

Concertgebouw Amsterdam: History of the main hall and its acoustics

PART 1: The early years: acoustic design and resolution of acoustic difficulties

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ABSTRACT

The Concertgebouw, Amsterdam, is regarded as one of the great concert halls of the world. But at the time it opened, in 1888, the hall experienced many difficulties, mainly due to its large volume and small audience. The site was undeveloped watery peat land beyond the city limits and there was no connection to public transportation, which posed great access challenges for the audience in the early days. It is hardly surprising, therefore that the room was experienced as “excessively resonant”; however, there was also the comment that the brass overpowered the strings. In 1899 the first (and only major) modification to the hall took place: the stage was enlarged and the built-in risers were rebuilt to a much lower height. The balance between strings and brass improved significantly. The city of Amsterdam grew rapidly, public transportation was improved and the new conductor and more skilled orchestra attracted large audiences. Thus, in the first eleven years of its existence, the Concertgebouw went from near failure to outstanding musical success. Due to improvements in the building, the logistics and the musical performance practice, both the hall and Concertgebouw orchestra became immensely famous. But even today, conductors and musicians need to adjust their performance techniques to the room’s overwhelming acoustics.

Keywords: room acoustics, Concertgebouw

1. INTRODUCTION

In 1888, now one hundred and thirty years ago, the Concertgebouw Amsterdam was opened and the Concertgebouw orchestra was created. The start was difficult, but after the difficulties were overcome, the hall and its orchestra became well known, the hall for its acoustics, the orchestra for its very high quality and sound character, that sort of exported the sound of the hall. The hall can be considered as an acoustical monument.

This first part on the history of the concertgebouw describes the early years. The later changes and the renovation of the hall are discussed in the second part. Elements of this first part have been published before (1). Much of the information in this paper was obtained from the excellent documentation in (6) and (7).

2. BUILDING A NEW CONCERT HALL

2.1 What happened before

Musical life in Amsterdam around 1880 happened within societies. Felix Meritus was a small hall with the shape of an oval cylinder and nevertheless good acoustics, but not many people were able to hear it because of the balotting and the high subscription fee. The biggest society was the Parkzaal with its own orchestra and with 2000 members. The Parkzaal was very popular for its summer matinee concerts. It had reasonably good acoustics, though there were also complaints, mainly about the audibility of the toilets during concerts and the lack of space around the hall. The reputation of

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the kitchen was much better; people sat at tables, smoked and were served during the concerts.



Figure 1 Left: Parkzaal (Pierre Tetar van Elven, 1860) and right: Felix Meritis (Pieter Barbiers II, 1791)

The role of the music in this society context was as an additional element, entertaining and animating (2). The musical quality was not really high but the ambition was certainly growing, also evoked by Johannes Brahms who wrote in 1879: “Ihr seit Liebe Leute aber schlechte Musikanten”. Rather suddenly it was announced in 1881 that the Parkzaal was going to be closed. The hall would be replaced by a theatre for the “World” exhibition in 1883. There were no real alternatives, the oval shaped concert hall of Felix Meritis had good acoustics but was far too small. The only option was the Paleis voor Volksvlijt (built in 1864 and burned down in 1929), but this hall is said to have had bad acoustics. In 1883 a weekly newspaper for the building industry included this interesting quotation: “The Paleis voor Volksvlijt, which was never built as a concert hall, resonates in a way that disturbs the senses and neither with cotton wire, nor with cardboard and linen, could it be improved”.

After an impressive call in the local newspaper by Mr. Hayward, initiative was taken to build a new hall, which they simply called the “Concertgebouw” (concert building). This initiative fit the economic rise and the international recognition of Dutch painting. It was a private initiative; art was not considered as government business. (The first municipal contribution was received in 1911.) A committee with six founders was formed, business people with an interest in music, four of them also board members of the “Maatschappij tot Bevordering der Toonkunst” (Society for the promotion of music, especially choral music), which was an organisation for (amateur) choirs. Four hundred shares of 1000 guilders were put on the market, but only a part of these were sold.

