GENESIS OF THE "SALLE DES CONCERTS" AT PARIS LA VILLETTE, A TRIBUTE TO PIERRE BOULEZ

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1 INTRODUCTION

In 1982, an ambitious process was started by the French government to investigate the feasibility of a wide-ranging "Cité de la Musique" that would serve many facets of the musical spectrum, from formal "classical" music to "contemporary" music, opera, pop and jazz. At the time, democratization of culture and, in particular, of music was a priority. The objective of this paper is to report on the unusual approach that was chosen to achieve this goal, to describe some of the original actions that were proposed, and to give well-deserved credit to many people and institutions that were involved.

At first, several locations were considered: La Défense, Place de la Bastille, Marne-le-Vallée, La Villette. After investigation, the decision was made to separate the opera house from this plan and to locate the rest at La Villette in the North-East of Paris.

A Music Study Group or "Mission Musique" was organized under the leadership of Jean-Pierre Guillard and Pierre Boulez to prepare the move of the National Conservatory of Music from rue de Madrid, an affluent West Paris area, and to program the construction of several concert halls and music institutions in a comprehensive music complex along Avenue Jean-Jaurès, a mixed neighbourhood in East Paris.

With limitless freedom, utopian and innovative schemes were investigated. The main targets were the construction of a large symphony hall and of a "contemporary" concert hall with unconventional acoustics befitting many music styles.

The first step was to determine the wishes and needs of contemporary composers. A number of them were interviewed and the results were translated into preliminary design specifications. Seven no holds barred sketches were developed with support from the Institut für Kulturbauten in East Berlin to determine how forward-looking specifications could be implemented and, in particular, to investigate the effects of variability on the acoustic response of the concert halls.

An architectural programme was then issued that led, after a two-round competition, to the design and construction of the National Conservatory of Music, of the "Salle des Concerts" renamed Philharmonie 2, and many years later, after a second competition, of Philharmonie 1.

2 WISHES AND NEEDS OF CONTEMPORARY COMPOSERS

As a preliminary step, an investigation of the needs of composers was launched in 1982[1] to attempt to define the characteristics of the future "contemporary" concert hall that would promote the development of musical innovations.

A brief summary of the answers given by key European music personalities[2] is provided in the following table. As one might expect, the expressed wishes were varied and contradictory. Colors in the following table attempt to translate main trends.

