred and applied.

## **2 Research problems**

The project has attempted to investigate the following research problems:

2.1 ...that very little has been investigated or published about the sounds of Warsaw's bells, either before 1939, during the period of reconstruction after 1945, during the period of the PRL, or during the first twenty-four years of the Third Republic.

2.2 ...that the period of anti-clericalism during the PRL created a climate that did not encourage interest in promoting religious observance through the sounds of bells.

2.3 ...that the anti-clericalism of the PRL meant that church authorities had many serious challenges that were of a much higher priority than seeking to reconstruct collections of bells.

2.4 ...that the successive periods of invasion, destruction, confiscation (of bells), and occupation eradicated any sense of living memory for bells and their sounds.

2.5 ...that there is currently no central point of information about the bells of Warsaw or their sounds, and no central focus of responsibility (in the government or the church) for their preservation or reconstruction.

### 3 Research questions

The above research problems lead us to the following seven research questions. These questions fall into two groups: one relates to the bells that now exist; the other relates to the bells and bell collections that do not exist, but should be reconstructed.

#### 3.1 Research questions relating to the bells that exist today (2013):

- a) where do bells exist in central Warsaw today?
- b) what musical notes do they produce, individually?
- c) what harmonies do they produce, collectively?
- d) what soundscape do these bells give to the city?

#### 3.2 Research questions relating to the bells that are missing:

- e) which places should have bells, but still do not have them?
- f) what musical and harmonic principles should determine how the missing bell collections should be reconstructed ?
- g) what soundscape can the city have after reconstruction of the missing bells and bell collections ?

The first step in attempting to answer these questions is to document the present-day situation of the bell towers in Warsaw's churches, monasteries and nunneries. This documentation has been gathered by visiting and inspecting all the bell towers in central Warsaw over the six-year period from 2007 to 2013 and is presented here for the first time. The information is subdivided in three sections, moving from north to south: bells in the Nowe Miasto area; bells in the Stare Miasto area; and bells along the Krakowskie Przedmieście.

## 4 Bells in the Nowe Miasto

### 4.1 Kościół Parafialny Nawiedzenia N.M.P.<sup>7</sup>

ul. Przyrynek, Nowe Miasto

This church is one of the oldest in Warsaw and was founded in the 14th century by Prince Janusz Mazowiecki I. The church and its belltower were rebuilt and renovated many times, most recently from 1947 to 1952, after the destruction during the Warsaw Uprising of 1944. The gothic brick belltower stands proudly to the south of the church and provides one of the most distinctive landmarks of the old city as viewed from the east of the Vistula. A brief account of the history of the bell tower is given in Volume Two of the Catalogue of Art Treasures for Warsaw.<sup>8</sup>

Inside the belltower are three bells made and installed in 1987 to celebrate the third pilgrimage of Pope John Paul II to his homeland. They hang in a row, suspended from a thin iron frame that rests on the floor. The interior of the bell chamber is very spacious and the distance from the edge of the bell frame to the walls is about three metres all round. Consequently there is no direct contact between the frame and the walls and no transmission of stress to the walls when the bells are swinging. The bells are not mounted on wheels, but they are mounted in such a way that the stocks can rotate, allowing the bells to swing. The large size of this bell chamber is such that it could accommodate a much larger installation, either of larger bells or of more bells.

The middle-sized bell of this matching set bears an inscription identifying the bell founders as: 'odlewnia dzwonów Kruszewskich w Węgrowie', but it does not have a name. The common decoration of the bells at the top shows that they were made as a set. Both the largest and the smallest also have inscriptions stating that they were made specifically for this church. The largest bell, which hangs in the middle, has an inscription naming it as 'Panna Maria', and is pitched in F. The middle-sized bell is pitched in A. The smallest bell is inscribed 'Stefan' in memory of cardinal Stefan Wyszyński and is pitched in C, a perfect fifth higher than 'Panna Maria'. Thus the harmony produced by the three nominal tones is a triad of F major. Acoustically, however, the harmony is complicated by the presence of strong overtones. Although 'Stefan' is nominally in (or on) C, it also has prominent tritone resonance on F<sup>#</sup>. The middle-sized bell is nominally in A, but has a strong perfect fifth harmonic on E. The latter harmonic produces the dissonant interval of a major seventh against the nominal tone of Panna Maria and highlights the inherent acoustic risks and problems of designing sets of bells around major triads in root position.

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<sup>7</sup> N.M.P. = Najświętsza Maria Panna (Most Holy Lady Mary)

<sup>8</sup> Maria Kałamajska-Saeed (ed.): *Katalog Zabytków Sztuki. Miasto Warszawa. Część 2: Nowe Miasto* (Warszawa: Polska Akademia Nauk, Instytut Sztuki, 2001), pp.8-9. No information is given about bells.

These bells are relatively new and should be an important acoustic feature of the New Town. Unfortunately, however, they are never rung. Despite the fact that the present author has been a regular resident of the street next to the church since before the bells were installed in 1987, living just a few metres from the bell tower, he has never heard them ringing together, even on important religious festivals when one would hope and expect to hear them. This is an extraordinary situation and the problem of these silent voices - and others like them - needs to be solved. It is also odd that these bells are not used for joyful occasions such as weddings. This particular church is one of the most popular in Warsaw for weddings, but the bells never accompany these occasions. In conversation with the present author (in 2013) the Sister responsible for the bells explained that the automated ringing mechanism has not worked for many years.

At the very least, the mechanism for ringing these three bells needs to be replaced or renovated. Ideally, the flimsy 1987 bell installation should be replaced completely. This would allow for several improvements: larger bells, to suit the very large space available in the bell chamber; a different harmony, designed to produce intervals of major second and minor third (rather than a root-position major triad); a new automated ringing mechanism that would enable the bells to be rung regularly.

#### 4.2 Kościół św. Franciszka

Klasztor Ojców Franciszkanów, ul. Franciszkańska, Nowe Miasto

The Franciscan church stands at the northern end of ul. Freta where it intersects with ul. Franciszkańska. The symmetrical facade faces east and has twin towers, at the northern and southern corners. On the south side of the church is a bronze plate embedded right across the cobbled street. This shows the position of a wall that until 1943 marked the north-eastern corner of the Jewish Ghetto. The cloister is on the northern side of the church.

The north tower contains two bells. The larger of the two, made in 1961, was dedicated to the Franciscan church and is inscribed with the name 'Maria Józef'. Unfortunately, it has a broken clapper (serce) and is not usable. The nominal pitch is between C and B natural (H). The smaller of the two bells is cracked and gives an indefinite pitch of conflicting harmonics.