The committee was supported by P. Cuypers, architect of Amsterdam’s central station and the Rijksmuseum which was constructed at that time (finished in 1885). Cuypers made some first sketches, also to see what building plot was needed. The city was growing fast, within the limited city borders a sufficiently large plot was not available. However, a building site that was sufficiently large and affordable was found just outside the city border, on the territory of the city Nieuwer Amstel. So now it was time to design a concert hall!

2.2 Designing a concert hall

In March 1882, the ideas for the new concert hall were presented at a public meeting. The requirement was that it would be for 2000 audience members (equal to the number of subscriptions in the Parkzaal) and the stage should accommodate 120 musicians and 500 choir members. The latter is interesting and probably influenced by the close relations of the founders to the Toonkunst choirs. The building should also have a small hall for chamber music (this would be a copy of Felix Meritis; we will not further discuss the small hall in this paper) and a garden for summer concerts, an important source of income. A closed and anonymous architectural competition was organised among five invited Amsterdam architects. The jury consisted of three persons and architect Cuypers was one of them. Nobody had experience in building concert halls of course. Acoustics was considered very important, but the only way to approach this issue was to look at other good examples. As early as 1881 the Tonhalle and its Kaisersaal in Düsseldorf built in 1866 was mentioned in the newspaper article by Mr. Hayward, calling upon an initiative to realise a real concert hall in Amsterdam. This was considered a good example, not only because of its acoustics but also because of the organisation of ancillary areas. Moreover, the Tonhalle had a large stage for an orchestra and choir. The plans of the Tonhalle circulated among the contestants.

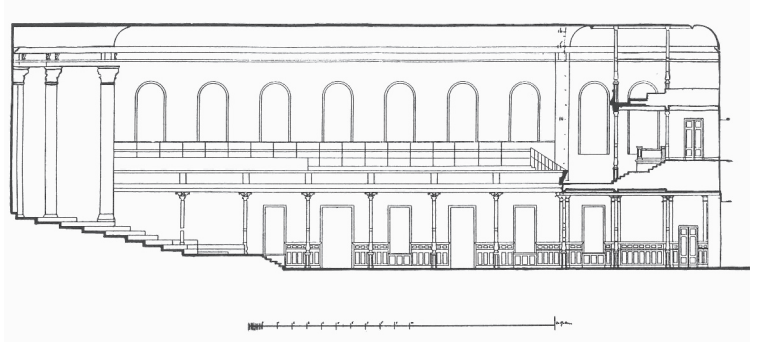
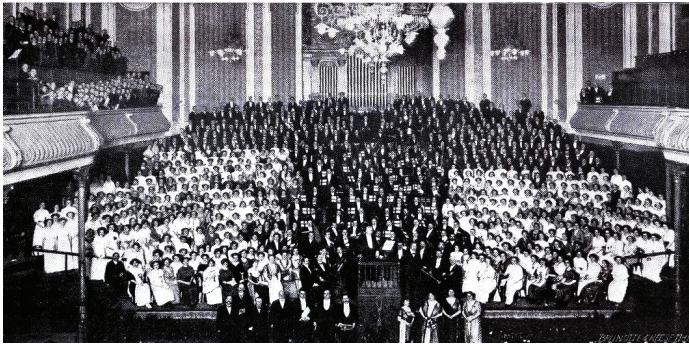


Figure 2. Tonhalle Düsseldorf: Kaisersaal. Left: Photo Mahler 8th Symphony, 1912, Right: section

However, in a later article in the *Algemeen Handelsblad* (March 1882) a well-known Rotterdam musician Mr. Thooft, who lived in Düsseldorf for five years, mentioned that there was a rather negative opinion of the acoustics of the Kaisersaal (3). According to Thooft, the acoustics was related to the shape of the plan; for a large hall the rectangle shape was considered dangerous because of the large distances between stage and audience. Especially for a large hall, the oval or circular shape should be preferred! Therefore, the board was confused. In the first presentation of the programme (June 1882) it stated the shape should be “rectangular, oval or circular”(!). In the second programme (July 1882), this was skipped and the shape was completely left to the architect. Also interesting in this period (June 1882) is the discussion on the slope of the audience area. The jury preferred a sloped floor to improve lines of sight but the board preferred a flat floor (to be able to accommodate diners, dancing etc). On this point as well a requirement was omitted and the decision was left to the architects (1).