Composer	Types of programmes	Shape, configuration of audience and musicians	Capacity	Variability	Acoustics	Scenography	Electroacoustics, visual and computer systems	Seats	Original requests
Pierre Boulez	All types but with a priority: programmes that require non-conventional arrangements.	Refuses classical concert hall shape. Avoid high symmetry such as sphere (not transformable). Wish: neutral parallelepiped. Couple main volume with secondary volumes.	Large, can be divided in sub-spaces. 1300 to 200?	Movable floors may not work properly in practice. Beware of stage platforms designed for symphony orchestras: not suitable for non-conventional ensembles.	Variable with coupled volumes. Electroacoustic variability always mediocre.	No comment.	Exclude electroacoustic enhancement systems. Control station in audience needed.	Removable seating. But transformation should take less than two hours. Favors uncomfortable seats.	Composers know little in practice about halls. “Ask conductors! »
Michel Decoust	Various.	Variable 1200 to 600. Simple frontal hall with simple variable acoustics + central orchestra + groups.	600+600=1200, associated to other rooms 3500 + studio + small rooms	Do not copy IRCAM Espace de projection. Use simplified and silent systems. Possibility to modify during concerts.	Reverberation time: 0,5 sec to ∞. A lot of absorption needed. Avoid fake acoustics.	Projectors and screens. Two control rooms: one in the audience, the other closed on edge of room. Technical space surrounding the room.	360°, exclude electroacoustic enhancement. Multiple sound sources of all kinds surrounding the audience for digital music. Many audio-visual devices.	Modular, removable seats.	Prepare for evolving technology.
François Delalande	Mostly amplified sound.	Irrelevant, must be frontal. Use of mobile and rotating sources.	No comment.	Divisibility not needed.	No comment.	Controls in the audience needed. Large light and sound control rooms needed.	Rotating and movable systems down to 5 Hz, near and far. Sources everywhere: ceiling, walls, floor and any point in the volume.	Audience mobility. Rotating seats.	
Célestin Deliège	Compatible with "classical" music and with multiple channels digital music.	No comment.	1200	Rotating hall. Divisible room. Multiple rooms of different sizes.	Considers that reverberated sound is part of the direct sound. Prefers the use or earphones.	No comment.	Multiple channels with signal processing. Electroacoustic and computer systems must be perfect. Remote computer systems.	No comment.	Orchestra should sometimes be enclosed (cf. "Mixtur" by Stockhausen).
Jean-Claude Eloy	With electroacoustics. Designed for powerful sound, including low frequencies. (Symphony orchestra not necessary).	High symmetry. Audience must be surrounded. Sphere or cube. Wants depth for distance effects and an oversized space.	1000 to 1200	Considers IRCAM variability as excessive. Recommends less absorption.	High symmetry but no modes. Diffusive. Music should drive directivity.	Multiple podiums. Associate optical and acoustical effects. Holograms, shading, lasers…	360°, lasers, holograms. Sources under the floor.	Rotating. No pre-set orientation.	No interaction of the public. The composer alone should control the piece.
Michel Fano	Mixed for ears and eyes: music, light, pictures, film, dance, comedy.	Polymorphic, not oval. Round shapes are inadequate optically. Audience in centre or around or frontal. Rectangular shape recommended.	300 to1200	Mobile floor. Divisible room physically or optically.	Exclude artificial reverberation. No artificial resonance for classical instruments.	Abstract space without any fixed systems or machinery. Technical plenum surrounding the hall. Movable floor unnecessary. Visibility is essential.	All combined together. Needs audio-visual box	Acoustics stable for empty and occupied seats.	Wrap the room into an acoustically transparent fishnet suitable for projections.
Luigi Nono	Classical and even ancient music, digital music.	Non directional. Suggests a labyrinth.	Large. Why not 5000?	Modular space that can be reduced to small cells.	Variable. Electroacoustic assistance (except for classical instruments)	Flexible floor. Easily movable technical equipment. Visible machinery. Combine theatre sets and audio-visual systems.	Exclude sound systems for classical music. Improve association of classical and digital sound.	Mobile.	Wished to push experimentation further. Example: underwater music.
Henri Pousseur	Interactive works. Input of audience. Moving audience.	Asymmetrical, not centred. Labyrinth.	Variable	Flexible space with many configurations and volumes. Acoustically articulated spaces for walking audience.	Driven by electroacoustics	Maximum flexibility.	Computers, sound processors. Constellation of sources of all types, digital or not.	Walking audience. Mobility is a must.	Suggests placing captors in the room for live reprocessing. Investigate collective improvisation.
Jean-Claude Risset	30 to 35 musicians ensembles + taped music + computer music.	Hyper-symmetrical. Orchestra in the audience or audience in	Divisible. Would also want a 400-seats space.	Mobile floor to raise the audience.	No comment.	Reduce transformation time.	360°, floor loudspeakers, digital sound. Projections. Computer	Revolving chairs.	

		the orchestra. Moving musicians. Walkways for circulating audience.					systems in audience area (avoid noise). Long range directional microphones.		
Karlheinz Stockhausen	"Classical", groups, amplified sound	Non-directional space. Symmetrical: sphere or cube. No rectangle.	1000 to 1500 28x28 m Frontal and Gruppen	Movable seats, "flexible floor"	Prefers totally absorptive space. Absorptive perforated wood panels preferred to metal. No strong reflections. No modes.	Stage 16.m x 14.m, moves up and down. Large doors with direct outdoors access. Technical space surrounding the room.	"Electroacoustics will be everywhere by 2000". 360°, 16 channels or more. Generate sound under the floor. 4, 8 and 16 tracks.	No fixed seats. Prefers seats without upholstery. Rotating.	Music Babel tower: spiral building with absorption and doors to rooms of different shapes (round, cubic, triangular, etc.).
Iannis Xenakis	Chamber music, electroacoustic music. Interactive music with audience input.	Flexible architecture is nonsense. No acoustically transparent envelope; shapes are fundamental. Labyrinth or 23x23x23 m cube. Audience in vineyards. Variable curvatures. Imbed audience among musicians.	Movable audience. Create a labyrinth where the spectator can be alone?	Variability should not devaluate acoustics. Divisibility would be a plus.	The concert hall is an instrument. Natural acoustics of the volume is the priority. Variable.	Believes that moving floors and platforms will never work well enough. A net may be a way to suspend sound sources or projectors.	360° sound diffusion. Sound systems within the orchestra. Specialisation 8, 16 and 32 tracks. Envelope covered by hundreds of vibrating transducers.	"Translucid" seats and floor.	Music should not be frozen: auditors should actively participate.
Composer	**Types of programmes**	**Shape, configuration of audience and musicians**	**Capacity**	**Variability**	**Acoustics**	**Scenography**	**Electroacoustics, visual and computer systems**	**Seats**	**Original requests**

