

CHAPTER 6

Sound and Space: Meanings and Intentions in Designs

As the major part of this thesis deals with the sensorial relationship between sound and space, this chapter briefly discusses current research on the relationship between architecture and music¹, particularly the research of architects and composers on several spaces intended for music performance. All of the above, in some way or other, account for aspects directly or indirectly related, but important, to the experience of music and architecture in concert auditoria that this thesis has not taken into account.

The relationship between music and architecture exists on many levels, and what this thesis has found, in relation to the sensorial relationship between sound and space in concert auditoria, is only a small aspect of the understanding of how it could be usefully applied in designs. As the relationship between audio and visual spatial impression is found to be both necessary and arbitrary, and as audiovisual interaction is strong in some cases and weak in others, the results seemed to suggest that a more detailed examination of the structure of audiovisual spatial impression is needed.

Perhaps, on the other hand, it is possible that symphonic music (of the Classical era) along with rooms built for the performances of such music have already reached their peak of artistic and technical achievement. Thus, more “event-specific” spaces are needed to engender a more coherent relationships between sound and space, music and architecture that would be more musically and architecturally expressive and meaningful. Since this type of performance space already exists, the ideas may have already surfaced long before this thesis was conceived.

¹ Refer to Appendix 7

6.1. MEANINGS AND INTENTIONS IN DESIGNS

Marshall (2004) understands “meaning” in architecture refers to “architectural intention”. He suggests that “It may be literal meaning or figurative, particularly metaphorical, and in memorable buildings this meaning transcends the function for which the building is built.” He goes on to say, “meaning in architecture is in fact analogous to meaning in music – multilayered, literal or figurative and not fully accessible to the abstraction of words.” Perhaps, expressing “meaning” in architecture or music in the context of auditorium design should be grounded to a more human level. Thus, the intention in music and architecture would become more accessible, thus contributing to the more holistic experience of the music and architecture event. In his paper (2004), Marshall suggests that the designers [architects and acousticians] of concert auditoria must recognize that “the dimension of meaning in both architecture and music has to be the starting point for multi-modal perception in concert halls.”

What is meaning in music or architecture? Meaning could be something intentionally attached to a musical composition or a driving concept that generates an architectural design. Meanings, intentions, and concepts should be some of major ingredients in the creative process of composing music or designing architecture. Although these ideas are always subject to debate, without them there would be only elevator music and car garages.

Perhaps the closest that music and architecture intentions have come to each other are instances where music and architecture were composed and designed for each other; for example, the Festival Theatre in Bayreuth for the premier of Richard Wagner’s *Farsifal* (Beranek, 1996, p231 & Isozaki, 1999); Le Courbusier’s & Iannis Xenakis’s *Philips Pavilion* at the 1958 World Exposition in Brussels for the performance of the *Poeme Electronique* by Edgard Varese (Cabrera, 1994); Renzo Piano’s *Prometeo* 1983 – 1984 in Venice and Milan for the Italian premier of Luigi Nono’s opera *Prometeo* (Spangemacher, 1984, Pasini, 1985, Piano, 1985, 1987, Buchanan, 1993, and Nono, 1995); Arata Isozaki’s Akiyoshidai International Art Hall for the 1998 Japanese premier of Nono’s *Prometeo* (Isozaki, 1999 & 2000); and perhaps Claudio Monteverdi (among other purposes) may have composed his 1610 *Vespro della Beata Vergine* (Vesper of the Blessed Virgin) specifically for Basilica di San Marco in Venice (Gardiner 1989, Wenham, 1997, Kurtzman, 1999). However, it is still a matter of debate whether it was first performed there in 1613 or in Mantual where Monteverdi

was employed as a court musician for the Gonzagas family (Kurtzman, 1999, pp.6, 14, 38). With the exception of San Marco and Monteverdi's Vesper, all of these architectural spaces and musical compositions were intended for each other, and the musical and architectural meaning is apparent, whether explicit or implicit.

Without intentions, music and architecture would not be created. Perhaps that is stating the obvious. Nevertheless, music and architecture created with the shared intention of providing a shared experience seem more meaningful than when there are no specific shared intentions. There is no doubt the numerous concert halls created with the general purpose of housing symphonic concert performances, many of which are cultural icons, are important technical and aesthetic achievements. However, most of them lack the deep connection between the two intentions that are characteristic of the few spaces and musical compositions, mentioned above.