When the five contest designs were evaluated by the jury, it certainly had an opinion on the acoustics. The length and width of the plans were compared to three other shoebox type of halls: Düsseldorf (24x39m), Vienna (19x40m)(note: actually the length at the top is ca. 54 m) and the design of the Gewandhaus in Leipzig (21x42.5m). The main hall in the first design of Dolf van Gendt had dimensions (w_xl_xh) 35x42x15,5 m and the jury considered it too wide compared to its length. Another comment was about the flat ceiling, which was considered unfavourable for the acoustics.

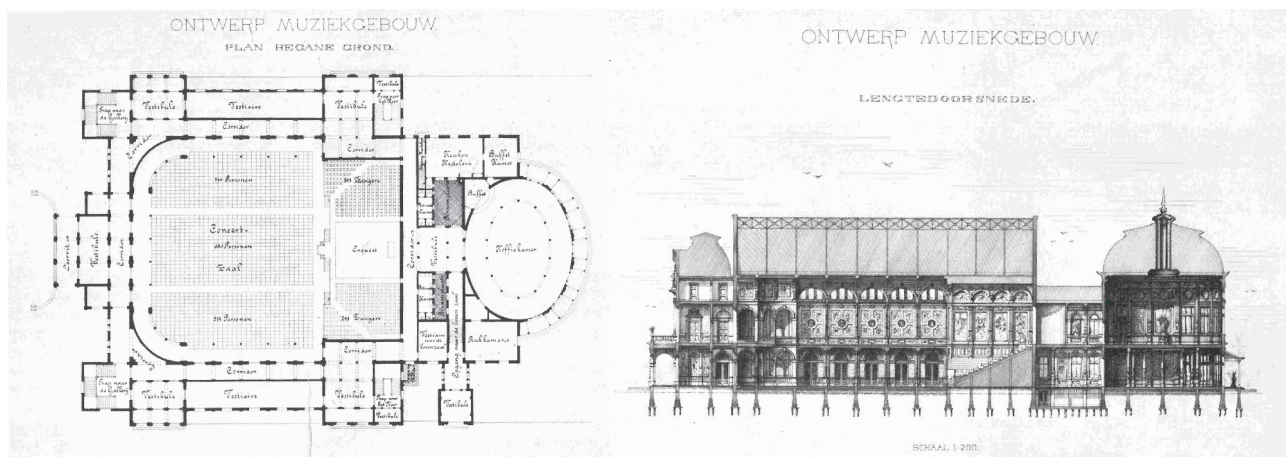


Figure 3. First contest design by Dolf van Gendt, October 1882. Left: plan, Right: longitudinal section

The other contest designs also received comments regarding the acoustics. A glass ceiling for the small hall was considered adverse for the acoustics, and wall rails and sharp edges were judged to be negative. Two architects were requested to improve their design, one of them Van Gendt.

The adapted contest design was delivered in March 1883. Van Gendt had listened to the jury and made the hall smaller (27.8 m wide, 44 m long). In the first design the hall was wider than the stage, in the second design it was continuous. The stage setting was curved now and all four corners were rounded, following the general opinion that rounded corners prevent sound from getting stuck in the corners. The ceiling was raised to 17.5 m (according to the architect: “because this seemed necessary”, in the first design it was limited to control costs) and provided with almost square

cassettes. There were no comments on the acoustics of the hall by the jury, even though Van Gendt's adapted contest design was still wider than all three examples they had. Although the jury could not decide between the two architects, the board awarded the assignment to Van Gendt.

