Geometry, Space, Configuration: a Meeting with Anna Sgrosso

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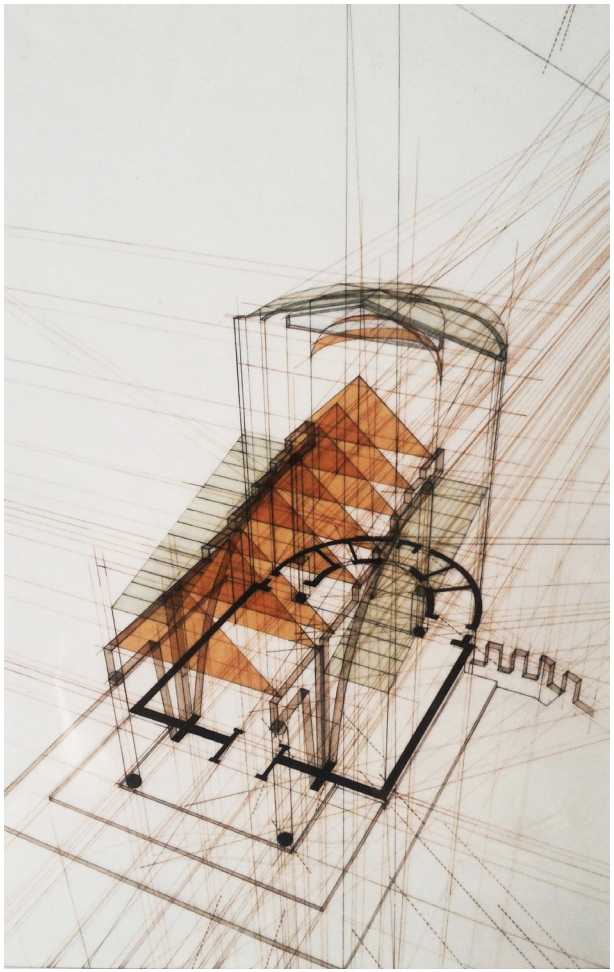
During the last Congress of the *Unione Italiana per il Disegno*, held in Naples, the *2017 UID Gold Medal* was awarded to Anna Sgrosso with the aim of rewarding the complex of scientific and cultural activities promoted at the University of Naples Federico II over a long and prestigious career. Thanks to her studies, both in architectural and mathematical fields, Anna Sgrosso has revitalized Descriptive Geometry, finding new expressive and communicative impulse in the study of its projective roots and in the links that this discipline establishes with the world of figuration and art.
In particular, Anna Sgrosso's proposal to use traditional representation systems (Monge, axonometry, perspective) in an unconventional manner led to an innovative interpretation of architecture –realized or in progress–, in which it is possible to identify structure and geometric genesis of the spaces. But the great passion for drawing of professor Sgrosso also emerges from the unconditional endeavor generously given in teaching activities at the Neapolitan faculty of architecture, where she trained entire ranks of students who still today show affection and gratitude towards her. Perhaps this is the most correct key for interpreting his extraordinary professional success! Although Anna has been busy over the years in important cultural, institutional and managerial commitments, she has not spared herself

Articolo a invito a commento della Lectio Magistralis di Anna Sgrosso, non sottoposto a revisione anonima, pubblicato con responsabilità della direzione.

in didactic field, fusing scientific rigor with an extraordinary humanity. So, we can say with certainty that Anna Sgrosso founded a 'school', whose students are now teachers in many Italian universities, spreading her research and training methodologies, as well as her critical studies, throughout the country.