The relationship between the sensorial experience of sound and space is only a small aspect contributing to the holistic experience of music in a concert hall. However, as it is becoming more apparent, the structural context of spatial impression is more complex than visual or aural perception alone. A meaningful experience of music and architecture, the cultural and aesthetic expression of the event should also be considered as contextual background in research or design related to music performance spaces.

6.2. CONCLUDING REMARKS

An experience of music in a concert hall is not a normal everyday experience for most people. Not until the later 20th century could those other than the wealthy or privileged afford to enjoy it. The buildings designed for such music have some of the most lavish architectural designs in history. Today, these performances are far more accessible to the general public. Even so, because of social norms and the significance of historical links to classical music, a symphonic music experience in a concert hall is still special.

This thesis is a small attempt to unravel the complexity of the experiential aspect of music listening. Not only that, it also proposes that the experience of music in a concert performance not only involves the auditory, but the visual as well. Facing the huge complexity of the relationship between music and architecture, sound and space, this thesis

begins with the basic sensorial relationship between sound and space. In this case, it considers the relationship between auditory and visual spatial impression.

Chapter 2 explores the current understanding of the terms used in describing auditory and spatial impression. Unlike auditorium acoustics, visual spatial impression is quite an under-researched subject in architectural design, specifically related to auditorium architecture. To remedy the problem, much investigation went into literature concerning spatial perception and relates to architectural spaces.

Although the terms ‘spaciousness,’ ‘envelopment,’ and ‘intimacy’ are being discussed as acoustic subjective impressions and spatial phenomena, they do not always relate to the same physical characteristics of auditoria. Furthermore, it seems that the acoustical and spatial desirability is not always the same when an acoustical aspect contradicts a spatial one. The findings seemed to suggest that when focussing on one specific design of an auditorium, it is possible to predict, optimise or improve upon the physical aspect to render greater spatial impression.

As one study is designed to build on the previous, Chapter 3 begins to examine the relationship between auditory and spatial impression in a more specific context by subjectively applying the visual spatial impression terms defined in Chapter 2. The results find visual spatial impressions do vary between different auditoria. Envelopment varies between auditoria while spaciousness and intimacy appear to vary between distances within an auditorium rather than between auditoria. Thus, it appears that the terms used in auditory spatial impression may be subjectively applied to spatial impression, which provides a basis for comparison between impressions. The result shows, at equivalent distances, subjective ratings of intimacy for the smallest auditorium are quite closely matched with those of the largest auditorium. Distance appears to be a better predictor of visual spatial impression (Envelopment is an exception) as compared to size of auditoria, which could appropriately be applied in design of auditoria, especially where visual intimacy may still be achieved in a large concert hall.

Chapter 4 goes a step beyond and explores the degree of correspondence between auditory and visual spatial impression. The results from separate auditory and visual experiments show distance is a likely reliable predictor for both auditory and visual spatial impression. This provides a basis for covariance between some attributes of auditory and visual spatial impression. However, the correspondence between the impressions could be

necessary (i.e. due to common determinants) or arbitrary, and it could pertain to the structure or the content of spatial impression. Although the concept of a ‘necessary’ relationship between corresponding attributes of auditory and visual spatial impression may overstate any relationship’s basis, some attributes are likely to co-vary in typical real-world contexts. Control of the degree of correspondence and contrast between visual and auditory spatial impression should allow the design of a rich diversity of spatial experience.

The findings in Chapter 5 relating to subjective responses to audiovisual stimuli suggest not only further investigation into the method of audiovisual subjective testing, but a critical account of the nature of music-listening in concert halls when such testing is used. Nevertheless, the results suggest audiovisual interaction exists in a concert experience, at least in a simulated concert hall. However, the interaction was strong in some impressions and weak in other. It also varied between seats (in relation to distance) in that concert hall. As the results showed, the subject perceived auditory to be dominant in an audiovisual stimuli. It would be fruitless to attempt to design for equal interaction between the auditory and visual, as this would possibly create distraction and confusion.