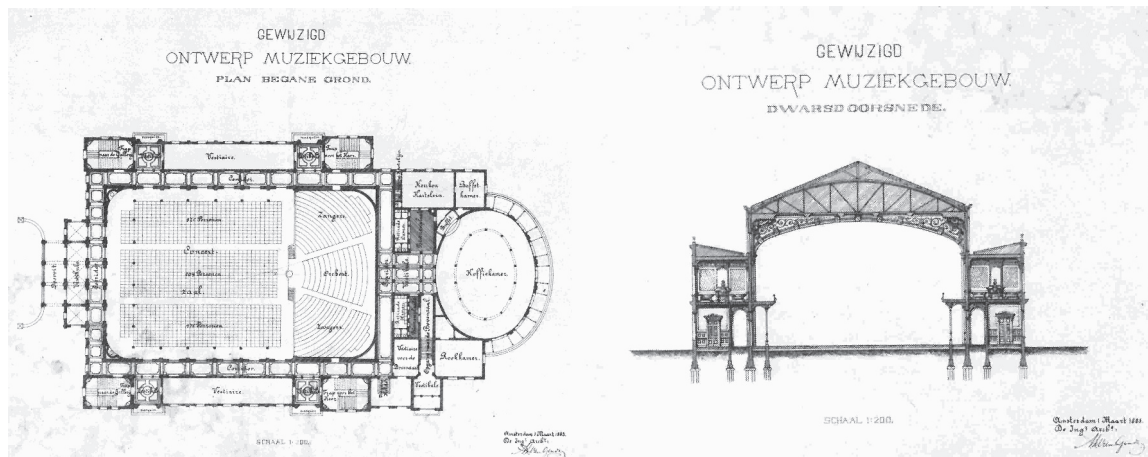


Figure 4. Modified contest design by Van Gendt, March 1883. Left: plan, Right: cross section

The Neues Gewandhaus in Leipzig was finished in 1884, so during the competition in Amsterdam in 1882, it was not completed yet. Nevertheless, the plan of Van Gendt has many similarities with Leipzig, which raises the question of whether the plans were known to Van Gendt. The small hall is rotated and positioned at the short end of the main hall. The ceiling is supported by a vault with roof dormers. It was considered beneficial for the acoustics to have other spaces surrounding the hall, so there were no outer walls (mentioned in the article by Thooft), which is the case for both halls.

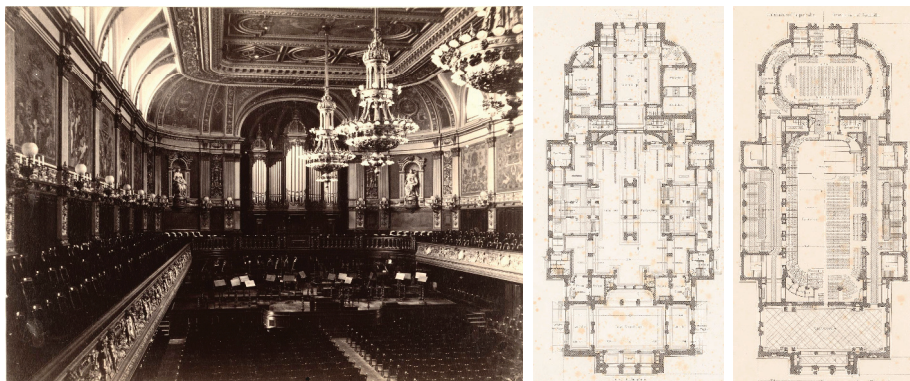


Figure 5. Neues Gewandhaus Leipzig (finished in 1884, Photo undated, plans published in 1886).

There are other similarities as well: it was a private initiative and a combination of hall and orchestra. However, there is also an important difference: the hall in Leipzig is on the first floor. Shortly after the appointment of Van Gendt in April 1883, he was asked to consider lifting the hall to the first floor to be able to make foyer space and vestiaires on the ground floor. The foundation was considered too heavy for this and it did not fit the budget, so this idea was abandoned. In November 1883 a simplified final design was ready. The two rounded corners behind the stage remained.

