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Sound Architectures:
The Relationship between Music and Architecture

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Abstract
The communion of senses operates in the human being. Attempts to cross borders have been made for a long time and in different directions, and the contributions can be very enriching. Architecture, like music, is an unavoidable art. We live or share spaces created by the human hand. Friedrich von Schelling referred to architecture as frozen music, Goethe defined it as petrified music, and Gerardo Diego described music as sound architecture. There are many paths shared between the architect and the musician. Terminology is one of them. Architects talk to us about rhythm and harmonies, while musicians do the same about soundscapes and chromaticisms. The coincidences do not end with terminology. There are many other ways of integrating music and architecture. Spaces, forms, functionality, or delight are other aspects shared by musicians and architects.

Keywords: architecture, Pierre Boulez, Iannis Xenakis, Le Corbusier, Heitor Villa-Lobos, IRCAM

Resumen
La comunión de los sentidos opera en el ser humano. Desde tiempo atrás y en direcciones muy diversas se traspasan fronteras, y las aportaciones pueden ser sumamente enriquecedoras. La arquitectura, como la música, es un arte ineludible. Vivimos o compartimos espacios creados por la mano humana. Friedrich von Schelling se refirió a la arquitectura como música congelada, Goethe la definió como música petrificada y Gerardo Diego, como arquitectura sonora. No son pocos los caminos compartidos entre el arquitecto y el músico, siendo la terminología uno de ellos. Los arquitectos nos hablan de ritmo y armonías, y los músicos, de paisajes sonoros y cromatismos. Con todo, las coincidencias no se agotan con la terminología; hay muchas otras formas de integrar música y arquitectura. Los espacios, las formas, la funcionalidad o el deleite son otros tantos aspectos que tanto músicos como arquitectos comparten.

Palabras clave: arquitectura, Pierre Boulez, Iannis Xenakis, Le Corbusier, Heitor Villa-Lobos, IRCAM

Many are the musicians of the 15th and 16th centuries who brought their stone to the cathedral of J. S. Bach. My contribution does not reach in this case the category of laying the first stone, this stone that is the conjunction of the solemn and the humble; I only aspire that mine appears in the pile, in the construction of the future cathedral.

Federico Mompou[1]

[1] P. O'Shea, et altri, *Semblanza. Federico Mompou (1893-1987)* (Madrid: Fundación Isaac Albeniz, 1993), p. 91. Unless noted otherwise, all translations in this essay are by Ana Benavides.

Suppose I want to build a house. The first thing I would do would be to contact a good architect. Before starting to draw up the plans, he will ask me where I want to build my house, when and what function I want to give it in addition to the attributes of a home that are taken for granted. He will probably want to know who I am, what I do professionally or what I like to do. I will certainly ask for a large, bright room with excellent acoustics to house my piano. Therefore, the architect will have to master both strictly visual areas and others more related to sound, closer to music. Architectural construction must necessarily be on a human scale, literally and metaphorically speaking. It is not in vain that many architects believe that when a building is created, a life is created.

> To feel on the skin the warmth of the sun in the shelter of a sunny courtyard, or the refreshing shadows of the surrounding arcade, to scrutinize the rhythm and scale of a facade, to listen to the volume of a room, to feel the hardness of stone, the softness of tiles, to smell the scent of the boxwood hedge that borders a garden, to taste the freshness of the water of a fountain. All this is architecture.
>
> Leland M. Roth[2]

Each construction must reflect a plural reality that escapes the specific confines of architecture, of the demarcations to which we often want to cling. And the fact is that, in reality, the communion of senses operates in the human being, it is something inherent to him. Joaquín Rodrigo illustrates it in a masterful way when he describes the house of his mentor, Paul Dukas, just after his arrival in Paris:

> The old house, narrow, the typical spiral staircase, a very modest floor, a small workroom and in it an old piano, some mats, a fireplace that was not very warm and many, many scores and a large number of books. At that moment, I became acquainted with his French, a French that took me months to understand, through his beard and through an opaque, almost hoarse voice.[3]

Spanish composer Joaquín Rodrigo. Photo: Fundación Victoria y Joaquín Rodrigo.

[2] Ana Benavides, "Arquitecturas sonoras. La relación entre la música y la arquitectura," *Excellentia,* nº 25 (septiembre 2022) p. 8.

[3] Joaquín Rodrigo, *Escritos de Joaquín Rodrigo,* edited by Antonio Iglesias (Madrid: Alpuerto, 1999), pp. 97-98.

It would seem a trivial, unimportant example, were it not for the fact that this description comes from a blind man who has been blind since he was three years old. He speaks of narrow staircases or an opaque voice, how is it possible for a blind person to perceive such visual parameters? Actually, it is possible to hear architecture. Blind people have a much more developed sense of hearing and can detect the proximity or distance of objects by the echo of their footsteps. Virtually all architectural spaces project sound in one way or another, and Rodrigo simply used his hearing to perceive the place. In addition, the great Saguntino surprises us with music for ballet or cinema, and also with his extraordinary *Concierto de Aranjuez*, undoubtedly the best sound portrait of the city of Madrid.

La plaza de las flores de Estepona, Málaga, Spain. Photo: Luzzyacentillo.

