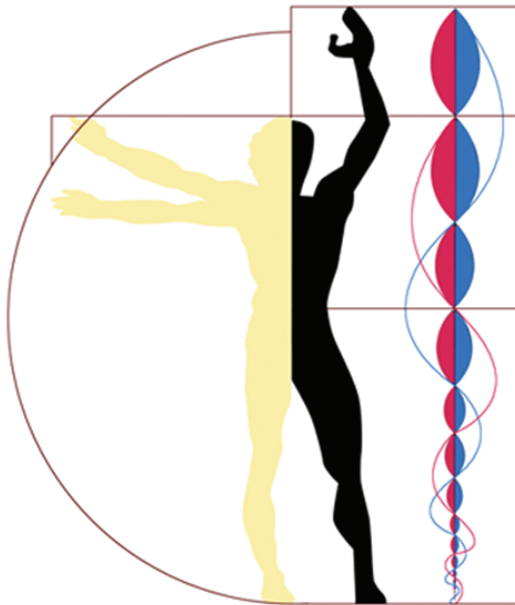


Fabbrica della Conoscenza

XIII Forum Internazionale di Studi

Le Vie dei
Mercanti

Carmine Gambardella



HERITAGE and TECHNOLOGY

Mind Knowledge Experience

Fabbrica della Conoscenza numero 56
Collana fondata e diretta da Carmine Gambardella

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Carmine Gambardella

**HERITAGE and TECHNOLOGY
Mind Knowledge Experience**

Le Vie dei Mercanti _ XIII Forum Internazionale di Studi

Carmine Gambardella

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XIII Forum Internazionale di Studi

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Il Progetto "Ecoturismo urbano per la fruizione sostenibile dei Beni Culturali in Campania", in attuazione degli Obiettivi Operativi 2.1 e 2.2 del Programma Operativo FESR Campania 2007/2013 per la realizzazione e/o il potenziamento, nel territorio della regione, di forti concentrazioni di competenze scientifico tecnologiche, di alto potenziale innovativo, intende favorire la concentrazione di competenze scientifico-tecnologiche finalizzata a rafforzare la competitività dei sistemi locali e delle filiere produttive regionali non solo nei settori dei servizi associati al turismo e beni culturali ma anche in settori ad altissima tecnologia che possano rappresentare una svolta tecnologica e culturale all'approccio innovativo per lo Sviluppo sostenibile in aree ad altissima vocazione turistica.

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Heritage
Tangible and intangible dimensions
History
Culture
Collective Identity
Memory
Documentation
Management
Communication for Cultural Heritage
Architecture
Surveying
Representation
Modelling
Data Integration
Technology Platforms
Analysis
Diagnosis and Monitoring Techniques
Conservation
Restoration
Protection
Safety
Resilience
Transformation Projects
Technologies
Materials
Cultural landscapes
Territorial Surveying
Landscape Projects
Environmental Monitoring
Government of the Territory
Sustainable Development

HERITAGE and TECHNOLOGY
Mind Knowledge Experience
Le Vie dei Mercanti
XIII Forum Internazionale di Studi

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Peer review

Scholars has been invited to submit researches on theoretical and methodological aspects related to Heritage and Technology, and show real applications and experiences carried out on this themes.

Based on blind peer review, abstracts has been accepted, conditionally accepted, or rejected.

Authors of accepted and conditionally accepted papers has been invited to submit full papers. These has been again peer-reviewed and selected for the oral session and publication, or only for the publication in the conference proceedings.

Conference report

357 abstracts received from:

Albania, Argentina, Australia, Benin, Brazil, Bulgaria, Canada, Croatia, Egypt, France, Greece, Iraq, Israel, Italy, Japan, Latvia, Malta, Mexico, Norway, Poland, Portugal, P.R. China, Russia, Slovakia, Spain, Turkey, United Kingdom, USA.

More than 500 authors involved.

291 papers published.

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Evolution of design and application of a method
Gilda EMANUELE

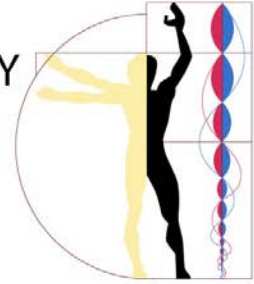
Preface

The theme of the thirteenth Forum “Le Vie dei Mercanti” aims to investigate the complex relationship that develops between technological innovation, knowledge, enjoyment and protection of cultural heritage and the landscape. This leads to the need for an international multidisciplinary comparison in order to explore the questions and issues that are being debated not only in academia, but also among those who govern, manage and control Public Administrations, Institutions and businesses.