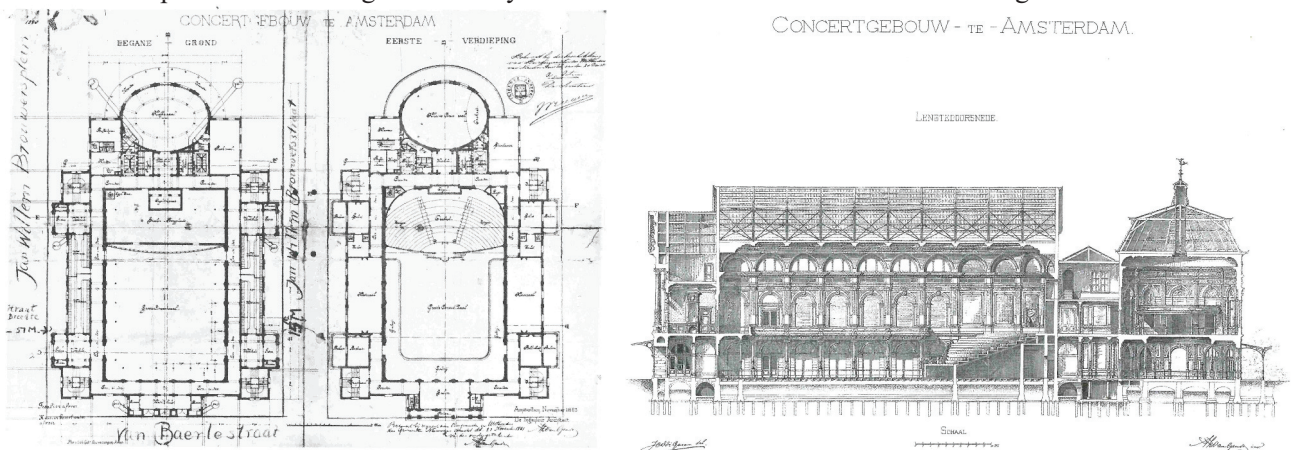


Figure 6. Final design, November 1883

Even though there was hardly any scientific knowledge on room acoustics at that time (the first paper by W. Sabine was published in 1900 in the US), it is clear that the need to obtain good acoustics played an important part in the design process. Comparison with or imitation of (elements from) other halls was the only option. However the number of references they used was very limited. Apart from the Tonhalle, on which opinions were divided, there were no usable examples. People of the office of Van Gendt visited Salle Pleyel in Paris, but this turned out not be a good example, and the intention of this visit was not to evaluate the acoustics. The Gewandhaus was an example for many practical and perhaps also architectural issues, but not for acoustics, since it opened after the design of the Concertgebouw was ready. The Vienna hall only pops up regarding dimensions in the first jury report. However, despite the lack of knowledge and lack of reference halls, they made the right decisions regarding room proportions (reducing the width, sufficiently high ceiling) and irregular ceiling that scatters the sound. Thooft's recommendations to make an oval or circular hall were (luckily) ignored and 2 corners were made rectangular in stead of rounded.

A remarkable aspect of the design of the Concertgebouw is the large stage for orchestra and choir (see above) and its steep slope. The large size of the stage relates to the programme with 500 choir members, but is probably also a reaction to the situation in the Parkzaal, where the niche for the performers was far too small to accommodate a large orchestra and singers. As can be seen from Figure 1 the Parkzaal must have had a relatively high stage and the Kaisersaal in the Tonhalle had a significant slope (Fig 2). However the slope of the stage in the Concertgebouw is more than the Tonhalle and might just have been a practical solution to obtain a connection with the corridor at balcony level.

2.3 Building Phase

During the finishing of the final design, from July 1883 to November 1883, 2186 wooden piles for the foundations, 12 to 13 m in length, were driven into the weak soil of the Amsterdam peat land.

Financial problems delayed the tendering for the building. The problems were, at least temporarily, solved with a mortgage and the construction commenced in February 1885. Meanwhile visits were made, also to the building site of the Gewandhaus in Leipzig. This led to a few changes in the design. Leipzig had a heating system with hot air blown through double walls. It was decided to copy this system and the walls of the hall were doubled. The system was purchased in Germany (Kaiserslautern). This decision was made during the first months of the construction, long after the piles were driven into the weak soil.