Here is another example, signed in this case by an architect, Peter Zumthor:

> It is Holy Thursday 2003. Here I am, sitting in a square in the sun. […] The square - in front of houses, church, and monuments – was like another panorama before my eyes. Behind me the wall of the café. The right density of people. A flower market. The sun. Eleven o'clock. The opposite side of the square is in shadow, of a peaceful bluish color. Wonderful noises, close conversations, footsteps in the square, on the stone, birds, the light murmur of the crowd, no cars, no clatter of engines [...] The temperature was pleasantly cool, and warm. [...] Now, what moved me there? Everything. Everything, the things, the people, the air, the noises, the colors, the material presences, the textures, and also the forms.[4]

Both Rodrigo and Zumthor take us into an enriching world, a very plural and "contaminated" world in the best sense of the word, of transversal and multiple perceptions. Just as a doctor cannot grasp the complexity of a disease without knowing the suffering or pain that causes it, to define an art such as architecture or music by dividing them into parts based on sight or hearing is to erroneously limit their field of action. Reality cannot be imprisoned from a single perspective. In his appointment as Doctor Honoris Causa of Stanford University, Steve Jobs focused his speech on what he called connecting the dots and revealed how Appel's typography emerged through unsuspected

[4] Peter Zumthor, *Atmósferas* (Barcelona: Editorial Gustavo Gili, 2006), p. 15-17.

channels. Both the architect and the musician feel, think and live as human beings and all that this entails.

One might therefore wonder to what extent the traditional division of the arts into spatial -architecture, painting or sculpture- and temporal -music or literature- is true. When one submits an article for publication, one generally has to adhere to very precise parameters of space, to a maximum of words. When it comes to a concert program, we find more of the same. There is a space, but it is a temporal space, imposed. And there's nothing better than the tune of *El Almendro* nougat to bring us home for Christmas.[5] Logically, these are very trivial examples, but they may well lead us minimally into artistic transversality. As Susan Sontag says, the history of art consists of a series of fortunate transgressions and Nikolaus Harnoncourt corroborates it: "I don't like to separate music from the rest of the arts. For me art is a great unity."

Attempts to cross borders have been made for a long time and in different directions, and the contributions can be extremely enriching. Setting up borders, erecting walls, whether architectural or artistic, has always impoverished. According to the German philosopher Carl Stumpf (1848-1936), all sensations, judgments and even abstract ideas are represented to us as transported to the domains of space. In fact, we place high-pitched sounds above and low-pitched sounds below. There is also a general association of the high with the morally elevated and the low, with the obscure or mysterious, the depraved or corrupt. It is not in vain that many mythologies place heaven in the heights and hell in the opposite stratum.

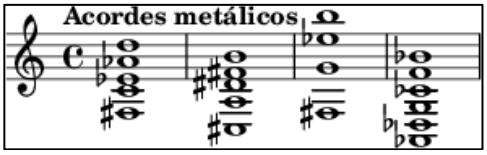
Music has no fixed home. Throughout history it has been related to the most diverse and heterogeneous fields. Pythagoras conceived music as a mathematical art and in fact, his monochord was nothing more than an acoustic device. The Quadrivium framed it together with arithmetic, geometry, or astronomy. Leon Battista Alberti (1404-1472), Italian humanist and author of *Ten Books of Architecture,* declared that the same numbers that delight the ear are useful to the architect: "Let us borrow the rules of the musicians, who are the great masters in this respect." The mathematical connection would be revived centuries later with the use of the dodecaphonic composition of mathematical formulas. Music has also been linked to literature, education, or astrology (the music of the spheres). The 19th century made it the best mediator of feelings. The cinema appropriates it, being in fact one of the most powerful channels in the filmic discourse. The shortage of medicines during the Second World War put the therapeutic power of music to the test, giving rise to music therapy. These are but mere examples of its versatility and clearly denote the extremely heterogeneous and disparate service that music can provide. Perhaps that is why there are as many sound worlds as there are races, as many cultures, and almost as many as there are people. And possibly the reason for this permanent dialogue and continuous inference is to be found in the very nature of the human being.

Architecture, like music, is an unavoidable art. Day or night we live or share spaces created by the human hand. It is an art that, especially for those of us who live in a city, surrounds us permanently. Music also operates in the same way, whether we are aware of it or not. Hearing is not limited directionally, like sight. We hear from all directions. In continuous alertness, the ear remains

[5] *El Almendro* is a well-known Spanish brand of candy that advertised its products for consumption during the Christmas season.

always open, with no spring like the eyelids to close it. In other words, we cannot avoid hearing. No individual grows in an acoustic vacuum. Language and music surround us and define us as humans. We are as communicative as we are musical and in this sense our species is unique. For many, music is not in fact a talent, but a properly human faculty. Hence there has been no society throughout history without a musical manifestation of its own.

The composer Alexander Scriabin, in addition to having what he called a 'mystical' chord, experienced color fever, attributing one to each sound. In March 1915, he programmed at Carnegie Hall his symphonic poem *Prometheus: the poem of fire*, a music for the eyes that required the aid of a chromola or clavier à lumières that would project different colors during the concert. Unfinished was *Armageddon,* another great chromo-sonorous bet, which Scriabin intended to premiere in the Himalayas. Messiaen regretted confessing that he linked each sound to a color when he saw that no one perceived it this way. He saw in composing a multicolored and changing stained glass window, and so he confessed to Pierre Boulez. Boulez himself considered transgression as an extremely enriching element. Erik Satie signs in 1897 the *Pièces froides* and Miguel Asins Arbó, very fond of illustrating his scores with drawings, compose for piano *Tres valses completamente azules*. Federico Mompou advises in his *Escenas de niños* "To play with the freshness of the freshly cut earth," and he also counted on the so-called 'metallic chords.'