The subtitle specifies the macro areas: Mind, intended as both speculative thought as well as the preparation of a methodological process; the subject who investigates, establishes an inescapable destiny with the object analyzed at different scales of analysis, from the architectural structure and design, to the infrastructure and the landscape; Knowledge, as the historicizing of the state of the art reached by the disciplinary skills, integrated with those of material culture, humus generative of innovation for the formation of a human capital that continues to grow; Experience, the representation and sharing of results obtained with good practices, exemplary and paradigmatic, as patrimonial value for humanity to achieve a better quality of life and places created working with Art.

The conference is open to multidisciplinary experiences on one or more of the proposed themes. Scholars are invited to present research on either the theoretical and methodological aspects or concrete applications carried out on these issues.

Carminé Gambardella



The architectural perspectives in the villa of Oplontis, a space over the real

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Abstract

Essential element of architectural design in the villa of Oplontis, the wall decoration is characterized by the research of daring perspectives tending to dilate the surfaces of the interior environments: these are paintings in II and III style that depict architectural perspectives according to a marked taste for the theatrical stage design applied to painted decoration; it's aimed to determine the illusion of environments that you happen endlessly in a game of feints architectures, often processed with extreme wisdom.

The working method is related to the establishing the relationship between the container and the space created by the perspective illusion and has its starting point in rigorous photogrammetric survey technique and rendering; then it move on to examine the specialties of roman painting, analyzing both the general characteristics and specific aspects.

This study also uses of a philological analysis with reference to vitruvian rules and to greek-romans typologies in order to reconstruct the painted space; finally the painted space, in 3d model, is recomposed with real space, thin to land to representations more effective than they allow to gather better still the experience of a quite new space, in a reconstruction of the architecture integrated by the illusion, as if it were real In this simulation of virtual spaces, the digital graphics helps to lead the experimentation that is developing, as part of the PRIN 2010-2011 research (Architectural Perspective: digital preservation, content access and analytics, scientific coordinator Riccardo Migliari), by the Salerno Unit, with the annexed unities (University of Naples 'Federico II', Second University of Naples, University of Basilicata). Of this research, which puts particular attention to the architectural, archaeological and iconographical heritage in Campania, are presented here only part of the achieved outcomes.

Keywords: architectural perspectives, painted space, Oplontis

1. Real space and painted space²

In current science, and, more precisely, geometric-representation, projective analysis of prospective conjuring postures used in Pompeian paintings reconstructs the architecture represented, their relationships and the virtual space that they comply. From the results of the perform graphic operations diversified are visible the personal choices of the authors, or of the author, conditioned by a search of perceptive fruition of every painting in the *cubiculum* in which it is situated; it's evident, from the metric and figurative restitution of every painted architecture and from the consequent construction of suitable structural axonometries, as those represented architectures are also been planned by the same authors of the paintings.

Particularly, principal purpose of our study is to clarify the hold relationship that the deceptive space establishes with the architecture that contains it, to the point that is possible to imagine before, and to represent then, the space simulated as it departs integral of real space.

The working method is related to the goals and the characteristics of the work designed: the issue of establishing relations between the container and the space created by the perspective illusion has as a starting point, without a doubt, the rigorous photogrammetric survey technique and rendering, then move on to examine the specialties of roman painting of the II style, analyzing both the general characteristics and more specific aspects relating to object of study.

Such study uses besides, of a philological analysis with reference to Vitruvius's rules and to greek-romans typologies (e.g. the temple, the *portico*, the *peristilio* etc.) what recurrent motives are in the examined paintings and directly model available in the near Pompeii. The reconstructed virtual space, is recomposed finally with real space, thin to land to more effective representations as axonometries and perspectives that allow us to gather better still the experience of a quite new space.

The architectural space returned through these successive steps was then represented according to the techniques that are now encoded the central perspective: in this way, it was possible to operate a comparison between the perspective of the divined of ancient paintings and the correct perspective representation, comparison that has allowed us to reveal the errors of perspective, distinguishing it from corrections and adjustments aware.

Through the subsequent phases of the work was therefore reached not only to define the parameters of a rigorous project of illusion that lies at the base of architectures and spaces paintings, but it was done well as a reconstruction of the integrated architecture in the illusion, as if it were real and in this simulation of virtual spaces computer graphic has helped to bring this forward experiment.

1.1 Pompeian painting

The ancients, who began the fashion of the wall decoration, at the beginning walked the different types and the placement of the coatings in marble and followed the various provisions of frames and blocks [1]. The first pictorial technique in Pompeii, in fact, looks like a plastic imitation of variegated marble, alabaster or of porphyry; in this initial phase of ancient painting, reintroduction in the internal spaces of the elements of the apparatus external brickwork in the building [2].