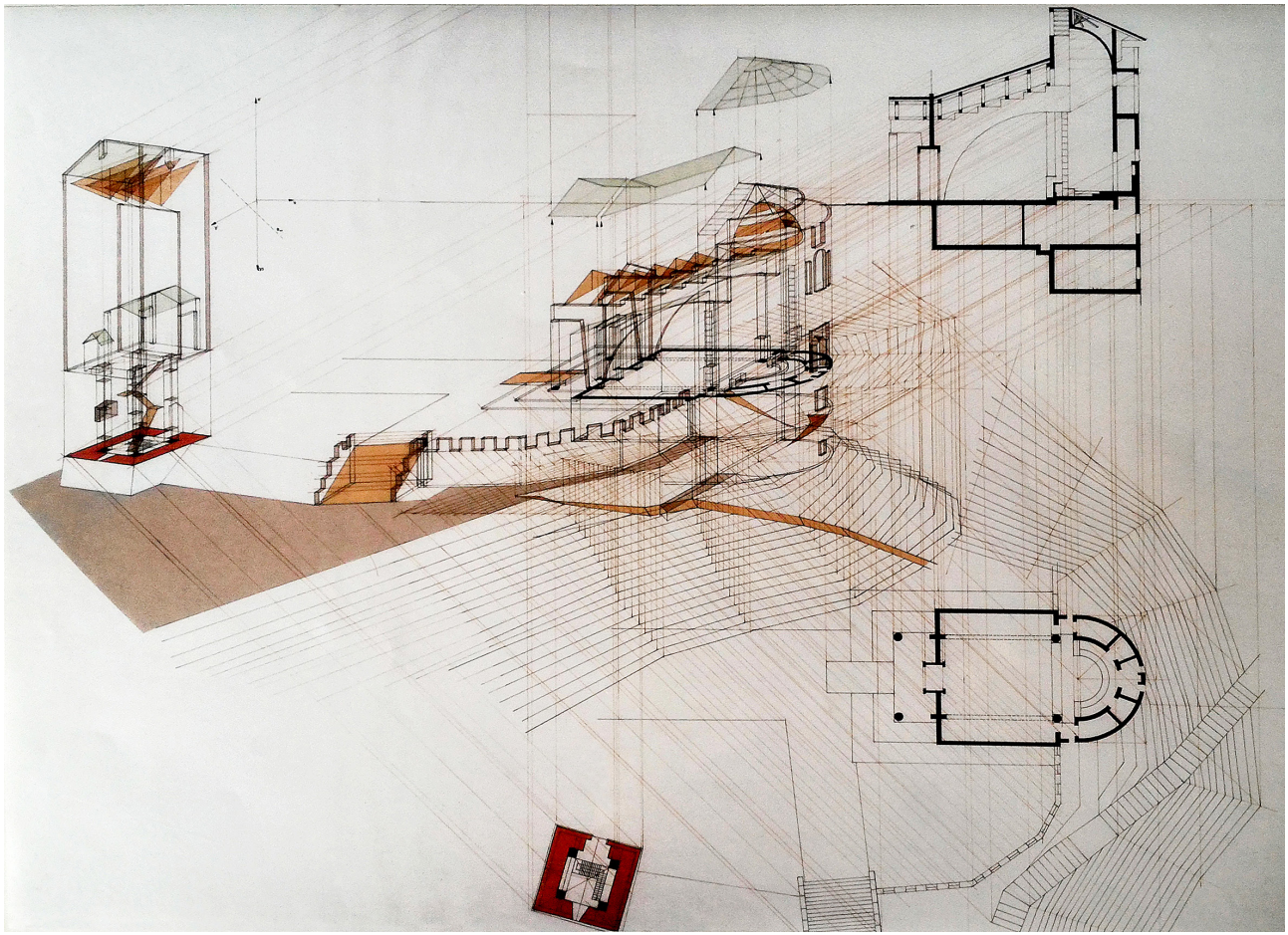
Fig. 1. A. Romano Burelli (with P. Gennaro) Saint Helena Empress Church, Montenars. Bird's eye perspective. Drawing by Alessandra Pagliano.



At the end of December 2017, the authors of these pages, as her former students, met Anna Sgrosso at her home, a place assiduously frequented during the last twenty years, not only for reasons of study but also for sincere affection. Reference master and scholar, but above all dear friend, even on that occasion Anna confirmed her incredible charisma: talking with her means facing a journey into memory, full of hilarious but also dramatic episodes. Indeed, During the conversation, several issues were addressed, such as the one concerning the situation of the Napolitanean *cursus studiorum* in architecture at the time of her degree –it was the year 1950 and *'la'* Sgrosso was one of the first women that graduates in architecture at the Federico II University in Naples after the Second World War– especially in relation to the disciplines of drawing. Anna was, then, 'voluntary assistant' in the *Descriptive Geometry* course held by professor Mario Giovanardi: the described situation also included the course of drawing from life. However, in the teaching system following the First World War (specifically in the academic year 1928-1929) the course of *Live Drawing* and that of *Descriptive Geometry* did not exist; only one *Figure and Ornate Drawing* course were established, held up to the A.Y. 1935-1936, when they were replaced by the course of *Live Drawing I*, followed, at the second year, by the course of *Live Drawing II*. This situation lasted until the A.Y. 1969-1970. The course of *Descriptive Geometry*, established in the A.Y. 1932-1933, will then take the title *Descriptive Geometry and Elements of Projective Geometry* (from 1935-1936), keeping it until 1969, when DPR No. 995 of 31.10.1969 was issued in relation to the reorganization of the studies of the faculty of architecture, and *Descriptive Geometry* comes back to this simplest denomination, placing the *Applications of Descriptive Geometry* at the second year. At a certain point the first of the two geometry courses is closed because the second one, the *Applications*, is considered sufficient; but to avoid a lack of knowledge and therefore learning difficulties, the main concepts of the first course will be reported at the second year. It is precisely Anna Sgrosso who proposes, at a national level, to name that course *Fundamentals and Applications of Descriptive Geometry*, as: "it would have been absurd to teach 'applications' of a subject whose theory is not known!" [1]. Among these applications photogrammetry would have been included. Other fundamental disciplines will be *Drawing and Survey* at the first year, replacing the *Live Drawing I*.
The first teaching experiences in Descriptive Geometry and its applications, in Naples, therefore passed through