Almost, without realizing it, we use expressions such as *to live in harmony, to go in unison, to serve as a counterpoint, to march to a good rhythm, to go to the same beat, or to put in tessitura,* among others. Expressions of a musical nature but already enshrined in common parlance. Friedrich von Schelling referred to architecture as frozen music, Goethe defined it as petrified music and Gerardo Diego described music as sound architecture. There are many paths shared between the architect and the musician. Terminology is one of them. Rhythm, harmony, coral, castanets, or horns are all terms taken from an architectural manual. Architects leave us talking about architecture and musicians, soundscapes. Musicians also speak of first and second planes, upper and lower planes, clarity of sound, chromaticism or harmonic densities, as well as of scales, tempos, textures or rhythms, terms, and expressions that are equally common in both disciplines.

The coincidences do not end with terminology, as there are many other ways of integrating music and architecture. Spaces, forms, functionality, or delight are other aspects shared by musicians and architects.

> Music needs space, it is space itself. It realizes the impossible of shining as instantaneous architecture, but only an instant. Music is always an instant, a musical moment. But in any case, it needs a sphere, a spatial hollow in which to sprout and spill itself.
>
> Gerardo Diego[6]

[6] Benavides, "Arquitecturas sonoras," p. 12.

Pórtico de la Gloria, Santiago de Compostela Cathedral,
Santiago de Compostela, Spain. Photo: Ana Benavides.

There are transcendental architectural spaces for the history of music. The first auditoriums burst into Greek culture with the odeons, created especially for singing competitions. According to Vitruvius, they were built with large basins under the floor to favor good acoustics. In their construction, hearing was more important than sight. The majestic Portico de la Gloria of the cathedral of Santiago de Compostela leaves us a magnificent organological inventory, a unique testimony to know how the ancient instruments were and how they were played. And from a Paleolithic cave, that of the Trois Frères in the French Ariège, comes the first musical representation known today. Dating back to 13000 BC, it shows a bison-man, a character known as the "little magician," playing a nose flute.

Teatro de Mérida, Mérida, Spain. Photo: Pedro Blas Vadillo Martínez.
Consorcio Ciudad Monumental de Mérida.

Music transgresses temporality to become spatial art. Each style proposes new spaces and new music. The very idiosyncrasy of Greek music marks the layout of its theaters, with three main parts: the *theatron* or place to see and reserved for spectators; the *orkhestra*, intended for the

declamation of the actors and the singing and dancing of the choristers; and the *skene* or backdrop. The Gothic is prepared by the Romanesque in the same way that polyphony is prepared by the preceding plainchant. A sonorous art is forged along with the architecture. The first antiphons are an example of proportion, of refined and sober lines, which mark the repose that we enjoy when we enter a Romanesque church. From the 13th and 14th centuries onwards, architecture underwent a radical change, as did the music. The opera that burst onto the scene at the beginning of the 17th century brought with it a new architectural and musical scaffolding, and the *parlato,* the *recitato,* or the arias wove the new sound framework. Now the word becomes essential, it needs to be intelligible and the accompanied melody emerges: the word in the upper melody and the instrumental basso continuo in the lower one gives it a seat. The neoclassical artist of the XVIIIth century traces splendid sonorous buildings through sonatas, symphonies and concertos, where proportion and symmetry prevail. At the other end of the historical arc, the avant-garde will arrive with new proposals, making spaces and music coincide in a kind of inevitable synergy. Its aesthetics now responds to a convulsed society that lives the tearing of wars and their consequences.

Space is necessary for the score and for listening. Annotations of dynamics, tempo or character and many others occupy a specific place on the paper. Not long ago, a clarinet professor asked me how to interpret a passage from Copland's *Concerto for clarinet and orchestra* in which *broader* was written. The amplitude, he told me, and rightly so, can be understood in tempo (dilating or widening the tempo) or in dynamics (louder). The conclusion was that it was a time reference since Copland had inserted broader in the upper part of the staff, an area reserved for the information related to the *tempo.*

Fundamental and absolutely necessary in architecture, musical listening also needs to occupy a space, invade it and even identify it. New York is not only revealed in its Empire State Building but also in Gershwin's *Rhapsody in Blue*. Isaac Albéniz was a splendid musical geographer, discovering every corner of Spain through his staves. The bells of the Torre Bermeja of the Alhambra in Granada conclude *A l'ombre de Torrebermeja*, by Joaquín Rodrigo, and the native American music places us in *Three Places in New England*, by Charles Ives. I do not know to what extent these sound postcards are not more eloquent than the best photography. In fact, García Lorca strove to treasure the best souvenirs with taste and hearing:

> In all the walks that I have taken in Spain, a little tired of cathedrals, of dead stones, of landscapes with soul, I started to look for living, lasting elements, where the minute does not freeze, that live a trembling present. Among the infinite that exist, I followed two: songs and sweets.[7]

Architecture, like music, does not remain a mere prototype or technical artifice; both are repositories of a cultural and social legacy. They are the two inevitable sides of a sheet of paper. Spaces have conditioned music and music has conditioned spaces.