Monochrome clogs or in false marble, you tan of stone and frames that represent the decoration adopted in the public buildings and in the environments of representation of the private residences beginning from 150 B.C. up to 80 B.C. From the formal point of view the imitation of various covering materials suits it for the measures and dimensions of the wall for which it is realized; from the chromatic point of view such decorations are performed with predominance of red and black and with a yellow band in low that forms an effective shades contrast; to Pompeii and Ercolano the paintings of this style also contain often small architectural elements as simple pillars that articulate the vertical division of surfaces.

This way, adjust and elementary, to decorate, or better, to easily pace the walls, through a sober breakdown in colorful paintings, demonstrates how the wall decorations, since its earliest manifestations, were to be regarded as essential to the embellishment of a building, and they are just the murals to be the most extraordinary aspect of Pompeii art that, starting from the simplicity of the style, it evolves to the point up to reach the representation of complex scenarios and great prospects.

From the beginning and until the last quarter of the I century BC, we assist in painting to a veritable upheaval: the painters that in principle walked the changing appearance and the placement of wall marble revetments, as a result it did also in the imitate of building structures, with columns and pediments detached from the bottom and in perspective [1]. The architectural theme takes over the wall decoration: architectures painted on walls and ceilings expand a perfect likeness space and expand the environment itself toward the outside through depictions of several plans, open between podiums and columns architraves, enriched with moldings and friezes, up to the representation of large scenes with bucolic landscapes and gardens.



Fig. 1: Oplontis, villa of Poppea. The perspective frescoes of the *atrium*

A series of wonderful paintings coming from a room in the *Villa di Fannio*, one of the many homes of existing campaign in the suburbs of Boscoreale, constitutes the apogee of the evolution of this style and of this technique. The panes, which are now visible at the Metropolitan Museum of Art in New York, there are as many masterpieces divided from one another by slender columns which contributed to give the room the appearance of a cloister which had a view of an amazing scenario and lively streets, houses and colonnades.

The fantastic baroquism excessive which had come, in its latest manifestation, the II pictorial style, it replaces the Augustan age is that Nero (20 B.C. - 50 A.D.) a new decorative style, not free from cultural influences relative to the passage between the Republic and the Empire.

In this period the painted architectures were totally subordinate to a flat and decorative effect that recalls partly that of the tapestries and of the draperies that, as they reveal the nails and the hooks, were used for covering the walls. Abandoned the illusionisms and the fanciful redundancies of the architectural apparatuses, the painted wall leaves ample central spaces to small pictures with landscapes or mythological subjects, that the colored fund almost island on the same wall, making them appear even more of dimensions redoubts, they were almost miniatures or easel pictures. Yet it didn't deal with easel works because the picture was directly painted on the wall becoming integral of it.

More than that of real wall should we talk about absence of wall, as if this became a space undefined [3]. This is the case, for example, the lovely frieze with cupids of the *Casa dei Vetti* in Pompeii: on a black surface, with brush strokes clear, light, almost a stain, are paintings cupids that await you at various trades and occupations; the bottom of the wall is a single color, red, coated in a compact manner.

With a few touches of color is made a quick painting that contemporaries was even defined *compendiaria* [4] because compared to the previous painting II style summary appeared, almost improvised. A few architectural elements, in fact, with the function of frame and division of the surfaces more that reason perspective, are filming scenes of the II style and it's alternate track also more widely to paintings of landscapes, marine villas and gardens with trees, flowers, fruit, birds: the space of a room widens beyond the four walls, in a mutual and fictitious integration between the interior created by the man and the free external nature [3].

Between A.D. 50 and the eruption of 79 A.D., it witnessed the birth and spread of a new pictorial style whose pillars had certainly come in large buildings like neroniane *Domus Aurea*. Features of the new painting are the sumptuous architectural shooting scenes from the II style but reworked theatrically richer and tastefully sumptuous: statues and painted columns bind to frames and trabeation, sometimes made of stucco painted too, to which then interweave draperies, curtains, winged figures and landscapes suspended. A key feature of this style is the reaction of the artists III style trends, manifested through a return to the II style; these artists, however, only partly follow the road backwards, since the architecture from their imagined dissolves in the imagination: are rare cases of realistic studies of buildings or city; more frequent are the images of fanciful architectural elements and thin and almost flimsy structures, prepared in an aerial perspective. Some of these drawings are definitely derivatives, as well as previous paintings, from theatrical scenery; each item is made with great care and refinement and skillful use of color, often contrasting, which corresponds to a new



Fig. 2: Oplontis, villa of Poppea. The frescoed ceiling of the thermal baths

taste of the customer, a Pompeian bourgeois commissions, which flaunts its financial resources with the exuberance of decoration, often lacking moderation and balance [3].