Without a doubt, what has been found in the course of this investigation of the relationship between auditory and visual spatial impression, and with the increasing interest in audiovisual interaction in auditorium acoustics discipline, is beginning to make a valuable contribution to the acoustical and architectural design of concert halls. However, it seems that audiovisual interaction, although requiring much further investigation, may become restricted within the specific designs of spaces for the performance of symphonic music. Most concert halls provide excellent acoustic environments, but this may be limited to the performance of symphonic classical music. Furthermore, the abstract content of symphonic classical music is often never intended to relate to anything but itself and was written to be performed over and over again and in any concert hall that can accommodate it. Thus, it would be a disservice to the listening experience and to the music, to design for improved audiovisual interactive experience when the music and the auditorium where the music is being performed were never intended to be related (at any level) in the first place. By having meanings and intentions as integral part of the creations of music and architecture, the relationship between music and architecture are further strengthened and become apparent when they are being present together in specific on contexts.

Therefore, only when the two (music and architecture, sound and space) are specifically

intended to be related to each other in concept or ideas, and that either explicitly or implicitly, the maximising of auditory and visual interaction would be the most appropriate and beneficial. This is the case with the musical compositions and architectural design of *Farsifal* and the Festival Theatre in Bayreuth, *Poeme Electronique* and the Philips Pavilion, the *Promoteo* and the Promoteo by Piano, and the subsequence design of the Akiyoshidai International Art Hall by Isozaki.

6.3. POTENTIAL FUTURE STUDIES

Resulting from the findings in this thesis, some potential future studies are being considered. As the auditorium acoustics discipline and researchers of spatial impression are becoming increasingly interested in audiovisual interaction, it would be particularly useful to continue with a more comprehensive study of audiovisual interaction in concert auditoria. This study should investigate a wide range of space and uses a variety of musical sources (not just an orchestra). It should explore new and more effective methods of subjective experiments to minimise limitation and maximise results. It should also focus on the applicability of the audiovisual interaction concepts in new auditoria designs. As the aural and visual desirability of today's concertgoer changes, the closer and more productive collaboration between the two disciplines in auditorium designs would only be beneficial in enhancing the audiovisual experience. Furthermore, more investigations of audiovisual interaction will have significant potential in encouraging more multidisciplinary collaboration, and not only between acousticians and architects.

The potential future studies should also take into consideration how to overcome the limitations that this study has yet to address or overcome. One of the important limitations is the use of greyscale photographs. A greyscale photograph only provides a limited amount of visual cues compare to a colour photograph. It is apparent that using greyscale photographs was intentional, since the study did wish to study the effects of colour in visual impression. However, if one wish to include colour photographs in visual spatial impression study of auditoria, it is important to understand the impact of colour in visual impression in general.

Another important limitation that this study has not able to overcome was the disadvantages of the binaural headphones presentation technique. Perhaps a loudspeakers arrangement in anechoic environment would be an appropriate option. Furthermore, variety of

loudspeakers placement options should be explored. Regardless of the complexity of the loudspeaker arrangements, it should yield results that would be usefully comparable with the results of binaural headphones presentation technique.

Regarding the limitation in the visual aspect of the research in this thesis, a potential further study would be sensible in investigating the varying light levels used in various concert halls and how they may affect audiovisual interaction in spatial impression. Perhaps a virtual environment experiment technique would be useful to compare subjective responses between still photographs and moving picture. Moving picture is another potentially useful experiment method, which would yield an even more realistic representation of audiovisual environments..

A particular research interest that this author has wished to explore is the experiential relationship between music and architecture. However, without understanding the relationship between sound and space, the study of the experiential relationship would be rather superficial. In light of the findings in this thesis, and the basic understanding gained of spatial impression in concert auditoria, it would be a useful contribution to further research in the experiential relationship between music and architecture. However, as this thesis found, at least in a very limited context, perhaps symphonic music listening in a generic concert hall is not the most appropriate place for maximum audiovisual interaction due to listeners' prior training. Thus, the relationship between music and architecture would be arbitrary when there is no intention for the two to be related. Therefore, it would be a further step to study audiovisual interaction in spatial impression and the experiential relationship between music and architecture in specific contexts such as the Prometeo or the Akiyoshidai International Art Hall.