Anna's work with some key figures: Mario Curzio, Mario Giovanardi, Rodolfo Permutti, and Maria Miglio. The experience made in particular with Permutti and Miglio is fundamental for Anna Sgrosso who considers them: "both extraordinary people, even if in a different way".
During the conversation, when we attribute to her the birth of the so-called 'Neapolitan school' of Descriptive Geometry as a science of representation applied to architectural configurations, Anna replies: "And does it seem strange to you? Won't it be because I am an architect? However I did not know at all that I had even founded a 'school'! And if this is true, of course I'm happy". Regarding the scientific approach, it must be recognized how the frequentation of the institute of mathematics on the one hand helped her preparation, on the other, it subverted teaching and interrogation methods during the examination, it was not usual

Fig. 2. A. Romano Burelli (with P. Gennaro) Saint Helena Empress Church, Montenars. Configurative representation of the building: Cavalier axonometric projection. Drawing by Alessandra Pagliano.



to ask students 'why' referring to statements recited often in a mechanical way; this pushed towards the understanding of the *ratio* that precedes every algorithm. Her scientific approach also has specific implications in teaching, while Anna refers to: "clarity and precision, above all in 'doing' lesson!", on the other hand, she remembers how, during the *Drawing and Survey* course, which she held for several years, she was even able to amuse the students; indeed, Anna had 'invented' an original way of analyzing buildings –already surveyed and represented following the canonical methods of Descriptive Geometry (Monge, perspective and/or axonometry)– advising students to go further in translating architecture into an 'exploded axonometry' that privileges a configurative reading. With this suggestion she meant an image of the building in which to eliminate the thicknesses of walls and stairs, so that in the new images only the edges remained: in this way exterior and interior would have emerged together. The final drawign would have been not only more readable, but also more 'elegant'. In reference to this kind of abstract analysis, la Sgrosso recalls an extraordinary experience performed in the academic year 1981-1982, that is immediately after the serious earthquake that devastated Irpinia on November 23th, 1980. Following the disaster, a group of teachers stipulated an agreement between the University of Naples (not yet split in the two universities) and the municipality of Gesualdo –a small but beautiful town that had suffered serious damage– with the title *L'Università per Gesualdo* and the subtitle *Un impegno di idee e di progetti per la ricostruzione e lo sviluppo del dopoterremoto* [Caterina, Gangemi 1985].
To this initiative, and at the precise request of the proponents, Anna Sgrosso adhered with great interest as a teacher of *Drawing and Survey*; each (the other teachers of the group belonged to different disciplines) would have offered their contribution to the reconstruction of those towns. Being a perfect knowledge of the site necessary, evidently obtained through a careful survey of the entire inhabited area, the work of Anna: "imposed itself as first operation to do". For this reason, it was formed a working team composed by students, to whom the survey of Gesualdo was proposed as exam theme of the year: "but not before asking whether a good number of them wanted to follow me up there, for the necessary operations […]. Instead all the students enthusiastically adhered to that initiative". The outcomes of this survey was published on the mentioned text with the title *Il rilievo: analisi di forme e sintesi di strutture*. This contribution, in addition to a detailed description of the site and the methodology adopted for the effective construction of images, collects the graphs performed by the students, together with photographic images, in particular those related to: "the splendid sculptural details that decorated the portals of the houses". But the same pages also show the innovative interpretations that Anna defines: "configurative-structural representations", readings of architecture, in transparency and without thickness of the walls, that highlight, in a sort of *ante litteram* wireframe, the paths, the connections and the geometric-structural matrices of the buildings. In the Sgrosso's vast scientific production there is a constant interest in the term 'structure', aimed at examining the building as meta-text and linguistic form: in this sense, Sgrosso refers to coeval research contexts on semiotics, in particular to studies by Renato De Fusco, with whom she establishes a certain convergence of interests on the architectural phenomenon. Anna Sgrosso recalls a conversation with De Fusco about the concept of space, a theme on which she was writing an essay: "Renato seemed very interested in this subject, so much to publish the text *Topologia e architettura*– in the magazine *Op. Cit.*, which he directed, even as the first essay of that number" [Sgrosso 1979]. In this regard, Anna clarifies that topology, which has always been one of the subject of mathematical studies, introduces, alongside traditional geometry –which in the architectural project plays an essential role– a new concept of space, considering it in the sense of 'place' (from '*topos*'), stating that: "The resulting methodology brings to a meta-formal approach, aimed for abstracting from the architectural structure, going beyond the tangible data (which remain within the Euclidean geometry), its most real and intimate essence that could be defined precisely with the term of 'meta-form'.
It is therefore clear that Anna Sgrosso's contribution appears to oscillate between two poles: on the one hand, the study of the projective rules of images, on the other the historical study of methods and forms of representation. If we analyze her scientific production, her fundamental contribution to both thematic areas is evident. In particular, in 1984, Anna published a small book, a forerunner of the vast editorial project on the history of methods of representation [De Rosa, Sgrosso, Giordano 2000-2002]. This is *Il problema della rappresentazione dello spazio attraverso i tempi* [Sgrosso 1969], of which we report below the introduction, first because the covered topics are extremely present in some researches of our disciplinary sector, and second because the concept of space is articulated with great lucidity.