Since the IV style paintings belong to the later years of the vesuvian cities, they have come to us in greater quantities than the specimens of previous ways and therefore the different varieties of the IV style, seen in their complex, numerically far outnumber all other put together.

1.2 Painted space in II style

The II style painted architecture were represented without codified rules: ancient art knew only conventional perspectives, the so-called “parallel perspectives”, which alluded to the three-dimensionality of space, representing the deep lines; however the pompeian paintings, with the architectural II style, are an example of impersonation founded on precise perspective principles that will be then more various and multiple in fanciful architecture of IV style.

The wise introduction, in these paintings, of false windows or handed that drive the eye over the wall to not only show luxurious gardens or seen harbors, but also fountains, ancient monuments and colonnades in perspective escape, determine in the spectator a particular deceptive vision that expresses a particular concept of space. From these paintings it emerges, in fact, a space that is not static and objective, but dynamic and subjective, that becomes a continuous creation, an illusion that uses of color effects, lights, perspective and it also includes other themes as the landscape, the still-life and the architecture. The illusion of reality seems to win, in this way, the flat surface of the wall: painted shapes come off from the bottom and place themselves on the surface, while the scenic background, landscape, architectural or shatters appears immense, infinite in illusion of depth. This illusionistic architecture represented in perspective, so that beyond the walls seem to see open an environment, is a plaintiff in the roman wall painting II style that not only testifies to the particular vision of the space for the Latins, but offering a tangible example of that style that Franz Wickhoff has called illusion [5]. With the Romans figurative art tends to express a space understood as a place of infinite human action, characterized by the relationship with the subject and measured only by this relationship; that space is defined as tangible, according to that style of illusions, of course, where all, air, shadow, light, must cooperate to give the illusion of reality.

The creation of similar intangible space becomes deeply the meaning of figurative heritage that Rome inherits from Greece: those forms of space streamlined fit Roman taste away from the bottom and smashing the background itself, whether architectural or landscape, whose elements are, in this way, on the surface.

The material continuity of the wall is thus interrupted, but the picture is rather fragmentary, but comes back together on a plane where colors, lights, shadows form a *continuum* illusory, one breakthrough of the limit, an openness toward architectural environments imaginary.



Fig. 3: Oplontis, villa of Poppea. The illusory space of the “sala dei melograni”