The south tower contains three bells. The larger one is inscribed with the name 'Franciszek Antoni' St Antonius, and was made by Georg Wreden in 1716. It is pitched in  $A_b$  ( $as^1$ ). Above this bell is a much smaller one pitched in high  $D_b$  ( $des^2$ ). Above that is a tiny bell, made in Germany in 1886, pitched in high F ( $f^2$ ). Despite its small size this little bell has a good, strong tone.

This group of five bells is in very poor condition and is neither usable nor used. The ferrous mechanisms (for automated ringing) are badly corroded and would need to be replaced. Although the bells in the south tower do produce a recognisable pitch set (a triad of D-flat major in second inversion) they do not correlate with the pitch of the 'Maria Józef' bell in the north tower. Clearly, this church deserves to have a good set of bells and there is an opportunity here to create a five-note harmony with



three bells in one tower complemented by two bells in the other tower. The towers are very tall and thin, so it would be inappropriate to install a set of large, heavy bells.

The most obvious option would be to create a pentatonic set with the following pitches (descending): F, E<sub>b</sub>, D<sub>b</sub>, B<sub>b</sub>, A<sub>b</sub> (F, Es, Des, B, As). This option would retain the three bells in the south tower and add es<sup>2</sup> and b<sup>1</sup> in the north. The inclusion of the high E<sub>b</sub> (Es) would give a falling pattern of mi-re-do in the top register. This would be a light peal, both in weight and musical pitch, but it would be bright and joyful. The addition of a low D<sub>b</sub> (des<sup>1</sup>) - to make six bells in total - would be a worthwhile undertaking and would enhance the euphony of the resonance.

#### 4.3 **Kościół Parafialny św. Jana Bożego i św. Andrzeja Apostoła**

Klasztor Ojców Bonifratrów, ul. Bonifraterska 12, Nowe Miasto

The monastic church on the corner of Bonifraterska and Konwiktorska streets has three bells pitched in C, B<sub>b</sub>, A<sub>b</sub> (c<sup>2</sup>, b<sup>1</sup>, as<sup>1</sup>, or mi-re-do, descending). These bells have not been viewed *in situ*, but they have been heard ringing regularly as a collection. Evidently, the automatic ringing mechanism is in good order. The constant noise of traffic along ul. Bonifraterska means that the sound is not fully appreciated from the west of the church. But the sound does carry well to the east, and can be heard across the northern area of the Nowe Miasto. These are attractive bells that do not seem at this stage to require renovation.

#### 4.4 **Kościół Rektoralny św. Benona**

Klasztor Sióstr Redemptorystek, ul. Piesza 1, Rynek Nowego Miasta

This church was destroyed in 1944 during the Warsaw Uprising and rebuilt after the war. The reconstructed church was reconsecrated by cardinal Wyszyński on 22 June 1958. It is maintained by the order of Sisters of the Redemption (Redemptorystki) who have their cloister next to the church.

The Church of Saint Benon is located very close to the belltower of the NMP church, and there are direct lines of sight and sound between them. It is important, therefore, that the pitch relationships between them should be complementary. The Church of St. Benon does not have a belltower, but it does have a bell lantern above the church. This lantern currently has one very small bell ('Anioł Pański').

#### 4.5 **Klasztor Sióstr Benedyktynek-Sakramentek**

Rynek Nowego Miasta 2, Nowe Miasto

The Benedictine monastery on the east side of the New Town Square (Rynek Nowego Miasta) does not have a bell tower. The cloister to the south side of the church does have a small Sanctus bell in an open lantern on the roof.

#### 4.6 Kościół Akademicki św. Jacka,

Klasztor Ojców Dominikanów, ul. Freta 10, Nowe Miasto

The Dominican community was established in Warsaw in 1603.<sup>9</sup> Construction of the church began in 1605. In 1864 the church and cloister were confiscated from the Dominicans as a consequence of their support for the Uprising of 1863. In 1944 the church and monastery were used as a military and civilian hospital during the Warsaw Uprising. The hospital was bombarded by German artillery and at least 100 people died in the rubble. The Dominicans returned in 1947 and began rebuilding both church and monastery according to the original design. The rebuilding was completed in 1959 and the church was re-consecrated in 1962. The massive bell tower next to the church (on the south-west corner) was rebuilt, but bells were not re-installed.<sup>10</sup> Since the post-war rebuilding the huge bell tower has been empty and strangely silent.

Viewed from the street, the bell tower has two main levels, plus a metal crown. The lower level is now subdivided into two floors, both of which are rented to the tiny *To lubię* cafe. The upper level is the main bell chamber; it has full-length louvred windows on all four elevations and is subdivided internally into three floors. The metal crown is also louvred, indicating that it was also intended to house bells. There is now no access to the bell chamber through the lower levels occupied by the cafe. Internal structural changes have removed the staircase that presumably existed as part of the original design. The only access to the bell chamber is now through a small external door in the upper section of the east elevation about ten metres above the street level. This door has no ladder or stairs and can only be accessed by portable ladders. There is no access to the bell chamber from the church, because the buildings are not physically connected. An inspection of the interior of the bell chamber carried out in June 2013 (by the present author) confirmed that there are no bells, either in the main bell chamber or in the louvred crown. It also confirmed that there is a severe pigeon problem; the interior of the bell chamber is deep in pigeon dirt and dead birds.

In terms of size and shape this Dominican bell tower can be compared to the one located at the south-western corner of St. John's Cathedral in the Old Town. Both buildings occupy a relatively large ground space and have a strong architectural 'footprint'. Their walls are thick and strong. They are constructed as separate buildings and they are not very high. Clearly, they were both designed to accommodate large, heavy bells.

Visually, the impact of the Dominican bell tower is very strong. It dominates the view of Freta Street from the south (approaching from the Barbakan) and from the north (approaching from the Maria Skłodowska-Curie Museum). It also dominates the view from ul. Długa as one approaches Freta Street from west to east. These strong lines of sight would also be strong lines for sounds of bells.

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<sup>9</sup> A brief historical account of the Dominicans in Warsaw is given at the following website: [www.freta.dominikanie.pl](http://www.freta.dominikanie.pl)

<sup>10</sup> A few historical details relating to the building and rebuilding of the bell tower are given by Maria Kałamajska-Saeed (ed.) in *Katalog Zabytków Sztuki. Miasto Warszawa. Część 2: Nowe Miasto* (Warszawa: Polska Akademia Nauk, Instytut Sztuki, 2001), pp.52-53. No information is given about bells.

It is both obvious and essential that any new bells created for this very important bell tower should be dedicated both to the memory of the hospital patients who died here in 1944 and to St. Hyacinth. The pitch set for such new bells must complement the bells of the Kościół Świętego Ducha (and Klasztor Ojców Paulinów) on the opposite side of ul. Freta. These churches are very close to each other and the harmonic relationships between the bell collections must be configured as complementary pentatonic sets or sub-sets. The physical, architectural differences between the bell towers of these two churches suggest that the Dominican bell tower should contain three large, relatively heavy bells, complemented by two groups of smaller, lighter bells in the twin towers of the Pauline church.