As expected, the answers were wide-ranging but trends may be extracted.

Programmes		“Classical”	**6/11**
Shape		Asymmetrical	**8/11**
Capacity		About 1200-seats	**6/11**
Variability		Simplified	**5/11**
Acoustics		Natural + electroacoustics	**7/11**
Scenography		Multiple systems	**6/11**
Electroacoustics, visual, computers		Multiple sources	**10/11**
Seats		Removable	**8/11**

On December 22nd 1982, Jean-Pierre Guillard proposed to Iannis Xenakis, an important composer who was also an architect, to design the project; Xenakis accepted. However, later, it was decided that an architectural competition was in order.

At the end of the day, this phase demonstrated that it was necessary to investigate whether in practice the design of a large and very flexible concert hall was realistic.

3 FEASIBILITY STUDY

To determine whether the imaginary wishes of musicians had a chance of becoming reality, an architectural and technical feasibility study of a large variable concert hall for contemporary music was launched.

With the cooperation of the Institut für Kulturbauten in East-Berlin, seven preliminary schemes were sketched, ignoring the architectural and technical habits of the time. Three of them were selected and developed in detail: feasibility, variability, seating arrangements, acoustic response, ergonomics, safety, maintenance and costs were thoroughly evaluated in each case.

The following figures show some of the attempts that were made to design movable ceilings, walls and floors and to vary the capacity and acoustics of the room.