Gregorian chant, characterized by long values and slow tempos, was allied to stone, the material of the first temples, which was highly reflective of sound and made for very reverberant spaces. With hard walls and excessive reverberation times, it was almost impossible to make the

[7] Benavides, "Arquitecturas sonoras," p. 14.

word of God intelligible. It was then decided to sing the liturgy, thus Gregorian chant was born. Music was inspired by Architecture. With polyphony, which took place with the *Ars Nova* around the 14th century, the choir acquired a decisive role. All its members have to be seen, hence its u-shaped arrangement, with the organ in the foreground. Absorbent materials now prevail in the construction to allow the voices to be heard clearly. The Renaissance brought new changes. The original layout of St. Mark's in Venice in the form of a Greek cross, with four equal arms, five domes, and walls covered with mosaic, generated a new aesthetic. Giovanni Gabrieli, the Venetian composer of the 16th century, created the so-called *cori battenti,* with several choirs and instrumental groups dispersed and with an antiphonal music that alternated the dialogued interventions of the different groups and under a slow tempo that avoided sound saturation.

If chamber music favors small spaces, little by little these will be enlarged to accommodate music with larger instrumental staffs, until the consolidation of the great symphony orchestra is reached. The democratization of culture and therefore of music requires larger spaces to accommodate a larger audience. It also pushes the composer to redefine his aesthetics, increasing the power and density of the orchestra through complex harmonic and timbral interweavings, and introducing new instruments. It should not be forgotten that these changes favor, modify and even discard instruments. The harpsichord, beautiful in sonority, cannot cope with its very little power to the wide spaces that were opening; the piano replaces it.

The efficient construction of theaters and auditoriums has been a constant concern since the Renaissance. Domes were particularly problematic, as they did not distribute sound well enough to concentrate it in a single focus. On the other hand, sight and hearing are equally involved in the building. The architect who designs an auditorium is confronted with acoustic problems, especially those arising from reverberation, but also with visual problems; he must provide good viewing angles. When Garnier drew up the plans for the Paris Opera, he realized that the social as well as the musical character prevailed; the public not only went to the opera to listen, but also wanted to see and be seen. That is why the passageways became as important as the stage itself. Similarly, the Sydney Opera House or the Casa da Música in Porto delight us both acoustically and visually.

Moszkowski Testimonial Concert, December 21, 1921. Carnegie Hall, New York City.
Courtesy of Carnegie Hall Susan W. Rose Archives.

The origin of the auditorium as we know it today dates back to the middle of the 18th century and was consolidated in the 20th century. The so-called shoe box was created, with low ceilings and a frontal arrangement of the audience in front of the stage. The considered first concert hall dates from 1748 and is the Holywell Music Room in Oxford. With the incorporation of new instruments, many of them more powerful and with lower registers, new spaces were created that favored sound projection and correct instrumental matching. Thus the Musikverein in Vienna (1870), the Gewandhaus in Leipzig (1884), and the Concertgebow in Amsterdam (1888) were created. Wagner promoted a new theater in Bayreuth, necessary for his stage productions, his proposals of total art. With Carnegie Hall (1891) a new multipurpose building was promoted, with symphonic and chamber halls, meeting rooms and offices, exemplified towards the middle of the 20th century in what Mies van der Rohe would call the Vielweckraum or multifunctional space. Today, new musical venues can adapt the listening experience by modifying reverberation times and reorienting the interior cladding panels, as in Jean Nouvel's Lucerne auditorium. Similarly, the performer himself must adapt to the space, adjusting the sound planes, dynamics or tempo and adjusting the pedal. The level of reverberation is a determining factor for listening and conditions both performers and listeners.

Hence the recurrent and enriching associations between architects and musicians, as well as the parallels between architectural and sonorous construction. Since the Middle Ages, composers have considered the spaces where their music would sound. For the inauguration of the first phase of the cathedral dome in Florence, Guillaume Dufay (ca.1400-1474) analyzed the dimensions of the building and composed *Nuper rosarum flores* adapting the *tempi* and other acoustic effects to the dimensions of Santa Maria del Fiore. Bach adapted himself to the architectural enclosure of the church of St. Thomas. We know that this church, for which Bach wrote most of his works, was then completely clad in wood, which made possible rapid changes of harmonies or tempo. It was no coincidence that the master liked very lively tempos. Handel's *Music for the Royal Fireworks* arranges the musicians at various points in the garden and uses mostly percussion and brass instruments, suitable for open spaces. Berlioz's *Requiem* was conceived to be performed in a specific enclave, Les Invalides in Paris, and with the musicians placed in crosses simulating the angels calling the Last Judgment from the four cardinal points. For its part, the 20th century will leave us magnificent testimonies of this concert in dialogue between the musician and the architect.

The Greek-born composer Iannis Xenakis was also a notable architect, a collaborator of Le Corbusier, and co-author of the Phillips Pavilion built for the Brussels Universal Exposition of 1958. It seems that the major work in the construction of the Pavilion, unfortunately, demolished in 1959, fell on Xenakis himself because Le Corbusier was quite busy. Music and architecture assisted Xenakis' creativity, for as he himself said, music and architecture were based on the same assumptions: "I discovered on contacting Le Corbusier that the problems of architecture were the same as those of music." If the central idea of the Pavilion was to create a multimedia space, *Metastasis,* a musical composition by the Greek artist premiered in 1955, explores sound as a whole elaborated under architectural structures. Le Corbusier's *Le Modulor,* a book first published in 1948, served as inspiration. *Metastasis* bets on a *sonorous continuum*, a game without edges of timbre alternations and playing with the contrasts provided by each one of the interpreters and by the whole of the orchestral mass.