#### 4.7 Kościół Rektorski pod wezwaniem Świętego Ducha

Klasztor Ojców Paulinów, ul. Długa 3, Nowe Miasto

On 16 April 1950, after a gap of 130 years, the Pauline brothers returned to their monastery and church in the Nowe Miasto.<sup>11</sup>

The Church of the Holy Spirit has a large and imposing presence on the west side of ul. Freta, facing to the east down ul. Mostowa. The connected Pauline cloister stretches along the south-east end of ul. Długa. The front (east) elevation of the church has symmetrically positioned twin towers, one on the north side and the other to the south. Both towers have two louvred levels, indicating that they were/are intended for bells. In addition they have ornamental metal crowns/helmets. The north tower now contains a set of three bells installed in the lower of the two louvred levels; the upper of the louvred levels (i.e., the one that rises above the facade of the church) is empty. The south tower is empty on both of the louvred levels.

The bells of the north tower were made in 1966 by the Felczyński bell-foundry in Przemyśl. They form a set and have matching inscriptions indicating that they were made specifically for the Ojców Paulinów and the Kościół św. Ducha. The largest bell is pitched in C and is inscribed 'Imię moje Najśw. Marija Panna'. The middle-sized bell is pitched in E<sub>b</sub>, a minor third above the C, and is inscribed 'Imię moje św. Józef'. The smallest of the three bells is pitched in A<sub>b</sub>, a perfect fourth above the E<sub>b</sub>, and is inscribed 'Imię moje św. Paweł Pustelnik'. The harmony produced is a triad of A-flat major in first inversion (c<sup>1</sup>,es<sup>1</sup>,as<sup>1</sup>).

The bells of the Kościół św. Ducha are mounted on stocks that enable them to swing, but they are not operated by any automated system: they are operated by thin ropes that pass through holes in the ceilings and floors all the way down to the ground level of the tower. This method of operation has not been observed in any of the other churches of central Warsaw and seems to be a unique feature of this particular installation. Obviously, it means that three people would be needed to ring the bells as a trio.

The bells are in very good condition. The stocks on which they swing are slightly corroded, but superficially rather than seriously. The louvred windows all have wire

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<sup>11</sup> A brief history of the Pauline brothers in relation to this church is given at the following website: [www.warszawa.paulini.pl](http://www.warszawa.paulini.pl)

mesh which has been successful in keeping out the pigeons and the corrosive mess they can create. The interior surfaces are free of the pigeon dirt that has made such a mess in the towers of several of the other churches in the area.

The north tower of the Kościół św. Ducha is close to the bell tower of the Kościół św. Jacka on the other side of ul. Freta. This means that new bells for the Dominican church must be designed so the harmonies will blend and complement each other. One obvious option would be to have four new bells on the east of the street tuned to C, B<sub>b</sub>, A<sub>b</sub>, F (descending), complementing the existing chord on the west side: A<sub>b</sub>, E<sub>b</sub>, C (descending). A better option is to install three bells in the south tower (c<sup>2</sup>, b<sup>1</sup>, f<sup>1</sup>) so that six bells in the Pauline church would produce a five-note chord: c<sup>2</sup>, b<sup>1</sup>, as<sup>1</sup>, f<sup>1</sup>, es<sup>1</sup>, c<sup>1</sup>. These could complement a larger and heavier three-note group in the Kościół św. Jacka providing the Te Deum motif: B<sub>b</sub>, A<sub>b</sub>, F (b, as, f). The combined effect would be a magnificent minor pentatonic.

According to the Pauline monk who accompanied the present author on a visit to the north tower in June 2013 the ringing of the bells has in recent years been severely inhibited by repeated complaints from only two local residents. One can imagine that these isolated but surprisingly successful protesters would be less than enthusiastic at the prospect of new bells being commissioned - and used. This type of inhibition has been encountered elsewhere and has made it necessary for the present study to consider the local laws administered by the city of Warsaw. The names of the residents who do like and support the ringing of bells have not been recorded.

#### 4.8 **Katedra Polowa Wojska Polskiego**

ul. Długa

The imposing, symmetrical facade of the Polish Army Cathedral stands on the south side of Długa Street, near the corner with Miodowa Street, facing north to Plac Krasińskich and the massive memorial to the victims of the Warsaw Uprising of 1944. It has twin towers, louvred in the upper levels. The west tower (on the right when looking south from Plac Krasińskich) contains one, large bell pitched in C. The east tower contains two smaller bells, the larger of which is pitched in E<sub>b</sub>, with the smaller one pitched a major second higher, on F. This pentatonic subset (of major second and minor third) is the same as that installed in 1974 in the belltower of the Church of St Anne in Plac Zamkowy, but here the bells are larger and are a perfect fifth lower than those of St Anne's.

Close inspection of the bells in both towers (on 4 June 2013, courtesy of ks. płk. Robert Mokrzycki) revealed that the largest bell is inscribed with the name 'Maria', is dated 6 November 1709, and carries lettering in German, not Latin: 'Gott und der Kirchen zu ehren und den seinigen zum Andenken verehret diese Glocke, Elias von Beuchel, Erbherr auf ober und nieder Seiffersdorf und Hisiger Kirchen ober Vorsteher Anna Rosina von Beuchelin gebohrne [sic] Bruch Mannin, Landes Hudt [ie Landshut] den 6 November Anno 1709'. From this we understand that the bell was commissioned in 1709 by a family of the German nobility (von Beuchel). How it came to hang in the west tower of this cathedral - during the period of post-war rebuilding of Warsaw - is a mystery.

The middle-sized bell of the trio (pitched in E<sub>b</sub>/es) is of Russian origin and bears an inscription in Cyrillics with the date 1718. In the Russian-Orthodox tradition bells are fixed in a stationary position and do not swing or ring; in this case, however, the bell is mounted so that it can swing. The smallest bell (pitched in F) carries a German inscription: "1917 aus Liebe geopfert durch Liebe erneuert 1927 [dedicated to Love in 1917 and through Love renewed in 1927].

The most interesting feature of this collection of three bells is that even though they were cast at different times, in different places, and according to different traditions, as a trio they produce a pitch set according to pentatonic principles. So there must have been a 'person or persons unknown' who chose these particular bells - from all those available in the post-war period of reconstruction - because of the harmony they would produce together. This is a fascinating situation, all the more so because until now it has not documented. It confirms that the pentatonic principle is the appropriate one to use for the other churches in the area.