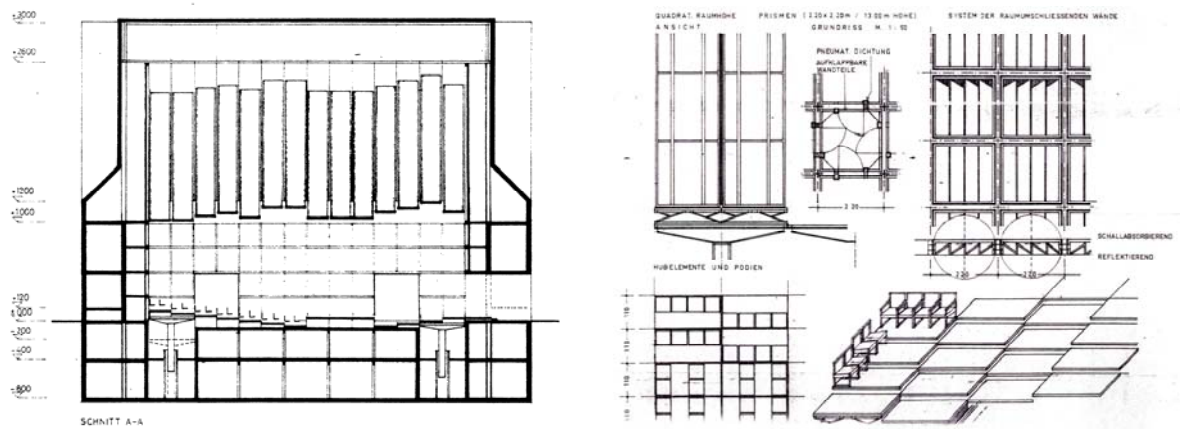

Figure 1: Example of flexible ceiling, walls and floor systems

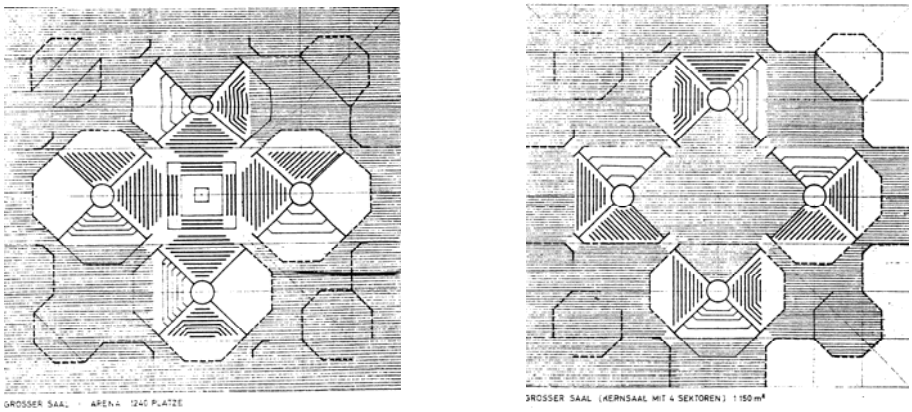

Figure 2: Example of variable capacity: rotating balconies

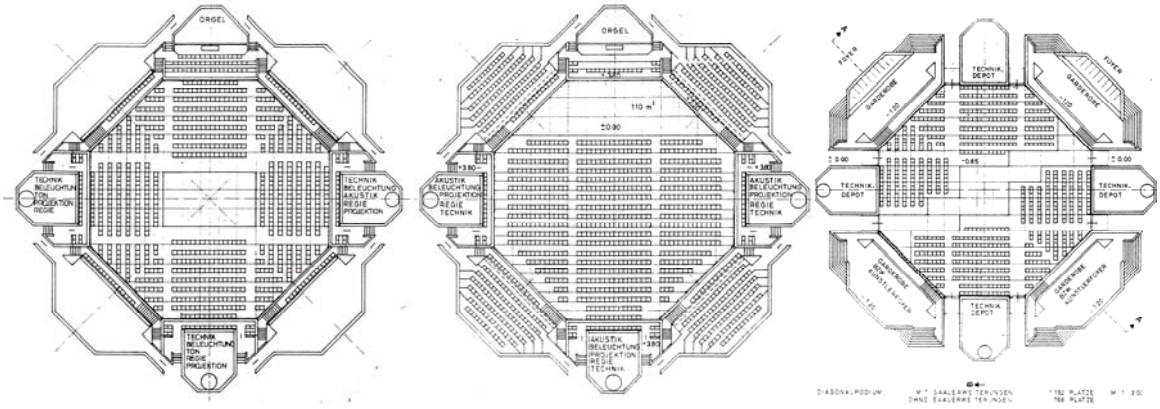

Figure 3: Example of variable capacity and floor arrangements: coupled angle balconies

