How to Design Temporality. Maurizio Sacripanti's "Theatre in Motion" (1964-1965)

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Maurizio Sacripanti (1916-1996) was a Roman architect whose work is still not widely known beyond the limits of architectural research. Very active in Postwar Italy, his visionary projects reached their peak when it came to theatres. In 1964-1965, Sacripanti took part in the competition to design the Cagliari Opera House, with a project called "Theatre in Motion". In his proposal, Sacripanti suggested a theatre made of prismatic elements – shaping the stalls, stage and ceiling – which could be lifted and lowered through electroning programming, thus defining endless configurations of space, acoustics and lighting. Without numerical analysis but by means of in-depth historical research, including the acoustic report of the theatre, written by the engineer Libero Innamorati, this paper aims to analyse Sacripanti's design method and its connections to the fields of acoustics and temporal design.

Key words: Maurizio Sacripanti, Theatre in Motion, Theatre Design, Variable Acoustics, Libero Innamorati

1. INTRODUCTION

The goal of this paper is to illustrate and analyse an unbuilt project by Maurizio Sacripanti (1916-1996), a Roman architect whose work is still little known beyond the research field of architectural history and design. Although this proposal was left at the drawing board and because of Sacripanti's great interest in theatre design, it is important to highlight the key architectural and technical factors which characterise his most famous theatre project, called "Theatre in Motion" (1964-1965), for the New Opera House in Cagliari. This project is also included within the wider debate on modern and contemporary theatre design, spanning from Walter Gropius's "Totaltheater" proposal (1927) to more recent examples. Furthermore, the peculiar design of this theatre is commented on from a temporal design point of view. In addition, by analysing the acoustic report written by the engineer Libero Innamorati, an overview of the methods for the acoustic design of the hall is given, thus connecting this particular project to the wider field of variable acoustics. Due to the author's background in architectural history, the methods and tools used to write this paper are those of this discipline, namely archival and bibliographical research.

2. MAURIZIO SACRIPANTI. A VISIONARY ARCHITECT

Maurizio Sacripanti (Rome, 1916-1996) was one of the most visionary and eclectic designers of his generation. Born in Rome during World War I, he graduated in Architecture in 1943 and worked both as an architect and as a professor for "La Sapienza" University in Rome. His projects spanned from skyscrapers to museums, from churches to schools, although the most of them were left unbuilt [13].

2.1 The New Theatre of Cagliari

In 1964, the Municipal Administration of Cagliari (Sardinia) launched a public competition for the design of the town's New Opera Theatre, to fill the void left by the bombings of the Second World War. Sacripanti, together with his colleagues (among them, the painter Achille Perilli and a very young Franco Purini), took part in the competition and his proposal was placed second. Yet, although this failure prevented Sacripanti's vision from being built, this project would have a much greater echo than that of the actual winners of the competition (architects Ginoulhiac and Galmozzi). The project, officially named "Theatre in Motion" and whose ironic

motto was “Oui, c’est bon!”, is keenly described in Maurizio Sacripanti’s book *Città di Frontiera* (1973).

3. ARCHITECTURE AND MOVEMENT

«At the 32nd Venice Biennale a ballet by Cage was put on at the Fenice Theatre, with scenery and costumes by Rauschenberg. I went along, and was greeted by music which was at one and the same time heretical, confused, prehensile and repelling. But then came a new kind of production. There was no longer a stage-set with fixed objects, but a “non stage-set” with moving objects communicating solely through the compositional compatibility of mobile planes, the painted bodies of dancers, the play on materials and conveyor-belts» [8].

In the 20th Century, the Fourth Dimension was quickly absorbed into the figurative arts, such as Cubism and Futurism, and, as written by Sigfried Giedion, «introduces a principle which is intimately bound up with modern life – simultaneity» [7]. Previously, it had always been hard to discuss time and temporality in architecture, due to the fixity of what is built. Nevertheless, the Modern Movement changed this long-lasting idea of a still built environment: Bruno Zevi, one of the most eminent architectural historians of the 20th Century, highlighted the importance of time, by including the «temporal space» [12] within his so-called «seven invariants» of modern architecture. In 1973, years after the spatial and temporal revolution proposed by the architects of the Modern Movement, such as Le Corbusier, Mies Van Der Rohe and many others, Zevi described the dynamic features of their modern buildings. Far from the one or two-point perspective views of classical architectures, modern structures must be understood by means of movement and, therefore, time.