There is, of course, a certain irony here. The Cathedral designated for the armed forces of Poland - and facing the Warsaw Uprising memorial - has a 'voice' created by German and Russian bells. It is not known if this was intended as a symbol of reconciliation with Poland's historic enemies to the west and east. It probably happened merely by accident rather than by design. Even so, the sonic symbol exists and is worth noting.

## 5 Bells in the Stare Miasto

### 5.1 Kościół św. Marcina,

Klasztor Sióstr Franciszkanek Służebnic Krzyża, ul. Piwna 9/11

Immediately to the south of the Church of St. Martin - and joined to it - is a beautiful, tall belltower of six levels (plus lantern above the sixth level).<sup>12</sup> On the lower three levels it adjoins the Baroque facade of the church (to the north) and the civic part of the street (to the south). But on the upper three levels it stands free of the other buildings, towering above them and allows splendid lines of sight and sound across the whole of the Old Town. There is a particularly fine street view of the bell tower from ul. Świętojańska looking west down the narrow alley that leads from the front of St. John's Cathedral to ul. Piwna.

The church was founded in 1352 by Prince Ziemowit III for Augustinian friars/canons from Silesia. The Order was dissolved by the Russian Tsar in 1863 as a punishment for the involvement of the friars in the 1863 Uprising. The church was destroyed by fire on several occasions (1478, 1669, 1888, and 1944). It was rebuilt between

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<sup>12</sup> The exterior appearance of the six levels are described briefly in: Jerzy Łoziński and Andrzej Rottermund (eds.): *Katalog Zabytków Sztuki. Miasto Warszawa. Część I: Stare Miasto* (Warszawa: Polska Akademia Nauk, Instytut Sztuki, Wydawnictwa Artystyczne i Filmowe, 1993), p.219. Strangely, this source makes no comment about the conspicuous absence of bells.

1951 and 1953 and was reconsecrated in 1956. It is now cared for by an order of Franciscan nuns.

Despite the fact that this is one of the most significant bell towers in the city of Warsaw it does not currently contain any bells. The interior condition of the tower is very good and the bell tower has not been compromised in any way by the installation of telecommunications equipment. The space that should contain bells has three levels linked by wooden stairs. There would need to be some rearrangement of these stairs to make space for a new bell installation.

The cloister to the west of the church has a tiny Angelus bell pitched in high A, but this is only heard within the intimate surroundings of the closed community and is not intended to form part of the soundscape of the Old Town.

A new set of bells for the Kościół św. Marcina would be a spectacular enhancement of the soundscape of Warsaw. The harmony would need to be designed carefully so that it complemented the harmony produced by the bells of the Cathedral. The height of the tower - above the roofs of the civic buildings - would mean that any new bells would be heard in Plac Zamkowy. Consideration should be given to the effect for a listener in Plac Zamkowy hearing at the same time new bells of St. Martin's Church (from the north) and the bells of St. Anne's Church (from the south). Harmonic pitch complementation should be planned very carefully.

## 5.2 Sanktuarium Matki Bożej Łaskawej, Patronki Warszawy

Kościół Księży Jezuitów, ul. Świętojańska 10, Stare Miasto

This church situated on the north side of St. John's Cathedral was built in 1609. It was destroyed in 1944 during the Warsaw Uprising and the post-war rebuilding was completed as late as 1970. It has a tall, slim, beautifully elegant tower, which stands higher than the roof of the cathedral; some might assume that it is the bell tower for the cathedral. During the post-war reconstruction the tower was fitted with a chiming clock. The clock faces can be seen from the streets on the east and west. Pre-war photographs shown that there was then no clock, and that the top level of the tower had louvres (suggesting the presence of bells). Earlier engravings (from before the era of photography) confirm that the clock was not a traditional part of the building. This clock is not currently operational and would need to be renovated. It is connected by cables to three small bells that hang in the open lantern on the very top level of the tower. These bells are chimed rather than swung/rung.

It is tempting to suggest that the clock and its tiny bells should be removed (as unoriginal) and replaced by a set of swinging bells. The problem with this idea is that the tower is really too tall and slender to cope with the architectural stresses that would be produced by a collection of swinging bells.

If the clock and its bells were to be renovated then the chiming would interact with the chiming of the clock in the central tower of the Zamek Królewskie. Perhaps this would not be a real issue with light, high-pitched bells. One would also need to confront the issue of how the clock bells are tuned and what melodic patterns they should produce to mark the quarter hour divisions. The bells were chimed by hand when the author inspected the top of the tower in 2013: the smallest produces

a high E<sub>b</sub>; the largest produces a B<sub>b</sub>, a perfect fourth below the E<sub>b</sub>; and the middle one produces an indistinct pitch probably intended to be either D<sub>b</sub> or C. All three bells are of poor acoustic quality and would need to be replaced with ones that produce clearer intonation.

### 5.3 Kościół Archikatedralny św. Jana Chrzciciela

ul. Świętojańska, Stare Miasto

The Cathedral of St. John the Baptist has on its south-west corner a massive bell tower. It is not particularly tall, but it has a wide base and thick, strong walls, designed to cope with a collection of large, swinging bells. The bell tower stands over the intersection of ul. Świętojańska and ul. Kanonia. At the street level it forms an archway as the entrance to ul. Kanonia. A brief account of its history is given in the Catalogue of Art Treasures.<sup>13</sup> We learn that it was constructed between 1649 and 1656. It was destroyed in 1944 and rebuilt in 1950.

Above the archway are rooms that are currently used for choir practice. Above these levels is a very large bell chamber with open louvres. Inside this chamber is a collection of three large bells mounted diagonally, from corner to corner, on a massive concrete frame. As usual, the largest bell hangs in the middle and the (slightly) smaller ones hang on either side. The largest bell seems to be pitched in C<sup>#</sup>, with the next one a minor-third higher in E. The smallest one produces an indistinct pitch of conflicting harmonics, suggesting that it has a crack. Its relatively large size (only slightly smaller than the E natural) suggests that it was intended to produce the note F<sup>#</sup>. Thus the collection should produce the familiar Te Deum pattern of major second and minor third (descending).

The rusted clapper of the smallest bell has evidently been striking in unintended ways. This is shown by a wide arc of bright impact marks on the interior lip of the bell (whereas the other two bells have clearly defined strike marks in diametrically opposed places). Clearly, the smaller bell needs to be replaced or re-cast.

All three bells are in very poor condition and have evidently not been maintained. All surfaces inside the bell chamber - including the bells themselves - are severely contaminated with very thick layers of pigeon droppings and the decayed corpses of dead birds. It would appear that the bell chamber has not been cleaned for many years, perhaps decades. The pigeon problem was so bad in 2013 that it was impossible to read the inscriptions on the bells, even when viewed from very close, at the top of a long ladder.