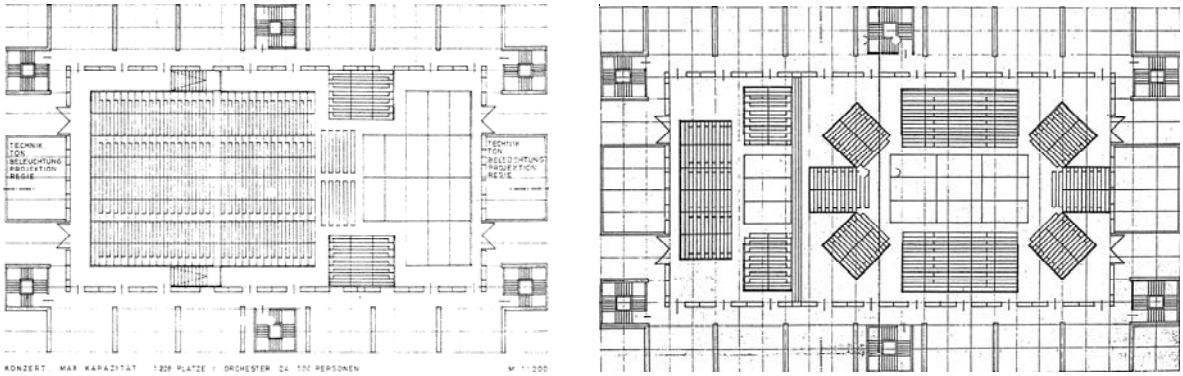

Figure 4: Flexible floor arrangement and divisibility

Because of economic limitations and of public safety requirements, it became obvious that it would not be possible to vary adequately the volume of such a large hall. Then, if the room body was to remain invariable, acoustic simulations demonstrated that, in a volume of around 14 000 m^3, sufficient acoustical variability would not be achieved over the whole musical frequency range. Moreover, the estimated cost of construction and maintenance proved prohibitive. Transformation times would also forbid a rapid succession of concerts requiring different settings.

It was then decided, following the categorical advice of Pierre Boulez, to postpone plans for a large symphony hall and to concentrate efforts on a fixed medium-size concert hall designed primarily for contemporary music with high diffusion and with full acoustic reciprocity between any pair of points within the volume.

4 OBJECTIVES OF THE ARCHITECTURAL BRIEF

The architectural program was driven by very simple acoustical conditions: the “contemporary” concert hall would be fixed, with an even reverberation time of around 1.6 seconds over the widest possible frequency range. The floor arrangement would be as flexible as possible. In addition, acoustics would be such that instruments or even spectators could be installed anywhere in the volume to accommodate contemporary works such as Gruppen or Répons, meaning acoustic reciprocity anywhere[3].

In December 1983, the main objectives of the future Salle des Concerts (nowadays renamed Philharmonie 2) were set:

- Accommodate public activities of the National Conservatory of Music.
- Be the permanent home of Ensemble Intercontemporain.
- Host invited orchestras of all types including symphony orchestras.
- Host concerts or creations that include instruments, voice and digital sound.
- Allow varied configurations of musicians and of audience.
- Include movable seating systems in the stalls.
- Achieve divisibility with simple means including optical devices.
- Guarantee that transformation time is short.
- Organize operation and maintenance so that only a limited staff is needed.
- Install sound systems, digital systems, visual systems, scenography systems, lights, radio, television and recording facilities.
- Check that replacement of obsolete equipment is non-destructive.

The programme included the National Conservatory of Music, the Salle des Concerts (today's Philharmonie 2) and the large symphony hall (Philharmonie 1) for which a technical programme had also been prepared.

5 THE ARCHITECTURAL COMPETITION

An architectural competition, limited to sixteen preselected French architects, was organized in two rounds. The authorities ruled out an international competition following the disappointing outcome of Opera Bastille.

5.1 First round

In the first round in April 1984, architects were asked to sketch the whole programme, including the contemporary music concert hall and the large symphony hall. Six projects were chosen including a detailed and striking proposal by Iannis Xenakis and Jean-Louis Véret that translated elegantly the needs of contemporary music, inscribing the hall in a twisted cylinder using the principle of varying curvatures in all directions to optimize sound diffusion over the whole musical frequency range without focalizations or shadows. A 3.25° ramp, where musicians and spectators could be placed, surrounded the audience. The spiral envelope of the concert hall opened up to the Parc[4].