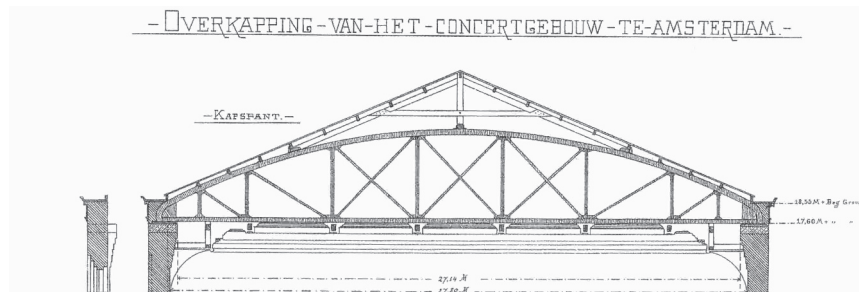


Figure 7, Steel construction for the roof and the ceiling. (published in October 1887)

The roof construction was made with steel trusses. The large span of 28 m was special and the drawings were published in a building magazine. The deflection was tested (5.5 mm with a load of 24 tons). The steel construction was made in Leuven, Belgium.

In December 1885 the board decided to change the stage to accommodate more musicians. Comparing the final design with the photos after opening leads to the conclusion that the orchestra area was enlarged to the expense of the choir rows (nowadays: “side stages” with audience).

The outer building was finished in march 1887, the works on the interior continued and the site was still in bad condition, with a ditch between the building and the road, that was not paved yet and missing street lights.

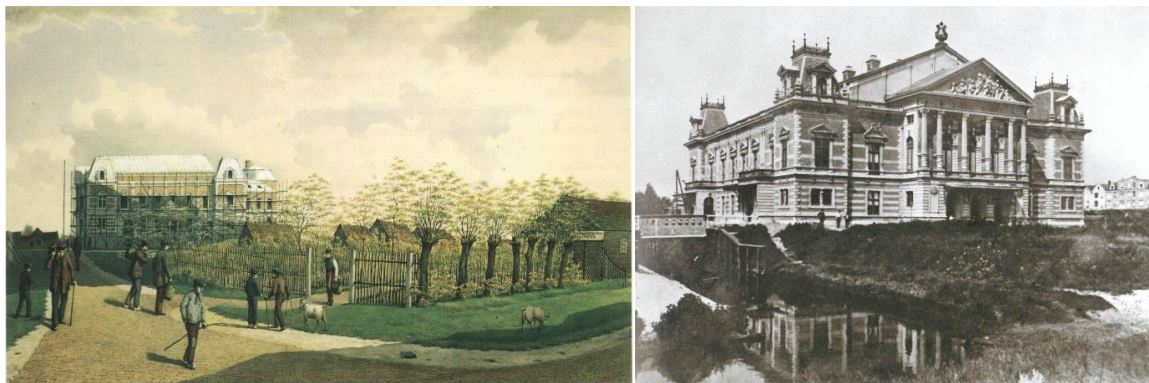


Figure 8. Concertgebouw, left: in 1886 (painting by J.M.A. Rieke) and right: 1887 (photo finished exterior)

3. THE EARLY YEARS: FROM ACOUSTIC FAILURE TO SUCCESS

3.1 The grand opening

As the building neared completion, a question arose as to whether the acoustics should be tested. They decided not to do that, as it was considered too risky.

Then finally, on the 11th of April 1888, the hall opened with a large orchestra and choir. It opened with Beethoven's 9th and other works and the hall was completely filled. The conductor is Henri Viotta. The *Algemeen Handelsblad* reported on the 12th of April that people in different parts of the hall had praised the acoustics. (7). On the 13th the *Nieuws van de Dag* reported divided opinions on the acoustics depending upon where one was sitting, but nowhere was "without resonance". (7). The magazine *Caecilia* wrote that it didn't matter that much who performed and what was performed, what mattered was how it sounded ("*scientists are still searching and a solid theory has not been found yet.*") and they praised the acoustics.(3). Despite the resonance, the hall was well suited to follow the little textures in the accompaniment (*Nieuws van de Dag* on the 16th).