Berliner Philharmoniker, Berlin, Germany. Photo: Reinhard Friedrich.
Archiv Berliner Philharmoniker.

The Berliner Philharmoniker had several locations, some of them surprising, such as the Flora, an open-air Berlin restaurant, or a skating rink near its current location. In 1956 and after the destruction of its last venue during the Second World War, a new space is promoted under the direction of Karajan: the Berliner. Hans Scharoun, the architect in charge, and Lothar Cremer, head of the Department of Acoustics at the University of Berlin, were hired for this purpose. Together with the great conductor Herbert von Karajan, they designed a hall that reflects the natural arrangement of the audience when listening in the street: performers in the center and the audience around them. A circular hall was built, a continuous, interconnected open space with seating for 2,400 people. The shape corresponds to that of the triple pentagon, with three superimposed pentagons representing the union of music, space and humanity. A democratic concept of equality for all. This magnificent venue, controversial at first, served as a model for the subsequent Walt Disney Concert Hall by Frank Gehry, erected in the city of Los Angeles.

In the 1970s, the IRCAM (Institut de Recherche et Coordination Acoustique/Musique) was created in Paris. The then president of France, Georges Pompidou, entrusted the composer Pierre Boulez with the direction of the project. Once again, music and architecture were combined. Renzo Piano was the architect in charge of designing a building that had to be architecturally adapted to the requirements of the new musical aesthetics. Inaugurated in 1977, the IRCAM is today a reference point. Moreover, Pierre Boulez relied entirely on architecture to compose: "You have to build, the more you know about architecture, the more spontaneous you can become." His fondness for architecture is reflected in works such as *Structures,* composed for two pianos and with architectural, mathematical, and scientific implications. In *Répons*, the first contribution for IRCAM and written for a large chamber orchestra with six percussion and electronic soloists, it is the circular architecture of the Guggenheim in New York that inspires his triple perspective: before, during and after the exhibition.

The major cities, in addition to providing the setting for the best auditoriums, have also served as inspiration for composers and architects of all kinds. Far from being a mere delimited physical space, the city has given rise to defined social and cultural practices. In 1978, Bruno Nettl studies what he calls urban ethnomusicology, investigating the influence of the urban framework on composition. The Cuban urban reality and its response in music has been approached by María Teresa Linares, with special emphasis on the multicultural aspect. Andalusia is recreated on the piano in *Una noche en Sevilla*, by Vicente Costa y Nogueras, or *En la Alhambra,* by Tomás Bretón. If Madrid's Lavapiés neighborhood has generated such diverse works as Barbieri's *El barberillo del Lavapiés* or Isaac Albéniz's *Lavapiés. Suburbios,* by Federico Mompou, transports us to the suburbs of Barcelona in the 1920s, with narrow streets and whitewashed houses. The 20th century offers us *La ciudad resonante,* by José Iges; *Paisaje sonoro de la ciudad de Valencia,* by José Luis Carles; *Los espacios acústicos* by Gérard Grisey or *Central Park in the Dark* by Charles Ives. Aaron Copland strives to compose distinctly American music and the result is *Quite City,* a work completed in 1941 and centered on the city of New York. The Canadian writer, composer, and environmentalist Murray Shaeffer coined the concept of "soundscape" and launched the World Soundscape Project in the sixties and seventies with the main objective of creating a world soundscape archive. Even the members of Pink Floyd, many of them architects, signed the album *Music for Architecture Students* in 1969.

A singular proposal of this symbiosis of music and city leaves us Heitor Villalobos. He took a photograph of the city with its towers, domes, and roofs and then placed it under a millimetric paper with abscissae and ordinates previously fixed. From here he traced the sound contour of cities like Rio de Janeiro, New York, and Buenos Aires. In *New York Skyline Melody* (1939), the upper melody forms the profile of the New York skyline, it is the main melody, the superior and most perceptible. The basses build the foundations, and on them rest the pillars or intermediate voices, not so relevant melodically, but necessary to sustain the construction. The city of New York unfolds successively, showing us the sonorous architecture proclaimed by Gerardo Diego and so splendidly described by Joaquín Turina:

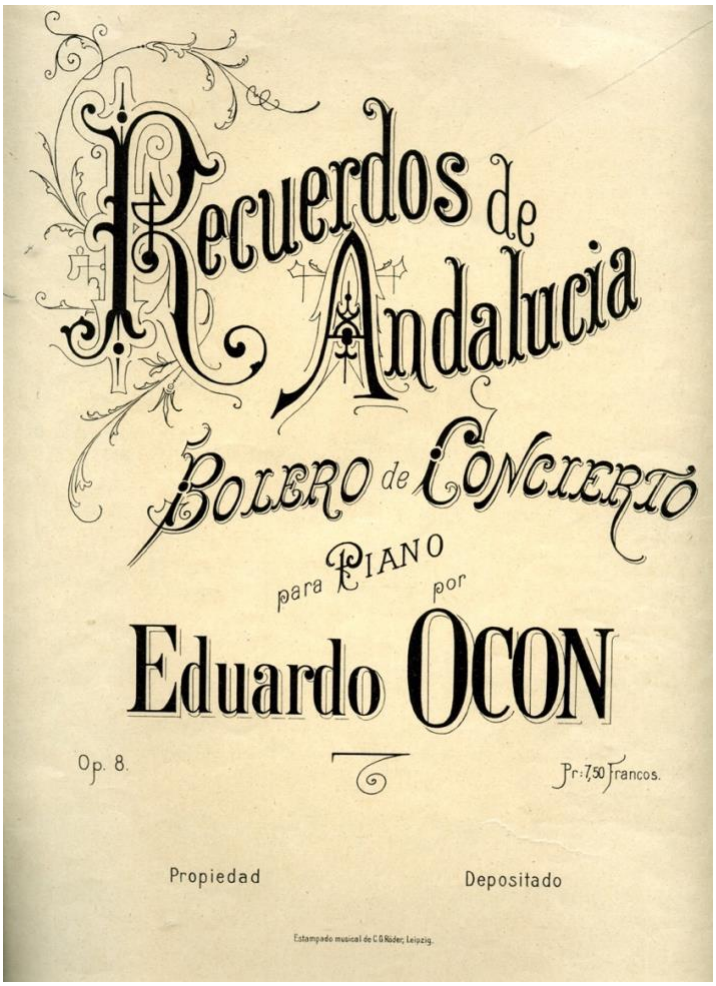
> Musical works are constructed like buildings. The constructive elements are more abstract, no doubt, but, not for that reason, less solid. The tonal bases of a musical work are its foundations. [...] When contemplating, for example, a gothic cathedral, the whole of the temple is embraced at first sight. Little by little, as the eye travels along the architectural profile, it discovers the tower, the spires, the flying buttresses, the shape of the apse, the tympanums of the doors; and, as if coming out of the shadows, the smallest details appear, images of the tympanums, fleurons of the ogives, gargoyles, ornaments and reliefs of the doors. Well, when listening to a musical work, the opposite happens, that is to say, from detail to totality, and the somewhat experienced listener can indulge in the construction of the work, as the performance unfolds. As on a white screen, a mysterious pencil is tracing lines, indecipherable at the beginning, but that, little by little, draw the tonalities that will serve as foundations; the main themes, first lateral wall; the central development, vault or dome; the re-exposition of themes, or second wall that closes the building; and, finally, the coda or final development, which corresponds to the turrets, pinnacles and spires.[8]

The inner voices, the most camouflaged of Heitor Villalobos' *Skyline,* generate a constant beat that makes the sonic dynamism possible. They may not be protagonists in melodic terms, but they

[8] Antonio Iglesias, ed., *Escritos de Joaquín Turina* (Madrid: Alpuerto, 1982), p. 175.

are at a rhythmic level. The score is not something static, it has a life of its own, something that gives it rhythm, another fundamental aspect for architects and musicians.

Rhythm reigns in the human being, it is present in the beating of the heart or in our walk and is indispensable in speech. The pattern of recurrence and continuity in architecture manifests itself through the repetition of elements, structures, forms, or details. Both sight and hearing seek some kind of organization to relate elements. That is why rhythm provides a stimulating effect, an emotional response of balance. Just think of the mosque in Cordoba or the Colosseum. Rhythm is closely linked to tempo, but above all to form, to the point that it conditions it. It is not in vain that rhythm is to music what drawing is to painting, as Ingres said. It is not for nothing that stable rhythmic patterns have flourished in such genuine formulas as the habanera, the seguidilla, the bolero, the tango, the *zortzico,* or the polonaise, with examples in *La morena cubana* by Joaquín Malats, *Segismunda* by Felipe Gorriti, *Recuerdos de Andalucía* by Eduardo Ocón, *Ocho Zortzicos* by Manuel Mendizábal, *Tango* by Isaac Albéniz or in Chopin's splendid polonaises.



Eduardo Ocón, *Recuerdos de Andalucía* for piano. Ana Benavides Collection.

But rhythm is indispensable in practically all artistic disciplines. According to Cristóbal Halffter, music is born from a mind with creative intentionality and establishes three necessary stages for it to

be produced: instrumentalists who convert graphics into sounds and a group of human beings willing to perceive in real time what the composer previously imagined. But none of this is possible without a person having previously imagined, thought, and ordered some sounds that pass to a graph according to some concrete, sonorous and formal intentions. This would actually be the first stage in creative intentionality.

Many believe that music is only intuition. Nothing could be further from the truth. According to Ravel, music that results solely from inspiration is not art, but chance. Just as architecture is defined as the science and art of construction, the "art of organizing sounds" is the most widespread definition of music. One day I asked Manuel Carra what was the first thing he projected in his mind when composing. He did not hesitate for a moment: the form, he told me. Joaquín Turina postulates in a similar way when he advised outlining the structural plan of the work before writing a single note. Even when jazz or flamenco musicians improvise, they do so on a solid structure prefixed in advance, essential so that the interpretation does not become chaotic.

Construction prevails in both the architect and the musician. Both work with a skeleton, a framework that supports the architectural and musical work. Little has changed in the principles of architecture since Vitruvius in the time of Julius Caesar proclaimed its main elements: "utilitas, firmitas et venustas." Architecture must provide utility, solidity and beauty. The utility is necessary, as is the support provided by solid pillars. Beauty is achieved by adjusting all architectural elements under the formal principles of proportion and symmetry.

Just as in architecture, there are horizontal and vertical pulling forces, so in music, we find something similar. Musical form is generally impressed by a constant force of gravity, that which derives from the tonal hierarchy, and which is necessary in both spatial and temporal art. It operates as much for the architect as for the musician. The perception of gravity is something natural to the human being, it surrounds us since we are born, long before giving it scientific consistency, hence its importance. In sound composition, gravity is largely impressed by the tonal system. On it rests much of the musical history of the West, to the point that violating these rules has been a challenge for many composers not always been successfully resolved.