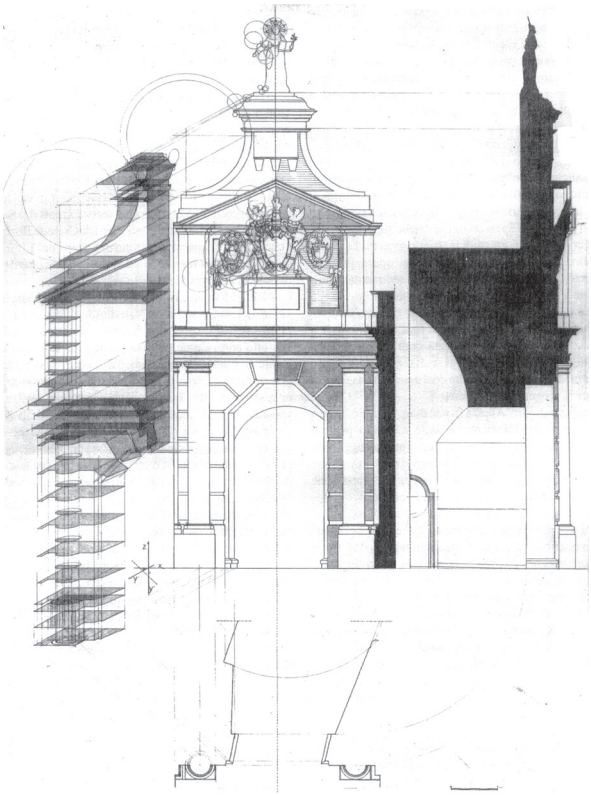
This introduction constitutes a unique synthesis for the times, which usually tended to delineate the development of methods through the interpretative key of geometrization. The same issue had already been addressed by others, previously, but never so broadly in terms of the historical interval examined.

On geometry and space

The following text is a translation of an excerpt from the introduction to the Anna Sgrosso's book entitled Il problema della rappresentazione dello spazio attraverso i tempi, published by Stabilimento poligrafico I.E.M., Casoria, in 1969.