In the summer of 1888 a new orchestra was formed: the Concertgebouworkest. The conductor is Willem Kes. The first concert was in November 1888. There were only a few hundred people in the audience, and only 66 musicians in the orchestra, surrounded by a big empty stage. This was the first acoustic test of the room for symphony concerts, and it confirmed that the hall "resonated" too strongly and that the brass overpowered the strings. As described later: There was too much echo and the brass sound, that should "be caught behind the ears of the stringplayers" sounded much louder than the stings, even when not intended. Also in the press there was an increase in negative criticism of the acoustics (among other by Henri Viotta).



Figure 9. Left: Opening 11th of april 1888 (Aquarel N.van der Waay), Right: Photo of the interior in 1891 (with new organ), with screens, drapes and plants to help to control the acoustics.

3.2 Early remedies

It was not clear what was causing the acoustical problems. Some felt that the missing organ was the culprit – the space for the future organ was covered by a heavy curtain. But when the organ was installed in 1891 the acoustic problems were not resolved, and some considered the sound to have become harsh and the balance problems even worse.

Other early remedies included adding drapes (“portières”) at the entrance doors, building a low screen at the back of the orchestra, covered with thick drapes, and filling empty areas of the stage with potted plants, which it was hoped would “soak up the sound” (fig 9, right). Carpet was placed under the brass and percussion instruments. There was no sufficient budget for carpet along the corridors in the hall. Attendance at Concertgebouw Orchestra concerts continued to be poor, for a large part because of poor access roads. Only a few special performances drew a full audience. Financial difficulties were so severe at this time that the institution barely survived, and indeed in 1891 the orchestra’s contract was for a time dissolved.

3.3 Solutions

3.3.1 Musical

Willem Kes had to deal with the common society culture which regarded the music as an additional element. He abandoned the tables and waiters, and he required that everybody be quiet before starting and he did not allow audience members to come in after the performance had started. He also trained the musicians, required auditions before hiring them and organised extensive rehearsals. He professionalised the orchestra and educated the audience.

But the real turning point for acoustical success came in 1895 with the appointment of the 24 year old Willem Mengelberg as conductor of the Concertgebouw Orchestra, and the first concert of the 1896 season, a performance of Tchaikovsky’s 6th Symphony, the *Pathétique*.

Mengelberg opened his second season on the 24th of September 1896 with this symphony, and suddenly everything changed – musically and acoustically. The performance was described in the *Algemeen Handelsblad* (30 October 1896) as truly inspirational, a “wonder” of the concert room, an amazing psychological phenomenon (3). Mengelberg and the *Pathétique* had established the orchestra’s greatness, it was said, and demonstrated that the orchestra could meet the demands of modern composition. Most of all (from the point of view of acoustics) the brass did not overpower the strings, which was partly attributed to the purchase of two French trumpets, but it also suggested that the balance problems had been solved (3). At subsequent concerts in this season the *Pathétique* was repeated thirteen times, drawing tremendous crowds (3).

Mengelberg was a very different conductor from his predecessor Willem Kes. Kes was a conductor in the classic style, maintaining steady tempos and leading the music in a straightforward, non-interpretational way. Mengelberg, on the other hand, became one of the great international star conductors of the late Romantic/early twentieth century era.

His approach to conducting was strongly personal and interpretational. His focus was on giving expression to the phrasing, the broad sweep of beautiful melodies and the emotional effect of the music. His interpretations were known for wide fluctuations in tempo, grand dynamic range and sweep, a “lavish” gliding from one tone to the next in the strings (*portamento*), and an emphasis on instrumental timbre and colour. Later recordings (1937 and 1941) of Tchaikovsky’s 6th Symphony, conducted by Mengelberg, are still available.

Mengelberg’s score of Tchaikovsky’s 6th Symphony is now held in the Haags Gemeentemuseum. It is full of numerous annotations made by Mengelberg over the years, including widespread changes in tempo, dynamics and orchestration. These changes show a process of responding not only to the score and to his own idea of the composer’s intentions, but also to the conditions of the performance – the capabilities of the musicians (now much improved from the early years) and the acoustics of the room.