The alternations of tensions and distensions towards the tonic play a fundamental role and are manifested both vertically or harmonically and in the horizontal directionality or conduction. It is another form of traction that simultaneously to the tonality is manifested horizontally through motives, themes, and sections that complete the sonorous edification. The composer plays with these materials similar to the architect, although using different materials. He repeats them, fragments them, varies them, shortens them, lengthens them, ornaments them, in short, alters them melodically, harmonically or timbrally. Isaac Albéniz was a friend of small forms, he built them like mosaics that were assembled to form the piece. He compared his famous *Suite espagnole* to the arabesques that recreate the architecture of the Alhambra. Beethoven also composed by small rhythmic cells that were unfolding and interlocking, like a layman. And José Luis Turina's *Preludio de Lindaraja* is also based on small concrete and evanescent cells.

Small assembled pieces is what Gaudí shows us recurrently. So prone to collage, especially in his exterior ornamentation, he affirmed that "originality consists in returning to the origin. So, he is original who, with his means, returns to the simplicity of the first solutions." A musical parallel can be

found in Federico Mompou, advocate of a "primitivism," a return to start from what already exists, but not in the form of a return, but a return with a different look. The Catalan master focused on the essential, in a desire for synthesis and conciseness, for the elimination of everything superfluous. His maxim was to make use of few, essential notes, and through the alternating and necessary interplay of sounds and silences.

Thelma Muro, Light and Shadow design, Dong'e Ejiao Museum (DEEJ World), Shandong Province, China.

"In my gardens, in my houses, I have always tried that the placid murmur of silence prevails, and in my fountains silence sings," claimed the famous Mexican architect Luis Barragán.[9] Mexican American architect Thelma Muro dialogues with the silence in her Light and Shadow design for Dong'e E Jiao Museum gateway ramp at DEEJ World Shandong Province, China, 2016. Silence in music or architectural emptiness has an imposing structural value. It gives it the architectural packaging it needs, and all musical or architectural itineraries must play with its alternation. As Leland M. Roth states, "the reality of architecture does not reside in the solid elements that configure it, but rather, the reality of architecture must be sought in the space enclosed by the roof and the walls rather than in the walls themselves." Beethoven advised not to break the silence if it was not to improve it, and when García Abril was asked what he thought was the best music, he did not hesitate: silence well used. Silences are manifested in music not only in the interpretation or listening, but also visually, in the score itself, a complex web of graphics and spaces.

Directionality also has diverse alternatives in music and architecture. The German pavilion in Barcelona proposes non-directional spaces. Without a defined directionality, there are as many routes as possible walkers. Open music also has its own bet, offering us different routes through sections that the interpreter can combine at will. Henri Pousseur was a pioneer in the use of the mobile form and the piano was his first field of experimentation. In *Mobile for two pianos* (1958), the performers choose the succession of elements to configure the work, conditioning the listening in parallel. The same principles are pursued in *Rimas para diferentes fuentes sonoras* (1959) and *Responso*

[9] Luis Ramiro Barragán Morfín, "El discurso de Barragán." See https://www.arquine.com/el-discurso-de-luis-barragan/.

para siete músicos (1960). In the opera *Vuestro Fausto* (1967) the spectators themselves decide the course of the plot. Cristóbal Halffter composes *Formantes para dos pianos* (1961), a work made up of eight different formants with multiple possibilities of recreation according to the combination chosen by the performers.

In addition, the concerted dialogue between music and architecture presents more points of coincidence, such as functionality and delight.

It is an established cliché to believe that music is conceived only for mere pleasure. Music is created and performed for dancing or singing, for bullfighting, for parades, for education, for work, for processions and even to muffle the heart-rending screams in a concentration camp. Music and religion were once very dependent, hence, St. Jerome's statement that the singer does not please God by his voice or talent, but by what he dictates to the heart. The waiting rooms of a doctor's office or a hospital need to reduce anxiety and have background music to match. Great sports competitions make use of hymns that extol identity. If advertising experts are aware of how music can work to arouse our interest, cinema has turned it into one of the most necessary and effective elements. Even in the ill-famed silent movies, the interventions of the pianist, besides driving the plot and predisposing the spectator, served to disguise the noises derived from the projection.

Walter Gropius affirmed that everything is determined by its nature and must respond to its own function. When, after the fire in London in 1834, Parliament had to be rebuilt in 1943, the neo-Gothic style was chosen, despite the opposition of many who were in favor of a fan-shaped layout, similar to that found in the legislative chambers of the United States or France. Churchill disregarded these voices, arguing that the English form of government had been defined by its physical space. In other words, architecture had conditioned the form of government.

Architectural space becomes vital in terms of musical purpose. Music conditions space and space conditions music. Johann Sebastian Bach was very clear about the ultimate purpose of his compositions. Committed to the Lutheran cause, his works were conceived almost entirely for the religious office. George Philipp Telemann (1681-1767) composed in 1732 one of his most important instrumental works, *Tafelmusik* (Table Music), to ensure the well-being of the nobles during the banquet. If cathedrals required large choirs and a powerful organ to satisfy the parishioners, the musical evenings in the Versailles of Louis XIV were located in smaller halls, which favored the liveliness of the tempos, the display of ornaments, the lightness and subtlety of the timbre and also conditioned the instrumentation. Wagner could not find an appropriate place for his operatic bets and had to conceive a new one to host his operas. Thanks to the patronage of Ludwig II of Bavaria, who provided him with the site, and to the architects Otto Brückwald and Carl Brandt, the Festpielhaus Bayreuth was built between 1872 and 1876. It is now the music that determines its location.