Yet, it is unlikely that the architect accepts the flow of time over his or her creations – a time that does not follow the strict rules that the designer sets at the beginning of the project. Although one can claim that time is a pivotal element of modern design, modern architecture is still far from being the result of a “temporal” design, as we mean nowadays. Therefore, only a few buildings in the history of architecture are able to accept the passing of time and can transform movement and the human experience into a key factor of their programme. Among them, Maurizio Sacripanti’s design for the theatre in Cagliari is a worthy case-study.

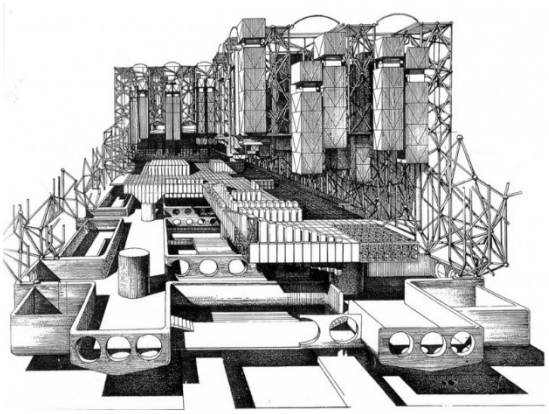

Fig. 1 - Theatre in Motion. (Perspective) [8]

3.1 A Theatre in Motion

«The performance abounded in vitality. A change of lighting would annihilate or exal it, and the resulting pattern was created by the stage-designer’s propos. The spectacle called for boundless gestures but the confined space of the stage made it impossible for the stalls and the stage to come to one [...]. The stimulating spectacle and the frustrating stage remained at the back of my mind. The idea took shape when I designed the “theatre in motion” as my entry in the open-competition for the new Cagliari theatre» [8].

Sacripanti’s entry for the theatre in Cagliari is from any viewpoint unique. He suggested a theatre made of prismatic elements – shaping the stalls, stage and ceiling – which could be lifted and lowered thanks to electroning programming, thus defining endless definitions of space, acoustics and lighting, according to the different performances which a theatre can host. The architect was therefore able to sketch on paper what Bruno Zevi called «the sixth invariant of modern language: the temporal space» [12], which hosts and enhances all possible events.

The design of the theatre is thus opened up to everything that may happen within its space. Polyfunctionality is indeed a key factor, as it helps architecture adapt to a dynamic society whose desires are to experience several functions and forms at the same time. As a matter of fact, the “Theatre in Motion” covers functions which are not only related to performances: it can host conferences, meetings, exhibitions, festivals, and so on, thus becoming a pivotal space for any event in the community. Ultimately, Zevi’s «electronic era» is reflected in Sacripanti’s vision, where «action and reaction are simultaneous» [12].

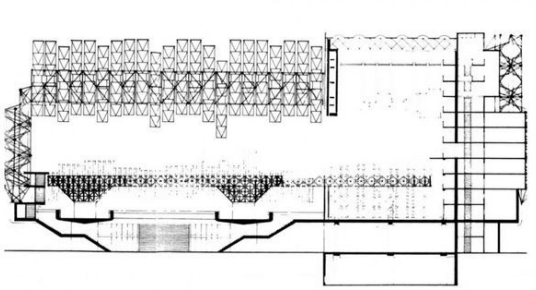

Fig. 2 – Section of the Theatre. For the ceiling, each moveable prism is 220x220cm. For the stalls, each module is 100x100cm. [8]

In addition, Sacripanti would claim, after the conclusion of the competition in Cagliari: «The aim of an ideas-competition is to find ideas. After the Berliner Philarmonie there is nothing else to suggest when it comes to traditional theaters. We have to move forward, inventing a machine which, although embracing the past, can make the future possible, or make it even present» [13].

3.2 Architecture as an Open Work

Sacripanti's proposal was described by the architectural historian Manfredo Tafuri as a «field of organic flexibility within space», a concept related to what Umberto Eco suggested in his essay Opera Aperta (Open Work, 1962). The "Open Work" is a «field of interpretative possibilities», so that «the user can be exposed to several and variable interpretations» [6]. Although Eco analysed the arts of music, poetry and cinema, where «every use is an interpretation and a performance», without dealing with architecture, still considered too far from flexibility compared to the other arts, Sacripanti's idea for a theatre is extremely flexible and can be well defined as an "open work". In his words: «The floor may therefore be utilized in a variety of ways, raised, lowered, composed at different levels, made into slopes, platforms, walls and staircases thus lending itself to a vast range of possibilities» [8].