Tchaikovsky’s *Pathétique*, with its broad lyrical melodies and rhythmic and chromatic intensity, was perfectly suited to Mengelberg’s conducting approach. It contains remarkable homophonic writing for “choirs” of instruments, blending timbres of small groups of instruments across different sections of the orchestra to achieve specifically nuanced sound colours. This blended sound across instrumental groups very likely gave the impression that the balance problem had been solved. The result was a passionate intensity that was enhanced in the reverberant Concertgebouw.

The orchestra by this time was also much improved and better able to play into the acoustics of the hall. Under Mengelberg it grew from 66 permanent members in 1895 to 86 in 1907; new modern instruments were acquired and professional conditions were improved. More highly skilled

musicians, of course, are much more able to shape their sound to the requirements of score and acoustics.

3.3.2 Logistics

In 1893 the horse tram was extended closer to the Concertgebouw, and in 1895 the city Nieuwer Amstel merged with Amsterdam, so the municipal boundaries disappeared. Roads began to be built, and neighbourhoods rapidly grew up adjacent to the Concertgebouw. At last it was becoming easy for audiences to attend Concertgebouw concerts, and after the arrival of Mengelberg and his performance of Tchaikovsky's 6th, the audience came in droves.

3.3.3 Architectural

It was soon discovered that the hall's balance problems had not been solved by Mengelberg and the Pathétique. In 1899 Mengelberg took the initiative to rebuild the stage. The board was not enthusiastic from the start, not only because of the costs but also because it could turn out to be counterproductive. Together with Van Gendt the stage was redesigned. It was reduced in height 20 cm at the front, 1.2 m at the sides, and 2.3 m at the rear and stairs were introduced next to the organ. The works were done in the summer, while concerts were given in the garden. The new stage not only reduced the excessive vertical spacing between the orchestra sections, but also provided a wider area for musicians at the front of the platform and exposed reflective surfaces at the rear. When the hall reopened on 11 September 1899, the balance between the sections was vastly improved. It was declared in the *Nieuws van den Dag* (12 September 1899) that the impression was very good and "all the necessities for world renown were now present".

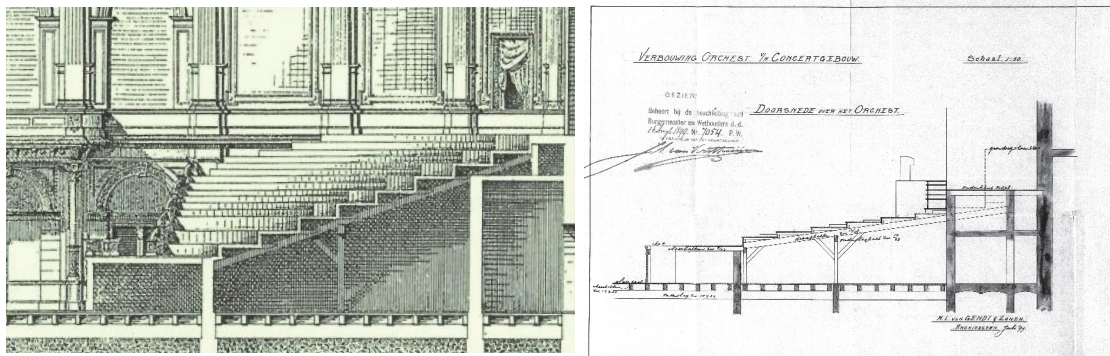


Figure 10. Section of the stage before (left) and after the renovation in 1899 (right).

Nevertheless, the reverberation time of the Concertgebouw remained a challenge, in rehearsal and for performances of more classical works with small ensembles, especially for small audiences. Mengelberg experimented with screens to help him hear the orchestra during rehearsal, and many conductors since have used curtains extending from ceiling to floor at the middle of the audience area to help control excessive reverberation during rehearsals.

4. CONCLUSIONS

The Concertgebouw's early acoustical difficulties involved an interrelationship of musical, architectural, and social factors. The problem with the orchestral balance was solved by changing the stage. The excessive resonance was reduced by the increasing number of audience.

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