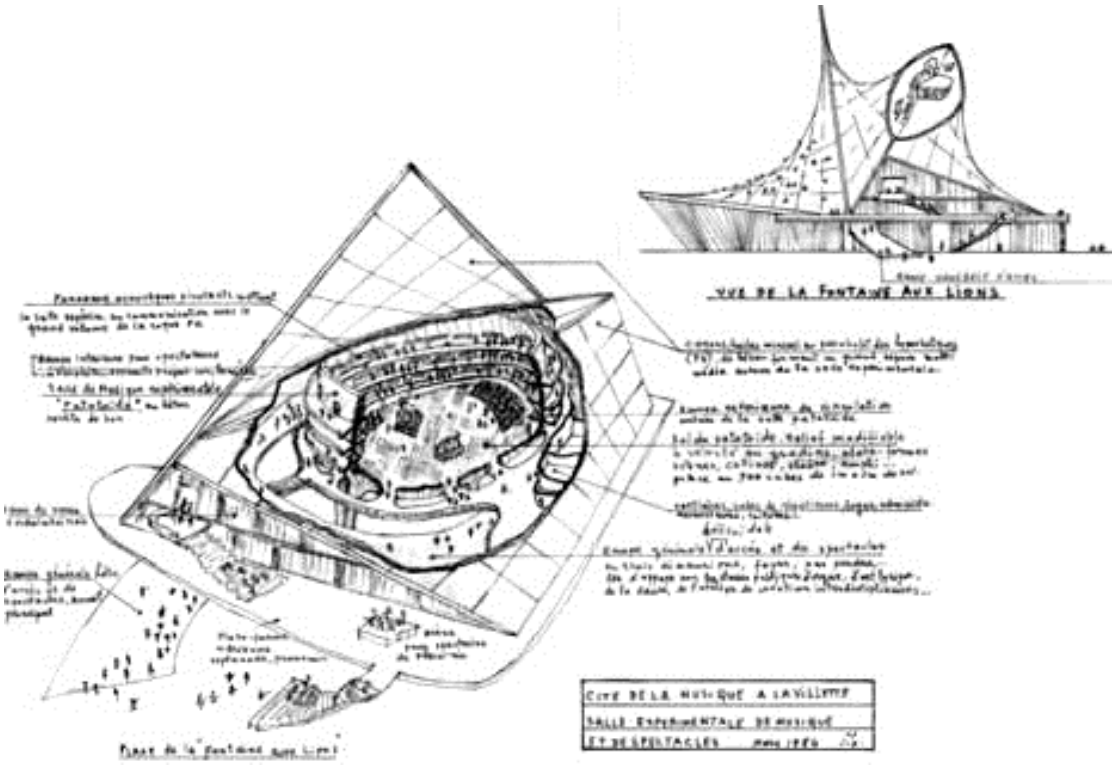

Figure 5: Xenakis sketch of the Salle des Concerts (Philharmonie 2)

Counter clockwise 11° torsion was applied to the patatoid; according to Xenakis, this would favour the Coriolis acceleration and stimulate an even sound field. This assertion, to the author's knowledge, has never been validated. The floor was highly flexible. Rotating acoustic panels could couple the main room to external volumes.

The six projects were presented in August 1984 to François Mitterrand, the French President who had a genuine interest in architecture. The President and his advisors selected three projects. Xenakis was rejected presumably because Mitterrand preferred classical shapes as his previous

choices had shown: Louvre pyramid, Geode sphere, Grande Arche de la Défense cube. Xenakis attributed the decision to bad taste[5, 6].

5.2 Second round

The second round took place in September 1984. Before it started, the three foreign jury members, Alessandro Anselmi, Lucien Kroll and Cedric Price, resigned in protest of the arbitrary decision of the first round.

The competing architects were asked to provide details for the National Conservatory of Music and for the “Salle des Concerts”. Despite the elliptical shape and of the excessive volume of the concert hall, Portzamparc was declared the winner.

6 DESIGN AND CONSTRUCTION

Construction of the National Conservatory of Music was completed in 1990. Design and construction of the “Salle des Concerts” took longer. It was finally inaugurated on December 7th 1995[7] after financial, political and practical difficulties had slowed down the process.

In spite of these unfortunate circumstances, those years provided an unexpected opportunity to complete the investigations performed by the “Mission Musique” and to transform an elliptical volume with high symmetry and with a 34 000 m^3 volume into a functional concert hall.

Well-deserved credit ought to be given to Iannis Xenakis whose theoretical and architectural creativity had a strong influence on the final design.