3.3 Towards a Reconfigurable Architecture: Former Experiments and Future Influences

The "Theatre in Motion", whose mechanism will be discussed later, was inspired by Walter Gropius's "Totaltheater", designed by the Bauhaus master in 1927, together with the Hungarian engineer Stefan Sebök. The project, commissioned by the director Erwin Piscator, mirrored Gropius's desire to create an engaging environment for the audience and, therefore, he eliminated the proscenium in order to bring the actors and audience closer together. As highlighted by Giulio Claudio Argan, Gropius wanted to give more intensity to people's existence, in an era of automatic and alienating work [1]. Before properly analysing Sacripanti's project for the Theatre in Cagliari, it is important to mention two scenic experiments of the time, which greatly inspired the Roman architect: Peter Blake and David Hays's proposal for a "Flexible Theatre" (1961); Alain Bourbonnais's project for an "Experimental Theatre With Multiple Transformations" (1963). Traces of these projects can be found in Sacripanti's Archive at MAXXI Museum, Rome [14]. Moreover, Sacripanti's design also echoes Antonin Artaud's scenic avant-garde proposals, which longed for the theatre as «one space, without divisions or barriers» [2]. This ever-changing structure makes it possible to assert that Sacripanti is one of the few architects who adds the dimension of time to his works, mirroring Fernando Távora's words on the "Organisation of Space" (1962), written nine years before Zevi's «seven invariants»:

«There is a third hypothesis, for which the same point is not still, static, but in movement; in this case, we should add to the three dimensional parameters (x, y, z) the fourth dimension of time (t)» [11].

It is interesting to note that Sacripanti chose theatre design as the field of architectural design where he could best introduce the temporal factor. Perhaps, while attending a performance, we perceive the flow of time with more intensity, as both theatre and music are arts that are set in time itself and, therefore, help us experience the temporal side of architecture. This time-influenced building offers several spatial schemes, from classic sets to contemporary scenic experimentations, by means of a reconfigurable space, both internal and external. It is worth underlining the internal reconfigurable space of the theatre, corresponding to the scenographic possibilities given to the performances. The need to overcome the «frustrating space» offered by modern theatres – far from being flexible and still influenced by the traditional setting of the stage – is an effect of Postwar theatre experimentations, such as Jerzy Grotowski's proposal for scenic designs (1959). Moreover, a flexible use of the space is also linked to an audience-oriented way of listening to contemporary music. It is thus important to remember Pierre Boulez's "rug concerts", organised in the Philarmonic Hall of New York City, in 1973.

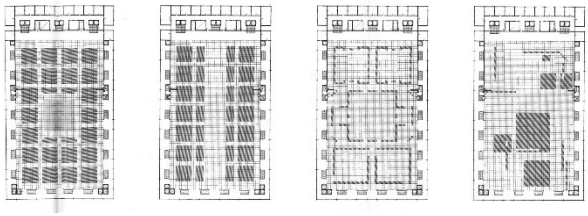

Fig.3 – Possible Reconfigurations of the Hall. Dark gray areas refer to seat occupancy [8]

In that case, reconfigurability was not an architectural feature, but an intention of the conductor, who hoped for an emotional engagement of the audience, therefore mirroring Gropius and Sacripanti's ultimate goals. Nowadays, spatial reconfiguration within theatre design can still be traced in contemporary projects, such as Frank Gehry's "Pierre Boulez Saal" in Berlin (2017). This "Salle Modulable" shares some traits with Sacripanti's "Theatre in Motion": in fact, it is shaped as an oval hall where the position of the seats is flexible and changeable [4].

4. AN ITALIAN APPROACH TO TEMPORAL DESIGN AND ACOUSTICS IN THE 1960S

Although Sacripanti's "Theatre in Motion" can be described as monumental, idealistic and perhaps an outcome of those visionary architectural times, it is interesting to notice how much value is given to details when it comes to the description of the project itself. Moreover, not only are architectural and structural details provided, but Sacripanti also offers reports and clarifications on the technical and acoustic characteristics of the building.