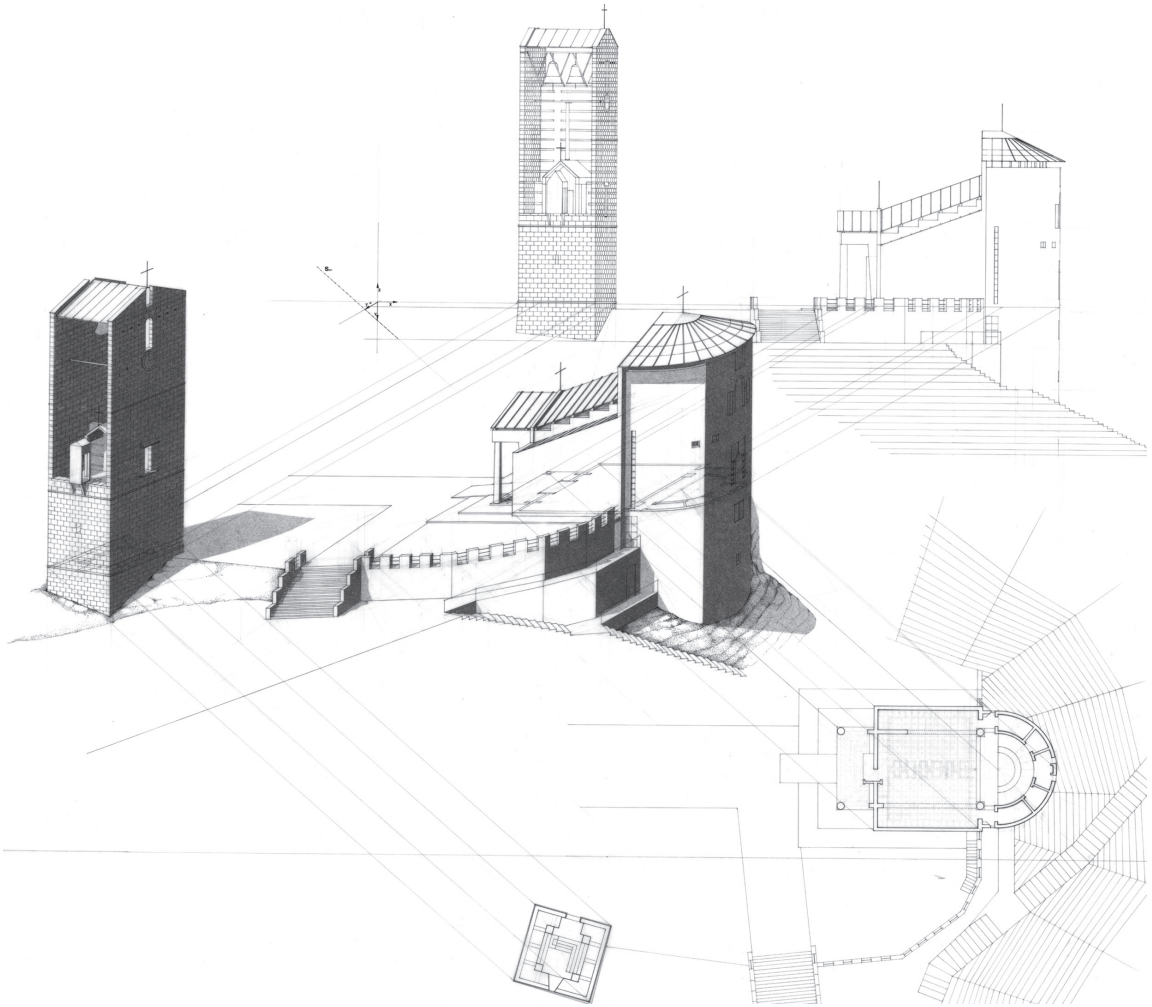
The concept of space structure assumes today a decisive weight and a precise role in the dialectic between figurative arts and mathematical sciences, while the research for a definition and characterization of the same space dates back to the time of Greek civilization and it is intimately connected to the great mathematical-physical discoveries, as well as to the positions reached by philosophical theories.
However, a precise definition of space concept has not yet been formulated, although its properties have been postulated: space is isotropic, homogeneous, infinite, so it is also measurable; but its three-dimensionality: "appears as an accidental configuration justified only by experience" [Jammer 1963, p. 164].
The research for a conceptual construction of space therefore poses both the problem of the physiological perception of the space itself, and that of its representation. So, Perception and representation are closely linked in the same expressive process; but the research for a spatial representation coincides with the research for the means to achieve it. These means, offered rigorously, or sometimes empirically, by geometry, constitute choices made in a given direction according to the dominant tendencies of every historical epoch.
Today the problem of representation appears intimately linked to linear perspective, above all because of the enormous diffusion of the photographic medium, which seems to confirm its validity. In reality, the representation-perspective binomial limits the very meaning of geometry, falsifying its role and giving it a weight different from the actual one.
The choice of a particular representative methodology must be consistent with the mathematical philosophical thought of its time: the figurative arts, in which this thought is reflected, therefore have an important part in this selective process. But when this consistency is lacking, a phase of rupture is determined, characterized by the rejection of the methods hitherto adopted and the research for others more responsive methods to new needs.
When the revolution of modern art began with the Impressionists, the rejection of the rigid schemes then dominant began, and the alternatives that were proposed took on a precise, though not definitive, dimension. After various experiences, which can be considered otherwise attempts of breaking up, the research in the pictorial field has become more and more decisive towards the rejection