The two larger bells need to be cleaned and renovated. The smaller bell needs to be recast/replaced. The operating mechanisms are all badly corroded and need to be renovated or replaced. The open louvres need to be replaced with new fittings that will allow the sounds to leave but prevent the pigeons from entering.

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<sup>13</sup> Jerzy Łoziński and Andrzej Rottermund (eds.): *Katalog Zabytków Sztuki. Miasto Warszawa. Część I: Stare Miasto* (Warszawa: Polska Akademia Nauk, Instytut Sztuki, Wydawnictwa Artystyczne i Filmowe, 1993), p.209. This source gives no information about any bells, past or present.

At the time when the interior of the tower was viewed in June 2013 the Cathedral had a major renovation project in progress, jointly funded by the European Union and the Polish Government. The bell tower was due to gain a new roof, replacement louvres to the windows, and rewiring of the electrical aspects of the bell mechanism. Unfortunately, this major project was not scheduled to include cleaning or renovation of the *interior* of the bell chamber or its bells. So the problems connected with the cathedral bells will remain exactly the same after the current project has been completed. The exterior of the building is being renovated, so the visual appearance from the street level will be good. This emphasis on the visual aspect seems to be typical of the many phases of reconstruction and renovation that have taken place with churches in Warsaw. Unfortunately, it is not matched by equal consideration of the sonic aspect of the bells. It seems that the curators of these expensive restoration projects are only aware of the visual perspectives and are unaware of the true functions of bell towers as buildings containing massive musical instruments. It is like restoring the exterior woodwork of a concert grand piano - as a silent piece of furniture - without considering the functions or the condition of the hammers and the strings inside the instrument.

There is an additional level above the chamber where the three bells are currently installed. This upper level appears to be empty. The bell chamber itself is so large that there is plenty of unused space (for example, in the corners at right angles to the diagonal bell installation). It is clear that there would be ample space for the installation of a collection of five or even six large bells. Such a collection would be in keeping with the status of this church as the cathedral of the capital. It is surprising that it has only three bells, even though they are relatively large ones. A collection of five bells could provide the following pentatonic mode (in descending order): h, gis, fis, e, cis. This harmonic design would retain two of the existing three bells (e, cis) and would replace the broken one (as, fis). It would add two new, smaller bells (h, gis). The minor third between the two larger bells would prevent the installation of a Salve Regina collection.

It is extraordinary that the major renovation project of 2013-2014 should overlook and omit the bells of the Cathedral. It is now imperative that this piece of unfinished business should be addressed. St. John's Cathedral deserves to have its voice.

#### 5.4 Behind the cathedral, ul. Kanonia

In the small square behind the Cathedral (to the east) there is a poignant monument in the form of a medium-sized broken bell fixed to the ground. It was placed there in 1972. The visual and historical details of this bell are documented in the Catalogue of Art Treasures for the Old Town.<sup>14</sup> It dates from 1646 and was made by Daniel Tiem. Unlike the bells hidden in towers this one is available for all to see and study. We know nothing of its sound except that it is 'popękany'.

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<sup>14</sup> Jerzy Łoziński and Andrzej Rottermund (eds.): *Katalog Zabytków Sztuki. Miasto Warszawa. Część I: Stare Miasto* (Warszawa: Polska Akademia Nauk, Instytut Sztuki, Wydawnictwa Artystyczne i Filmowe, 1993), p.411



## 5.5 Zamek Królewski

### Plac Zamkowy

The Royal Castle has a centrally positioned clock tower facing west across Plac Zamkowy. This clock has two bells, one pitched in A, and the other a major third lower on F. Being clock bells they do not swing but are chimed. They were made and installed by the Kruszewski bell foundry of Węgrów. Since the castle was rebuilt in the 1970s it also has small, louvred towers on the north-west and south-west corners. Photographs taken at the end of the nineteenth century show that the castle did not have these corner towers at that time.

## 6 Bells along the Krakowskie Przedmieście

### 6.1 Kościół Akademicki św. Anny

#### Top of Krakowskie Przedmieście, next to Plac Zamkowy

The Church of St. Anne has a massive, free-standing bell tower constructed in 1818 and renovated after the Warsaw Uprising of 1944. The tower stands slightly to the north of the west end of the church and is one of the architectural structures that defines and encloses Plac Zamkowy. The huge size of this bell tower and the solidity of its architectural ‘footprint’ suggest that it was intended to house an ensemble of large bells, not just the three small bells that currently hang in the open-air lantern at the top.<sup>15</sup> It would be absurd to build such a large and solid structure for such small bells. Further historical research is required in order to investigate how many bells were installed in this tower from 1818 and exactly where they were located.

The three open-air bells hang in a line from east to west. The largest of the three (pitch  $g^1$ ) is in the middle, the smallest (pitch  $c^2$ ) hangs on the east side, and the middle-sized one (pitch  $b^1$ ) on the west side. So the harmonic effect is the typical pentatonic subset of falling major second and minor third (in this case  $c^2$ ,  $b^1$ ,  $g^1$ ), known in the European bell tradition as the ‘Te Deum motif’. The interval relationships are similar to those in the Katedra Polowa Wojska Polskiego in Długa Street, but here the pitch level of the ensemble is a perfect fifth higher.

The bells are inscribed with names. The largest one has the inscription ‘imię moje Tadeusz Apostel’. The middle-sized one states ‘imię moje Anna’. The smallest one has ‘imię moje Bł. Władysław z Giełniowa’. There are no inscriptions to indicate who cast the bells or where, but the interval relationships would suggest that they were made by the Felczyński company. All three bells also have the following inscription: ‘w roku jubileuszowym 1974 wspólnota akademicka przy kościele akademickim św. Anny w Warszawie dzwoni ten ufundowała aby głosił wiarę stolicy’. This common inscription indicates that they were commissioned, cast and installed as a set.

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<sup>15</sup> Photographic evidence from the end of the Second World War shows that the lantern on the top of the bell tower did not contain any bells at that time.

This fact is important in relation to the pitch relationships, and proves that the pentatonic subset of 2+3 is the favoured chord.

The interior of the tower contains a staircase (to gain access to the viewing platform underneath the bells), but also contains various rooms and even a lift. Clearly, these will not have been part of the original design of 1818. It is tempting to propose that the tower should be renovated and the interior reconstructed so as to allow installation of larger bells in the top chamber, underneath the open-air viewing platform. If two larger bells were added to the three dating from 1974 it would be possible to have a full pentatonic set (for example, by adding an F and an E<sub>b</sub>). But one doubts whether there would be any great enthusiasm from the church or civic authorities for radical transformation of such an iconic part of the Warsaw landscape.