4.1 In Search of Temporal Design Through Electronic Control

«The ceiling shows a corresponding "elasticity". Its composition is analogous to that of the stalls, but it uses larger and longer prisms which, with the application of various kinds of interchangeable panelling, complete the functional inventions of the theatre, form the covering, and modify the acoustical, spatial, psychological and functional conditions. This ceiling may in fact define an enveloping space or a repelling space, may be an acoustic corrective, a support for the illumination of auditorium and stage, a screen for the integrative projection of the scenic space, etc» [8].

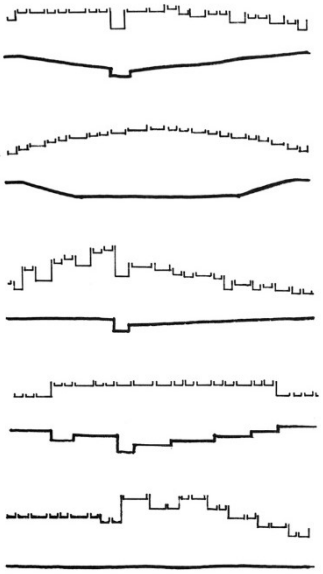

Fig. 4 – Different Configurations of the Hall (Sketch) [8]

In this context, what is most interesting is to stress the importance of Sacripanti's definition of «elasticity» in relation to the possibilities of design. As a matter of fact, the possibility of reconfiguring the theatre space is also connected to the individual's personal experience during the performance. When Sacripanti mentions «psychological conditions», he surely has in mind his own experience when attending Cage's performance at the 32nd Biennale. Architecture is indeed able to psychologically affect its inhabitants and several studies on environmental and architectural psychology have recently been conducted [3]. Nevertheless, modern architects, such as Le Corbusier and the teachers at the Bauhaus, mainly reflected on the use of colours and less on dynamic spatial changes, when it came to the psychological conditions created by their projects. On the contrary, through the design of the theatre in Cagliari, Sacripanti wanted to define a whole architectural space able to embrace all possible psychological effects, from maximum openess to complete closure, playing with surface and volume changes. Almost naively, Sacripanti arrived at something that we may define as an early attempt to design architectures by means of temporal design. We should remember that Sacripanti worked in an era of electronic utopias, therefore he opted for an electronically controlled system to be included in this project. Thanks to the moveable modules, psychological conditions are also conveyed through the acoustic and lighting changes within the hall.

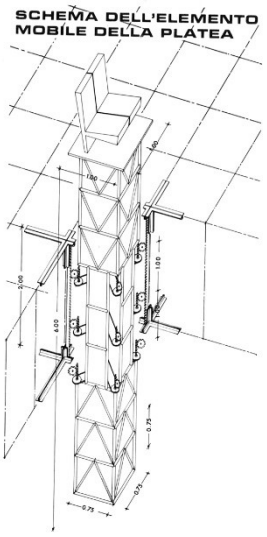

Fig. 5 – Moveable Seat. Detail of the Original Project [8]

When it comes to their technical features, Sacripanti describes the operating principles behind this complex machine-building very well:

«The elements, supported on a metal grid two metres high, which make up the stalls, have been designed as pistons and run along racks joined to the grid; two rotating seats, which may be dispensed with, have been collocated at the apex of each elements. [...] Mechanically, the spatial modifications are obtained by means of electronic controls which may be operated through a small servocomputer, both by punch-cards and by manual data introduction. This latter operation has been planned through the use of a light-pen and CRT (Cathode Ray Tube) access system. A CCTV (close-circuit television) gives a direct picture of the changing structure of the theatre. Thus the project realizes a real interactive "on-line" communication system between man and architecture» [8].

To conclude, it is clear that the architect was searching for a dialogue between «man and architecture», which is possible thanks to electronic programming. As Manfredo Tafuri claimed in 1968, it is indeed hard to be a critic of contemporary architecture when this architecture is largely made up of hypotheses and unbuilt projects [10]. Therefore, it is even harder to debate whether Sacripanti's unbuilt project for the theatre in Cagliari was an early experiment of today's notion of temporal design. What is sure is that this design comes from an era of utopian dreams about technology, that have evolved in time and that can still influence our contemporary approach to architectural design.