Fig. 3. Alba city gate, Naples, geometric and structural representarion of the city gate. Drawing by Andrea Giordano.



of the geometric representation of space, that was, then, emptied of all its ideological meaning and crystallized in too strict constraints.
On the other hand, while the profound and radical changes undergone by mathematics extend the field of its operations and deductions, geometry today is no longer today able to provide an equally valid code, as linear perspective did during the Renaissance, also if it, even with the advent of projective, had opened many roads to pure inquiry and a large number of applications.
In this way we are witnessing the figurative research of new representative means more responsive to the modern

Fig. 4. A. Romano Burelli (with P. Gennaro) Saint Helena Empress Church, Montenars. Shade and Shadows applied to a Cavalier axonometric projection. Drawing by Alessandra Pagliano.



concept of spatial structure, and on the other hand to a new direction of mathematical studies: such studies, however, seem strangely to ignore geometry. This can partly be explained by the advent of a new theory which, polarizing the interest of researchers in a precise direction, neglects the other branches of mathematics or at least those that are not, or do not seem, likely to benefit from new ideas.
To the geometry and consequently to the perspective, today only the role of providing the technical means has remained, after all these means have been already challenged even at the level of simple representation, not only pictorial, to define spatial configurations.
The problem thus assumes a new dimension: geometry, lost its value as an object of study and research, it is no longer able, now, to provide a satisfactory code that is appropriate to new needs; but the total rejection of its methods, without the proposition of a valid alternative, determines as a logical consequence only the aggravation of today's state of crisis.
The methodological revolution of the figurative arts and the revolution of abstract mathematical procedures have not found their equivalent in geometry: but the need for the retrieval of new representative code does not, in my opinion, exclude research in the geometric field. I think, on the contrary, that the efforts of the researchers must converge in this direction, because geometry can and must be the instrument capable of providing this code.
It is therefore necessary to return to this discipline, its true meaning and its more specific function: geometry, is among all sciences, the most suitable to act as a means in the dialectical exchange between art and mathematics.
The rejection of certain geometric constructions does not necessarily imply the total rejection of geometry: the figurative space has today taken on a particular semantic meaning, as a synthesis of two moments, form and content, geometry and myth. If certain traditional relationships are therefore no longer acceptable, this only means that certain positions of geometry can be overcome, such as the Euclidean ones: but precisely according to the concept of space structure, it is always through geometry that new kind of links must be researched, because these new links are able to formulate a truly current representative code. However, to make sure that geometry assumes its specific role, a preliminary investigation is necessary, in order to highlight the reasons that deprived it of its primitive meaning: and this investigation can only take place through the analysis of the historical and evolutionary process of representation.

Notes

[1] Anna Sgrosso's direct statements are reported in this text as quotations. They are words gathered during our conversations with her.

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Reference List

Caterina, G., Gangemi, V. (1985). *L'Università per Gesualdo. Un impegno di idee e di progetti per la ricostruzione e lo sviluppo nel dopoterremoto.* Napoli: Liguori.

De Rosa, A., Sgrosso, A., Giordano, A. (2000-2002). *La geometria nell'immagine. Storia dei metodi di rappresentazione*. Torino: Utet. 3 voll.

Jammer, M. (1963). *Storia del concetto di spazio da Democrito alla relatività*. Milano: Feltrinelli.

Sgrosso, A. (1969). *Il problema della rappresentazione e dello spazio attraverso i tempi*. Casoria (Napoli): Stabilimento poligrafico I.E.M.

Sgrosso, A. (1979). Topologia e Architettura. In *Op. Cit.*, n. 45, pp. 4-16.