## 6.2 **Kościół Seminaryjny Wniebowzięcia pod wezwaniem N.M.P i św. Józefa Oblubieńca**

ul. Krakowskie Przedmieście 52/54

This church on the east side of Krakowskie Przedmieście next to the Presidential Palace has its facade facing west. The church does not have a bell tower, but to the north and south of the west elevation are two, symmetrically placed hollow stone urns containing small bells made by the firm of Felczyński in Taciszów. The one to the south contains only one bell (the largest): 370kg, dedicated to St. John the Baptist, made in the year 2000, pitched in h<sup>1</sup>. The one to the north contains the other three bells, the smallest of which dates from before the Second World War (d<sup>3</sup>), and the others from the year 1999 (h<sup>2</sup> and fis<sup>2</sup>). The four bells are rung each Friday afternoon, at 3pm for only two minutes. Harmonically, they produce a triad of B minor (h-moll): d<sup>3</sup>, h<sup>2</sup>, fis<sup>2</sup>, h<sup>1</sup>. They do not need to be part of a reconstruction project.

## 6.3 **Kościół Wizytek pod wezwaniem Józefa Oblubieńca Niepokalanej Bogurodzicy Maryi**

Klasztor Sióstr Wizytek, ul. Krakowskie Przedmieście 34

The Wizytka's church located on the east side of Krakowskie Przedmieście does not have a dedicated bell tower. The adjoining nunnery of the Visitation Sisters of St. Joseph has two tiny bells in an open lantern to the south-east side of the church front (looking at the church from the west, these bells are on the right, adjacent to the university buildings in the former Pałac Tyszkiewiczów). These are cloister bells used to sound the Anioł Pański (Angelus) for the benefit only of the monastic community. They do not need to be factored in to any reconstruction project.

#### 6.4 Kościół Parafialny św. Krzyża,

Księża Misjonarze, ul. Krakowskie Przedmieście <sup>16</sup>

The Church of the Holy Cross located on the west side of Krakowskie Przedmieście facing East (the high altar faces West) has twin towers with louvres on the upper levels. There are three bells in the north tower. The largest is pitched in D ( $d^1$ ), the medium-sized bell is pitched in E ( $e^1$ ), and the smallest is pitched in F<sup>#</sup> ( $fis^1$ ). So the ensemble gives two whole tones, with a major third between top and bottom.

The two larger bells are inscribed 'Parafia św. Krzyża w Warszawie', with the dates shown as 1982 (for the largest) and 1981 (for the middle bell). These bells dating from the period of martial law were both cast by the Felczyński bell foundry in Taciszów and are inscribed 'z odlewni braci Tadeusza i Wacława Felczyński w Taciszowie'. The biggest one (pitch  $d^1$ ) is dedicated to Pope John Paul II, and the middle one (pitch  $e^1$ ) is dedicated to St. Vincent de Paul (św. Wincenty à Paulo). The smallest of these three bells ( $fis^1$ ) has German inscriptions: "Wolteter bei diesen Glocken H. Daniel Fabian, Tuchscher in Breslau, mit Gott goss mich Ernst Gottlieb Moretzki [sic] in Breslau 1789".

At noon each day the middle bell is rung (not chimed). The ringing produces the characteristic rhythmic effect of a double strike, strong then weak, strong then weak. On the festival of Boże Ciało in May 2013 the F<sup>#</sup> and E bells were heard ringing together, a whole tone apart. The lower bell (D) was not heard on that occasion.

The bells are all mounted on wheels and can be operated mechanically. The condition of the two bells cast in the early 1980s is good, but they are both marked with pigeon droppings that obscure the inscriptions.

The south tower was not viewed, following advice from the priest guiding the visit that there are no bells in that tower. But the absence of bells in that tower presents an opportunity to enlarge the collection of bells in this church. The existing three bells of the north tower could be complemented by two new ones in the south tower, in order to establish a full pentatonic harmony. This could be done in one of two ways. Either one could add two small bells ( $a^1$ ,  $h^1$ ) to extend the pentatonic harmony upwards, creating a major pentatonic chord ( $h^1$ ,  $a^1$ ,  $fis^1$ ,  $e^1$ ,  $d^1$ ). Or one could add one bell at the top ( $a^1$ ) and one at the bottom of the pitch range ( $h$ ) to create a minor pentatonic chord ( $a^1$ ,  $fis^1$ ,  $e^1$ ,  $d^1$ ,  $h$ ). Any decision between these two options would, of course, be affected by considerations of space, practicalities of installation, and cost of the new bells. On musical and aesthetic grounds, however, the second option could be a very attractive one, adding a beautiful sound to this landmark church. One is tempted to suggest that Chopin, whose heart lies inside the church, would be happy with either option.

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<sup>16</sup> I am grateful to Kś. Robert Berdychowski for a fascinating tour through all the hidden parts of the church and its towers.

## 7 Bells outside the above areas

### 7.1 Kościół Parafialny św. Augustyna

ul. Nowolipki 18, Muranów

The parish church of St. Augustine in Nowolipki street was built in the late nineteenth century. During the Nazi occupation it was within the Jewish Ghetto. It was badly damaged during the Ghetto Uprising of 1943, but it was not demolished either during the Uprising or the subsequent flattening of the entire ghetto region. It is remarkable that the bell tower survived. Photographs dating from 1944 show the tower intact, but the surrounding area (present-day Muranów) was a wasteland. Very close to the church, on the other side of the present-day al. Jana Pawła II, is the site of the infamous Pawiak prison.

The bell tower is one of the most prominent features of the Warsaw skyline and is over 70 metres tall. The church faces south (the high altar faces north) and the bell tower is on the south-west corner of the asymmetrical south elevation. In the top chamber of the tower are five bells: one Russian bell dating from the 19th century, and a matching set of four new bells cast in 2003 by the bell foundry of Zbigniew Felczyński in Taciszów. The church has produced a handsome colour leaflet in which the four new bells are shown and described. They are named, in ascending order, as follows: Laudetur Jesus Christus (630 kg, fis); Matki Bożej (420 kg, ais); św. Augustyna (220 kg, h); and św. Moniki (140 kg, cis). The church website contains a three-page history of the bells, including a list of the local families who made financial contributions to the cost of commissioning the new bells.

It is not known for sure how many bells there were before 1939, but it is thought that there were four. Only two of them survived the war. The largest of these two - made in Danzig/Gdańsk in 1742 - remained silent for 27 years after the war and was heard again on 2 October 1968, following a restoration of the tower. It was then used for 33 years, until it became cracked in 2001. It was then removed from the tower and relocated to the inside of the church where it can now be admired on a wooden plinth in the south-west corner of the nave. It has an inscription in a combination of Latin and German: "Me fecit Joh. Gottfr. Anthoni, Gedani [ie Danzig or Gdańsk] AD 1742 den 24 April. Laudetur Jesus Christus, Amen". The pitch of this bell was not documented and cannot now be tested.