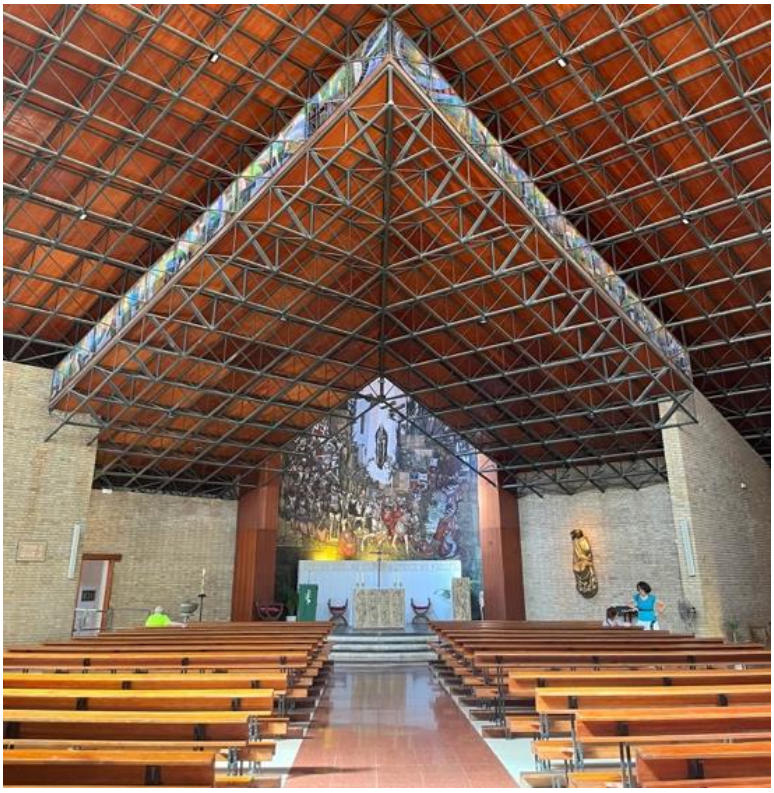
Popular music that is often performed in open spaces for recreation requires very loud instruments, such as the bagpipe, or even portable organs, useful in street processions, instruments with defined sound characteristics and suitable for their functionality. Large theaters are ideal for the great symphony orchestra, consolidated during the nineteenth century, just as the great sound power of the organ is optimal in large churches and cathedrals. The central position of the organ in the old Spanish cathedrals -as in the cathedral of Malaga- is not accidental. Acoustically it is more

advantageous, but also, the organ was part of the ritual itself, its central position corresponds to the fact that music in cathedrals was not a secondary element but something fundamental.

Malaga Cathedral organ, Málaga, Spain. Photo: Ana Rubio.

However, it is also true that functionality in music, as in architecture, can change over time. Many functional works left aside their original intention to become works for delight. This is what Mendelssohn must have thought when he managed to get Bach's religious works out of the religious precincts to be programmed in secular settings and for the enjoyment of all. Music had left aside its former functions and far from being a mere subordinate now lives for itself, providing pleasure, the last of the points of convergence that I propose today between music and architecture.

Surely when my architect has finished his house, which will be mine, he will want it to move us, to excite us. He will want it to stand and to please us, in other words, he will want it to go beyond technical audacity or mere utility. Architecture like music are manifest cultural artifacts; it is built to satisfy a purpose, but also to convey values and feelings. "For me architectural reality can only be about whether a building moves me or not," said Peter Zumthor. In the different arts, emotion seems to be an absolutely necessary ingredient, and there is no lack of testimonies to support this assumption. Leopold Mozart affirmed in the 18th century that the interpreter "must play everything in such a way that he himself is moved by it." To move was Joaquín Rodrigo's motto: "Music, he warned his students, must move, and if that does not happen, something is wrong." Possibly, as Óscar Esplá used to say, without the hegemony of affectivity, art has no reason to exist.



Iglesia Santa Rosa de Lima, Málaga, Spain. Photo: Ana Benavides.

A couple of years ago, I visited the church of Santa Rosa de Lima in Malaga. Since I was about ten or twelve years old, I had not set foot in this church. As soon as I entered, I was immediately transported to the world of my childhood. I relived my years with my grandparents, my uncles, aunts, uncles, and cousins, who seemed to return to my side. In fact, I didn't want to leave. It was an accumulation of emotions that assaulted me all at once. As Emilio Lledó says, human beings are pierced by the arrow of feelings, and at that moment I realized that emotion could come from very different angles. If music moves us, so can a space, giving us very similar sensations. One more sign of all that we share, of how much unites us and how little separates us.

> Music and architecture bloom from the same stem. The composer has his score. The architect has his system in which he works, and the minds are very similar, practically the same. My father was a musician...he taught me to see a great symphony as a building, a sound building. So, never forget the idea that music and architecture belong to each other. They are practically one.
>
> Frank Lloyd Wright[10]

Benavides, Ana. "Sound Architectures: The Relationship between Music and Architecture." *Diagonal: An Ibero-American Music Review* 9, no. 1 (2024): 51–67.

[10] Benavides, "Arquitecturas sonoras," p. 12.