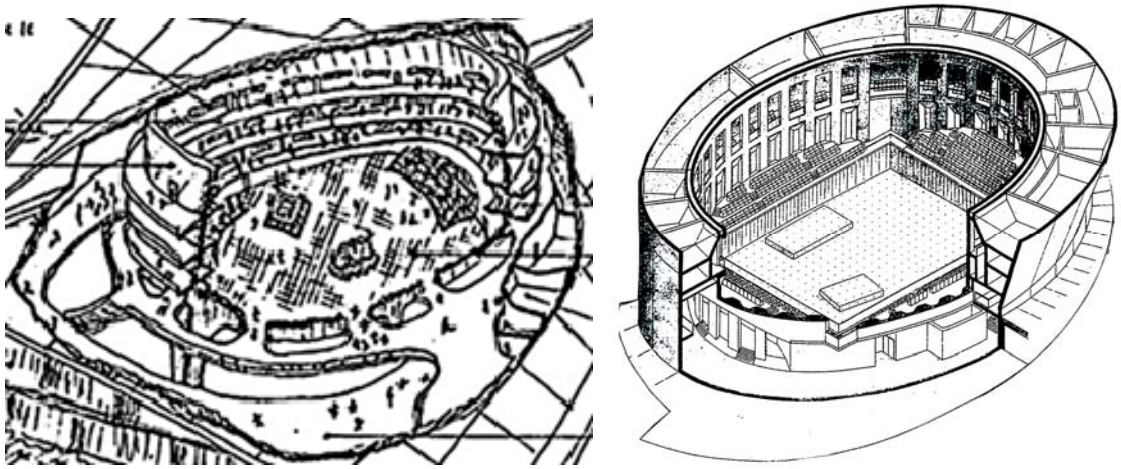

Figure 6: Xenakis 1984 concert hall proposal (left) and final design (right)

Acoustical consultants were able to shape the initial acoustic response of the early design and transform the concept, while keeping the elliptical shape, into today’s “Philharmonie 2”, which happens to be satisfactory for contemporary works but also for groups of all sizes from soloists to large symphony orchestras.

The opening rehearsal, a Mahler Symphony conducted by Claudio Abbado leading a large orchestra combining the European Youth Symphony and students of the Paris Conservatory proved that a hall with a relatively modest volume and a critical shape but with well-balanced diffusion can accommodate space-hungry pieces.

7 A TRIBUTE TO PIERRE BOULEZ

Planning and construction of Cité de la Musique has spread over several decades; many people, architects, musicians, conductors, engineers of all types including many acousticians, public servants, have had a positive influence on design and construction. Several outstanding individuals guided this group. It is fair to give credit to all.

Obviously, Pierre Boulez, drawing on his extraordinary skills and experience as musician, composer, conductor, teacher and acoustician in his own way, triggered a rich and unusual design process, encouraged creative research, provided priceless advice. Under his influence, many participants felt stimulated, let their imagination work, dared to break taboos, learned not to waste time.

This work is dedicated to Pierre Boulez.

8 REFERENCES

1 D.E. Commins, Étude de faisabilité d'une salle flexible pour la Cité de la Musique: les besoins exprimés par les musiciens, Commins-BBM report # 56, June 1983.

2 Pierre Boulez, Michel Decoust, François Delalande, Célestin Deliège, Jean-Claude Eloy, Michel Fano, Luigi Nono, Henri Pousseur, Jean-Claude Risset, Karlheinz Stockhausen, Iannis Xenakis.

3 For that purpose, a full grill is located above the diffusive ceiling; cables can be drawn at each intersection of the metallic structures. Today, a suspended grill has been installed under the ceiling thus influencing the original acoustic response of the concert hall.

4 Fonds Iannis Xenakis, Bibliothèque nationale de France (Paris) : documents officiels relatifs à la consultation des architectes: études préliminaires, croquis relatifs à la définition de la géométrie de la coque et l'aménagement intérieur de la salle (mars-avril 1984), correspondance (1983-1985), photos de la maquette, rapport de présentation, rapport du jury.

5 I. Xenakis, Original text: « Juries tend to favour the average. In the days of the enlightened princes, they took the decision themselves. Today, in the age of juries, no prince is there to take responsibility. And those who do lack taste. » (In Varga [11996:209]).

6 B.A. Varga, Conversations with Iannis Xenakis, London, Faber & Faber, 1996.

7 D.E. Commins, N. Auletta, The La Villette Music City in Paris and its « flexible » concert hall, 16th International Congress on Acoustics, Seattle, 1998.