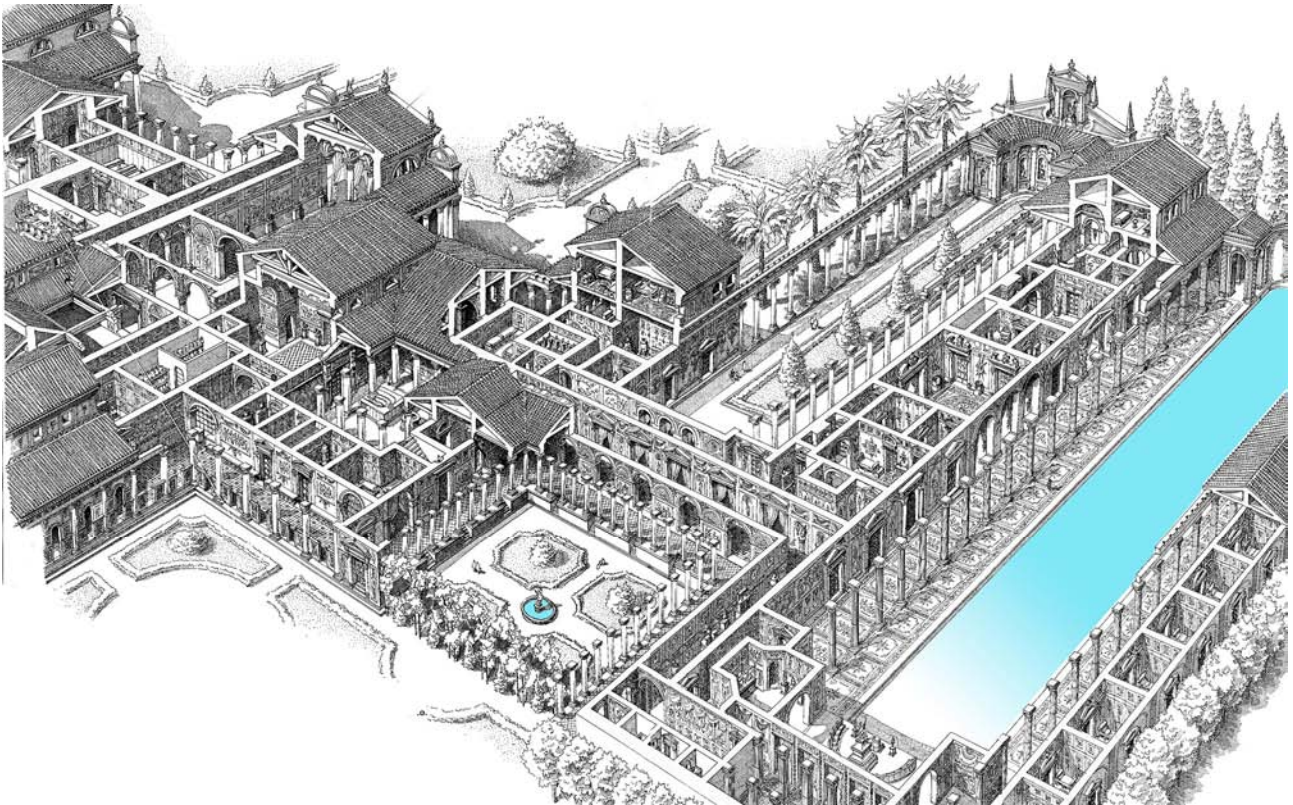


Fig. 4: Oplontis, villa of Poppea. Archaeological reconstruction by Samy Fayad

For this type of representation, which is a completely replaces the previous conception of the wall painting itself as perspective view of an illusory landscape can be understood beyond the wall, the wall is no longer the place where we can move from one compartment to another, but becomes the place decorated with central framework in which we can move from one compartment to one space made with illusionistic means. This type of representation that characterizes the painting space II style finds its maximum expressions in painted walls of the *villa di Poppea* in Oplontis: entire environments of this villa don't seem to have tangible limits in the walls that define them, indeed, it seems to be just that the walls are almost a pretext to frame another architectural environment or a landscape. The abundance of the frescoes in Pompeian residences more wealthy you must not only to their obvious desire to live surrounded by a rich ornamentation of the chromatic tones glorious, but it can also be expected from the unconscious need to exorcise the sensation of closed through the choice of scenes in and outside of subjects which brought the nature in the house: trees, fruit, fountains [6].

These details, as well as in the kinds of painted architecture into the various villas, there is such a similarity to induce to think that the walls of these residences are outputs from a same pictorial tradition and, if not by the same hand, at least from the same laboratory, in Campania region, that operated under the mastership of Hellenic world. It's indeed an excellent hand-painting and there's just enough to imagine operating in each villa, to the days when the Republic fell, some author or more than one creator whose intelligence it poured the whole name, in the sign of dissipating in the wind and his chronicle.

And let us not forget that when the ville rose was also the sign of that worry human limit wants to break through as well as the artist made with these walls [7].

1.3 The technique of roman wall painting

Roman wall painting doesn't stop surprising the modern public not only for its high artistic quality and fantasy decorations and figurative subjects (although it's widely spread handicrafts, as you can clearly see from the extensive documentation provided by the Vesuvius area), but also for the extraordinary technical perfection of its realization. A detailed description of execution's techniques of plaster paintings is provided by ancient writers such as Vitruvius and Plinio il Vecchio, but the direct testimony of taste and technical expertise is provided by the work of the artists in more places remained interrupted due to the eruption of 79 A.D.

From analysis conducted on the vesuvian area roman paintings have been able to identify a series of workshops in Campania region, probably operating by a parietal painting mainly fresco. The process was to lay out the colors on the plaster lime-based first that the socket was finished; once completed the grip, the color was well penetrated and, due to the reaction caused by lime contained in the plaster and the carbon dioxide

contained in the air, created a surface film of calcium carbonate to which the color was well linked. It was therefore necessary that the painter had a layer of plaster to preparation still fresh, and then it was working as quickly as possible, preparing a limited surface and masking off the stitches made necessary by the partition work. Vitruvius describes in detail the procedure to be followed for the preparation of fresco painting: seven following layers had to be realized, one of polishing of the wall, three of mortar and sand and then three of thin mortar and dust of marble on which the real color was stretched then. Through some reliefs to the microscope it has been possible to measure indeed the layers described by Vitruvio: on the first layer if it finds a second consisting of guidelines made at intervals to allow you to have perfect horizontality in the compact of successive layers; the third and fourth layer often are indistinguishable in section and are unified into a single big thickness of 3.5 cm or 4 cm, sometimes instead are two distinct layers, respectively 2 and 4 cm and 0.5 and 1 cm; the same situation occurs for three successive layers of lime and marble dust, carefully sanded, constituted the background color of the wall.