The other bell to survive the Second World War is a 19th century Russian one with an inscription in cyrillics. Although the Russian bell does not form part of the new set of bells it has been mounted with them. It has a nominal pitch of F natural, with strong harmonics on the major third (A natural) and the perfect fifth (C). It hangs immediately above the bell 'Matki Bożej'. The bell 'Św. Moniki' hangs immediately above 'św. Augustyna'. The largest bell (Laudetur Jezus Christus) hangs on its own.

The commissioning order for the new bells is defined in a document dated 26 November 2002 and shows the intended weights and musical pitches as follows: 700 kg, in G; 420 kg, in A<sup>#</sup> [ais or b]; 290 kg, in C; and 220 kg, in D. Three of the four bells as actually installed are in fact a semitone lower than the intended pitch, and the musical interval between the two largest ones is, in fact, a *major* third rather than

the intended *minor* third: F<sup>#</sup>, A<sup>#</sup>, B natural, C<sup>#</sup>. It is clear from the original order form of 2002 that the bells were intended to produce the pentatonic four-note subset of mi, re, do, la (descending); but they produce the equivalent of re, do, si, sol.

The 2004 installation has a unique feature. The automated swinging can be activated from street level by a hand-held remote control unit, like those used to operate television sets and other digital devices. Interestingly, on the day the bells were rung for the present author the C<sup>#</sup>, B and F<sup>#</sup> bells could be operated, but the second largest bell (the A<sup>#</sup>) could not. One wonders whether this was a technical problem or a deliberate decision made in order to avoid the dissonance of the minor second between A<sup>#</sup> and B. Obviously, the presence of this semitone would undermine the principle of anhemitonic pentatonicism.

## 8 Pentatonic principles of bell harmony

It has already been observed that several Warsaw churches have collections of bells that conform to the principles of anhemitonic pentatonicism that for many centuries have governed bell harmony across most of central and western Europe.<sup>17</sup> These pentatonic principles observed by the Roman Catholic and Lutheran traditions (but not the Russian Orthodox, Greek Orthodox, or Anglican traditions) now need to be explained, albeit briefly.<sup>18</sup>

Anhemitonic pentatonicism is a harmonic-melodic principle based on the exclusion of semitones (minor seconds) - and tritones (augmented fourths and diminished fifths). The adjacent intervals in this type of pentatonic mode will be either whole tones (major seconds) or minor thirds. Expressed in terms of solfeggio/solfege the notes will be either (ascending): do, re, mi, sol, la; or la, do, re, mi, sol. Bell collections are usually rung with the smallest bell first and the biggest bell last. So the descending pentatonic patterns can be defined as: either la, sol, mi, re, do; or sol, mi, re, do, la (or the same pattern transposed higher as do, la, sol, fa, re).

There are references to the pentatonic principles of Central European bell harmony in a useful but little known article in Polish by Father W. Gieborowski.<sup>19</sup> His article

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<sup>17</sup> Pentatonicism is harmony derived from a five-note scale/mode. It is generally understood to be a five-note mode having only two kinds of adjacent interval: major seconds, and minor thirds (for example, do, re, mi, sol, la, do). 'Anhemitonic' pentatonicism is a type of harmony that excludes semitones and tritones.

<sup>18</sup> These pentatonic principles in relation to European bell harmony were explained in a paper I presented to the Royal Musical Association in March 1993: 'The Harmony and Rhythm of Continental European Bells'. Parts of the explanation were also contained in my sections in the major article on Bell and bells for *The New Grove Dictionary of Music and Musicians*, 2nd. edn., ed. Stanley Sadie (London: Macmillan, 2001), vol.3, pp.168-182

<sup>19</sup> Ks. dr. W. Gieburowski: 'O Dzwonach', *Muzyka Kościelna* (1927), No.2, pp.27-31 and 84-88. I am grateful to Prof. Jerzy Gołos for providing me with a copy of this article.

was published in two sections. In the second, continuation section, he identifies three types of bell ensemble (*zespól*) according to the practice of Polish bell founders: harmonic; melodic; and harmonic-melodic. His examples of each type show that he means by 'harmonic' a collection of pitches that are not adjacent in the scale or mode (c, e, g). By 'melodic' he means notes that are adjacent in a mode (c, d, e). By harmonic-melodic he means a combination of adjacent and non-adjacent notes (d, f, g). Interestingly, the one pitch collection where he is inconsistent is one of the most important for the tuning of bells in Warsaw. He classifies the three-note group d, f, g (the *Te Deum* motif) as a 'melodic' collection, but it should, of course, be classed as 'harmonic-melodic'. Gieborowski does not discuss the significant issue of how to design the pitch collections of bell collections in churches that are very close to each other. He only refers to the pitch character of 'closed' bell collections. So the important issue of pitch complementation between churches that are close to or opposite each other (as addressed by Paul Smets) is left completely open.

Examples of three-note pentatonic sub-sets in the European bell tradition are the *Te Deum* motif (e.g. d, c, a or re-do-la falling) and the *Gloria* motif (e.g. g, a, c, or sol-la-do rising). One of the most important four-note pentatonic sub-sets is the *Salve Regina* motif (e.g. c, e, g, a or do-mi-sol-la, rising). The full pentatonic set can be presented as a major pentatonic (e.g. c, d, e, g, a, rising) or a minor pentatonic (e.g. c, a, g, f, d, falling).

## 9 Conclusions

The first conclusion to make from the field work done in 2013 is that there are many churches in central Warsaw that either lack bells completely (such as the *Kościół św. Jacka*, or the *Kościół św. Marcina*) or contain bells that are broken or cannot be operated (such as the *Katedra św. Jana*, or the *Kościół Parafialny N.M.P.*). These are problems of considerable cultural significance and need to be addressed in a concerted way with action from both the government and church authorities.

The second conclusion is that these cultural problems cannot be solved quickly. They will require a major, long-running project that will proceed in several stages, over several years. The cultural significance of such a project will be great, and will need to be viewed from the European perspective. The desire to reconstruct the city sounds destroyed between 1939 and 1945, and especially in 1944, will have a strong resonance at the European level.

Financial support for the project will need to be sought from within Poland and from outside the country. Potential partners will include the European Commission and the Vatican. It is also possible that contributions may come from the governments of certain countries (such as the United Kingdom and the Federal Republic of Germany), just as they were with the renovation of the Cathedral in Dresden after 1989.