4.2 A Theatre Designed as a Cinema: Notes on the Acoustic Report by Libero Innamorati

«There are changes, each time, in the geometrical shape, in the volume, destination, number and disposition of the seats of each space. As for acoustic design, it has been important to take into account all these factors and therefore a sound-absorbent treatment was opted in order to satisfy all possible needs» [8]. The reading of the acoustic report attached to Sacripanti's project and written by Libero Innamorati, engineer and acoustician, is pivotal in order to understand how the field of architectural acoustics was conceived at that time. Innamorati, former president of the ATIC (Italian Technical Association for Cinematography) used an acoustic approach which is similar to the one used for the design of cinema halls. While this should not come as a surprise, as Italian acousticians were skilled in cinematographic studies at that time, the calculations written by Innamorati seem clear and precise.

Acknowledging that each reconfiguration of the hall leads to a change in its spatial and acoustic characteristics, the engineer defines three different configurations through which the theatre can be used. The first hosts theatre or musical performances and is shaped like an ordinary theatre hall (1); the second offers a "flat" position of ceiling and floor, which are thus parallel, for hosting sport events (2); the third divides the main hall into two minor halls (3.1/3.2). By calculating the volume/surface ratio and defining a different preferred reverberation time for each configuration, Innamorati identifies the maximum and minimum quantity of sound-absorbent material to be used within the building. In particular, when assuming the ideal reverberation time for the reconfiguration of the theatre as a sports hall (3.2), it is interesting to note a reverse use of the Lombard Effect: he claims that it should be «the lowest possible, in order to minimise the noise caused by the audience's bustle», thus opting for K=0,4 and T60=3,25K=1,3s (see Table 1) [6].

Considering a fixed quantity of sound-absorbent material, related to the seat occupancy and the lateral walls (ranging from 1050m^2 to 1800m^2), in order to have an extra variable quantity of sound-absorbent material (ranging from 100m^2 to 2500m^2) he suggests attaching two moveable hemispherical elements to each module of the ceiling, in order to define a whole sphere at the bottom of every moving prism. One hemisphere is made of sound-absorbent material; the other can instead reflect the sounds.

Table 1. Different Configurations of the Hall Data by Libero Innamorati [6]

	1	2	3.1	3.2
Stalls Surface [m^2]	2250	3420	1800	1485
Walls Surface [m^2]	1410-1995	1936	1360	1472
Ceiling Surface [m^2]	2250	3420	1800	1485
Total Surface [m^2]	5910	8776	4960	4442
Volume [m^3]	23625	34200	18000	15576
Volume/Total Surface	4	3,9	3,6	3,5
Volume/Ceiling Surface	10,5	10	10	10,5
Seats [unit]	1500	2960	1848	1152
K	0,4 ÷ 1	0,4	0,4	0,4
T60	3,4K	3,5K	3,25K	3,2K
Sound-Absorbent Material Min-Max [m^2]	1100-2700	4000	2200	50-2000

Thanks to electronic controls, the rotation around a central axis of the spheres can define all possible configurations of sound-absorption or reflection within the theatre itself.

Although studies on variable acoustics have developed in recent years [5], by reading this report the special attention given to acoustics is evident. Instead of being defined after the architectural project, the acoustics are taken into account at the same time. To conclude, this brief consideration had the aim of highlighting the value given to the functionality of the architecture imagined, no matter how monumental and idealistic the project may be.

5. CONCLUSIONS

In 1976, the scenographic ideas for the theatre in Cagliari were also proposed for a new theatre in Forlì. As Sacripanti won the competition, he was therefore closer to the actual realisation of his visions. Although in this project the architect needed to deal with a historical presence, he designed a small portion of the stage with the same electronically-moveable pistons. However, the failure of the project stopped the interesting dialogue between Sacripanti and COAM (a firm producing lifts), whose remit was to produce the moving modules. In this way, once again, Sacripanti's ideas remained unbuilt and this second defeat eventually consigned the possibility of a moveable architecture to paper, for the foreseeable future.

In conclusion, this paper has described Maurizio Sacripanti's project for the theatre in Cagliari and similar projects for theatres. Moreover, it has provided a brief overview of the important issue of time within modern architecture, in relation to Sacripanti's peculiar approach to theatre design, and it has tried to determine if this project can be considered as a first step towards a contemporary notion of temporal design. Finally, the acoustic project of this theatre has been presented and debated, by analysing the original report. By writing these considerations, the author wishes to arouse more curiosity about Maurizio Sacripanti's works, in order to foster more studies on his architectures.

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