The overlapping colors to the bottom when they were applied when the plaster was still wet support, were mixed with lime to remain firmly anchored to the part though less strongly than the background color; to improve the capture of certain colors were used whose natural glutens is difficult to find. Painters' work departed from the top down: painting the ceiling came before, then realized in plaster the frame of crowning, then he passed to the walls of which the tall part painted before, then the central field and finally the clog; there was the painter called *dealbator* who operated for first bleaching the walls and stretching the color leading of the decoration, then the painter called *parietarius* traced and performed the panels and the decorations with recurrent motives even if you don't deprive of variations, finally the painter called *immaginarius*, the best remunerated, painted the central picture of the wall.

2. The ancient perspective between codification and intuition²

The linear perspective conical allows not only to represent the space, as it appears to our sight, on the plane of the drawing or painting, but also to obtain, by means of particular solutions, effects exasperatingly illusionistic once being extended to the structure of a built space and its entire decoration. These effects lead to perceive not the true reality space, but a reality completely fictitious suggested in the illusion perspective.

The search for a conceptual construction of the space is the problem of both physiological perception of the space and its representation: perception and representation are therefore closely connected in the same process expressive, while the search for a spatial representation coincides with the research of the means to achieve it; these, offered on a sometimes strict, sometimes empirical, the geometry, constitute the choices made according to the dominant trends and according to the different artistic spirit of every historical era. The perspective is, in fact, as an extraordinary intellectual construction as a genial mathematical invention, that it implies an endless and homogeneous space, in which the void has the same value of the full one and the objects and the spaces between them, constituting an inseparable unity, are observed by an only and immovable property eye. The perspective has therefore the goal to represent the reality, of way that the represented image coincides with the direct vision, succeeding in rationalizing that image of the space realized and represented, also without rigorous rules, already in the paintings of II style. Only following the scientific theory and to the geometric procedure formulated by the Renaissance artists, the perspective representation of the space is directed in a conventional direction, since it offers the possibility of use the mathematical procedures to the artists, but at the same time it doesn't condition their creative liberty or their vision of the world.

However II style paintings seem perspectives of represented architectures really according to the Renaissance rules: the problem it's to investigate if the ancients possessed and used in their works the perspective construction which we are familiar, or if the representations had casual character. In reality the ancient II style paintings repeat particularly a whole same scheme, even if with numerous and fanciful variations, that it makes us exclude entirely the hypothesis of a casual space's representation. The analysis and comparison of various architectures painted in II style was first noted a possible type of painting that is common to all the paintings of this style: a first layer that acts as a frame and that delivers the real representation, like a fake window open on the wall; a second layer where are the pillars that support an entablature or a blue ceiling; beyond this a colonnade surrounding a garden. You can talk about layered perspective or even broken in which the space is represented a results united more matters. At this point it is worth mentioning the Panofsky's theory that the ancients, especially in Hellenistic Roman, point out a prospective system, a curve perspective with vanishing axis only, which corresponds to the classical concept of space as discontinuous entity, place of conflict between bodies and space, as well as the flat perspective is in relation with the modern conception of the infinite and homogeneous space. It's certainly not easy to define the terms curved space of the ancients: If on the one hand, in fact the historical process leading first unification in the vanishing point for the single plan, then the integration, in the masters of the Renaissance, all orthogonal in space in a single point, you pay very well to the Cartesian notion of three spatial coordinates, on the other hand the ancient spatiality and perspective construction put us in front of a major complication; it seems rather that the classical antiquity has not achieved a consistent solution of certain difficulties that relate directly to the spatial problem, like those of the finite-infinite report. It has left those difficulties existed that they could find a solution through a progressive and radical modification of human spiritual attitude. Insufficient

domain of spatiality on a theoretical plan has its parallel in the inconsistency that is proper to the curved perspective, and in particular of that building with the axis of flight that must be occasionally masquerading as a fig leaf perspective. This contradiction of space's idea doesn't exclude some for antiquity to express a particular spatial feeling, well documented by the II painting style; and, in fact, the technique of representation of this space and the architecture define it to be the most interesting aspect of the paintings in II style. A representation that the Lessing in the ninth of his *Antique Letters*, in 1755, called perspective, stressing that deny the ancient perspective in its broadest sense it would be a true madness, because this would be tantamount to denying them the perspective, but the art of drawing in which they excelled.