Finally, in order to make this an active rather than a passive report it seems appropriate to end with a collection of specific recommendations that may help to guide the progress of a future reconstruction project. One hopes that this will not be too far into the future and that the residents of Warsaw - and Polish and overseas visitors to Warsaw - will not have to wait much longer to hear the spiritual sound of the city come back to life.

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## 10 Recommendations

It is recommended that:

10.1 A major cultural reconstruction project for the Bells of Warsaw should be established under the joint patronage of the Polish Government (through the Ministerstwo Kultury i Dziedzictwa Narodowego) and the Catholic Church (through the Polish Episcopate).

10.2 Specific positions and individual people should be identified within the MKiDN and the Episcopate in order to serve as ongoing points of contact, information, and expertise, for all matters in relation to the Bells of Warsaw.

10.3 The reconstruction project should focus on the bells of Central Warsaw, west of the river, covering areas that were destroyed in 1944, from the top of the Nowe Miasto in the north to the southern end of Krakowskie Przedmieście.

10.4 The highest priority should be given to renovation and reconstruction of the bells of the Cathedral in the Stare Miasto, and the Kościół św. Jacka in the Nowe Miasto.

10.5 The second level of priority should be given to renovation and reconstruction of the bells of the Kościół Parafialny N.M.P., the Kościół św. Franciszka, and the Kościół św. Ducha, all in the Nowe Miasto, plus the Kościół św. Marcina in the Stare Miasto, and the Kościół św. Krzyża in Krakowskie Przedmieście.

10.6 The overarching musical principle governing the reconstruction of all the bell collections should be the Central European, Catholic bell tradition of anhemitonic pentatonicism (do, re, mi, sol, la or do, la, sol, fa, re).

10.7 The individual collections of three, four, or five bells should be designed to produce sonic sub-sets of pentatonic harmony (such as the Te Deum and Gloria motifs), so that neighbouring churches will complement and harmonise with each other.

10.8 The joint committee of people from MKiDN and the Episcopate should make representations to the highest levels of the Urząd Miasta of Warsaw to seek improvements in the local city laws that are currently used by only a handful of residents to inhibit or even prevent the ringing of bells.

10.9 Certain days and important religious festivals should be officially designated (by church and civic authorities) for the ringing of all the bells of Warsaw at the same time, and this schedule should be published.



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**Charles Bodman Rae** is a composer, pianist, conductor and author. He is currently the seventh Elder Professor of Music at the Elder Conservatorium of Music, University of Adelaide, where he has also served as Director and Dean. This appointment to Australia's senior professorship in music (est.1884) was made in 2001.

He was born in England in 1955 to a family of Scottish and German origins. After private piano studies with Dame Fanny Waterman, founder of the Leeds International Pianoforte Competition, he read Music at Cambridge (Sidney Sussex College). Concurrent with his undergraduate studies at Cambridge he studied composition in Oxford with the composer, pianist and Messiaen scholar, Dr. Robert Sherlaw Johnson, with whom he also studied piano works of Messiaen. After conducting studies with Sir Edward Downes at Hilversum in Holland, and after completing postgraduate composition studies at Cambridge, with Professor Robin Holloway, he was appointed in 1979 to a permanent lectureship in Academic Studies at the then City of Leeds College of Music.

After two years he resigned his Leeds appointment in order to accept a postgraduate composition scholarship from the Polish Government, enabling him to live and work in Warsaw from 1981 to 1983 attached, as a visiting composer, to the Chopin Academy of Music. During this time he developed a close professional association - and personal friendship - with one of the great composers of the twentieth century, Witold Lutoslawski, which lasted until the composer's death in 1994. This association led to his doctoral thesis on Lutoslawski's compositional technique (University of Leeds, 1992) and his monograph *The Music of Lutoslawski* (London: Faber and Faber, 1994) currently in its third edition (London: Omnibus Press, 1999).

Returning to Leeds in 1983 he was appointed to a permanent lectureship in Composition and Analysis, and then in 1992 to the senior management position of Head of School of Composition and Creative Studies. In 1997 he moved from Leeds to Manchester to join the senior management of the Royal Northern College of Music as Director of Studies (ie Dean) with a subsidiary role as Head of School of Academic Studies. In his four years at the RNCM he was responsible for restructuring both the undergraduate and postgraduate curricula and awards, putting in place the innovative feature of 'Supporting Professional Studies' that later secured for the RNCM a coveted HEFCE-funded Centre of Excellence in Teaching and Learning. Whilst at the RNCM he contributed to the Sutherland and Tooley reports on the funding of UK music conservatoires, and was an elected member of the national executive committee of the National Association for Music in Higher Education. He also played an active role in the affairs of the then Federation of British Conservatoires (now ConservatoiresUK).

In parallel with his work for leading UK music academies he was for much of the 1990s a regular broadcaster (writer and presenter) for BBC Radio 3. He made several radio documentaries on Lutoslawski and Penderecki, but his biggest project for the BBC was a ground-breaking 9-hour series of programmes (first broadcast in January/February 1990) on connections between Music and Bells. This project represented a long-standing interest that had already been explored in several compositions beginning with *Jede Irdische Venus*, which had been premiered in Warsaw at the Chopin Academy of Music.

In 2001 he was recruited from the RNCM to direct and merge two music schools in Adelaide, the Elder Conservatorium of Music and the School of Music of the Adelaide Institute of TAFE. The merger was effected in 2001 and 2002 was the first year of the new dual-sector music academy (initially known as the Elder School of Music). From 2002 to 2005 he led a major multi-million dollar capital development of the school, jointly funded by the Federal and State Governments. The new facilities were formally opened by the Premier of South Australia in May 2005.

In 2004, concurrent with his leadership of the Elder Conservatorium of Music, he was elected to a three-year term as Chair of the Academic Board (Academic Senate) of the University of Adelaide. In this capacity he also served, *ex officio*, as a Member of the University Council, a member of the Vice-Chancellor's Committee (the senior executive group of the university), and many other university committees.

In Australia he has served as a non-executive Director on the Boards of the following organisations: the Helpmann Academy for the Visual and Performing Arts; the Australian Music Examinations Board; and the Adelaide Symphony Orchestra. In 2000 he had joined the Quality Assurance Agency (QAA) in the UK as an Institutional Auditor, and in 2006 he was also invited to join the Australian Universities Quality Agency (AUQA) as an Institutional Auditor.

His professional debut took place in 1974, with the premiere of his first orchestral work, *Primum Mobile*. The piece was selected for the finals of the UK Composers' Competition held in Aberdeen as part of the International Festival of Youth Orchestras. There it was played by the Young Musicians' Symphony Orchestra of London, conducted by James Blair. The performance received a Radio 3 network radio broadcast by BBC Scotland.

His Australian debut, as both pianist and composer, was given during the 2002 Adelaide Festival of Arts.