In this sense it seems directed an authoritative tide of the most recent criticism, that recognizes to the ancients the mastery and the use of the modern perspective: Decio Gioseffi, for example, starts from a non recent wise man of Beyen, which, since 1939, reacting to the diffused conviction that the ancients didn't possess our perspective; he had wanted to show the knowledge both theorist and practice of it in the classical world, supporting itself to the testimony of some frescos Pompeian in II style, more or less properly constructed according to a vanishing point. Gioseffi has a new demonstration in this sense, demonstrating that despite the seriousness and methodological validity, however, reveals their own limits through the words of the author: in his essay Gioseffi explain that survivors old paintings with representations of buildings in the vast majority have no perspective if no approximations and partial reductions and scattered and uneven prospects the other, those strict, doesn't constitute a tiny minority and should not exempt themselves from referees and contamination. [8]

This acquisition becomes then for Gioseffi the starting point to continue in his demonstration: at a later time he faces the arduous task of demonstrating the uniqueness of perspective at all times and places of art history-from Pompeian painting to the byzantine, from Giotto to Alberti, Brunelleschi to Leonardo to Galli Bibbiena and prove the scientific validity and adherence to visual reality. Referring both to descriptive geometry and optics, Gioseffi proves the inconsistency of every scientific perspective curve: the demonstration is detailed, suspense and the basic axiom is that as the framework perspective and vision of a natural object give rise to the same image on the retina provided that in both cases there is monocular vision and eye property is the right distance. This kind of vision, therefore, is the base of the perspective representation of the antiquity, a representation that, while not supported by a strict injunction like the Renaissance, it is proposed in more variations as a scientific representation and adherent to visual reality.

3. The space of the image, the digital space¹

The space represented in the Pompeii's frescoes is, therefore, the image of an illusory world, of an alternate reality to that tangible, with which, however, it interacts. In a magical play of overlaps, the real space enters into the picture, that precisely evokes, in the drawing, concrete elements with such fidelity of detail to make them almost materials. In contrast, the illusory space of the frescoes blends with the physical one, expanding its limits and simulating, in a depth often impossible to achieve, intangible environments that complete the real space. These representations, as Argan observes, "[...] indicate that the mind has the faculty to conceive a space beyond the limits that the static and the economy require to the architectural construction, and that the painting, in turn, can visually realize a space that the image can conceive, but that architecture can not achieve constructively". [9] Just this illusionistic interweaving, of the real with the virtual, makes the Pompeian pictorial art extraordinarily up-to-date: it proposes, anticipating of many centuries, the idea of being able to integrate the real architecture with the imaginative one, namely that of perspective drawing, thanks to the evocative power of painted images. However, analyzing in depth the relationship "[...] between the architectural space and the pictorial space, we see that the second does not replace the first, but follows and complete it without contradiction" [9].

The pictorial representation, therefore, allows to go beyond the physical limits of the wall that, almost like an interposed veil between the painter and the object – to say as Alberti –, marks the transition from the physical space to the image's space. So, the wall becomes an opened window above an immaterial space which, however, visually blends with the surrounding architecture. Yet, as said by Argan "[...] the theme of painted wall, as a diaphragm between the world of the true and what's verisimilar [...] aims not to replace an enclosed real space with an open and fantastic space, but to make the vision accessible, that is credible. [...] The miracle that painting realizes, through the ideal destruction of the wall, therefore, is not to throw open to the astonished eyes a wonderful and almost unbelievable vision, but to make it accessible and normal as an optical view [9].

The perspective drawings of architecture, in the Pompeian painting, explicit, then, the sense of interpenetration between reality and virtuality, typical of the latest systems of technological and visual communication of architectural space, but that has its roots far back in time. In fact, if already Plato, in the *Myth of the Cave*, distinguishes the true reality from that perceived, that is, made of shadows and objects' reflections, will be with the emergence of the perspective that this duality will find a real graphical translation. Albeit with some differences, obvious consequence of the potential linked to the new technologies, the architectural perspectives – both those intuitive, drawn by Roman and Pompeian artists, both those scientifically constructed by painters during the Renaissance – seem to anticipate the illusory world today proposed by the augmented reality, offering

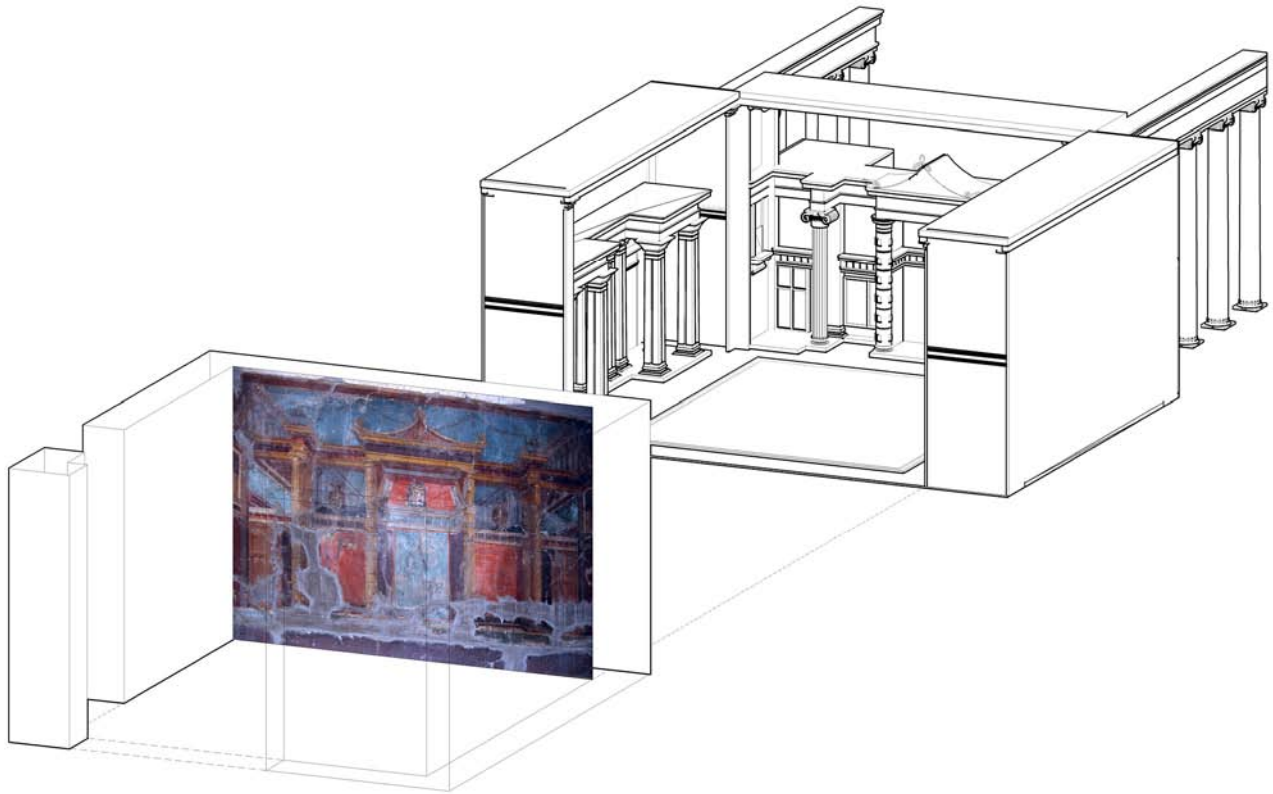


Fig. 5: Oplontis, villa of Poppea. The virtual space beyond the wall, in the “Sala dei melograni” (Processed by G. Manzo; coordination B. Messina, M.I. Pascariello)

the viewer the opportunity to participate in the painted space, or to enter an alternate reality than the physical. A reality, however – as noted by Maldonado – fully shared only if inserted in his “life space” [10]. Of course, the visualizing systems of the illusory reality that now we have, allow to produce infographical simulations – with greater accuracy and ease of use – that seem to destroy the fleeting boundary between the real world and the virtual one, superimposing digital information to the sensory reality. In fact, the augmented reality, precisely because of artificial vision's algorithms, makes visible, directly in the actual scene, a space designed and modeled only by computer graphics, which is therefore perceived as physically present. And, what's really significant, making the observer integral with the viewer of graphical interface, the augmented reality continuously acquires the scene and, simultaneously, analyzes and decodes information from the digital model, translating them in images, from time to time consistent with observer's point of view. Then, the overlap appears totally convincing, so much to lead to the conclusion that the two spaces, real and digital, are actually one.

Starting from these considerations, the presented research – which is part of a broader experimentation on visual communication's forms and dissemination of the Campania's pictorial heritage with an architectural subject, conducted within the PRIN 2010-11 – lingers, as already anticipated, the illusory spatiality of the frescoes' complex in the Poppea's Villa, at Oplontis, considered an emblematic example in order to determine what the role of the representation, in terms documentary, cognitive and informative. And, consequently, determine how, by exploiting the full potential of the graphical tool, you can identify appropriate strategies for prevention and enhancement of the investigated heritage. The presence, in the villa, of a heritage so rich in perspective scenes, or else strongly characterized by *ante litteram* virtual architectures, imposes the need to establish a scientific methodology that enables the correct use of three-dimensional architectures examined, digitally reconstructing not only their physical space, but also the illusory reality represented on the wall surfaces. That is, it is necessary to interpret, and then translate in infographical models, all the geometric and formal qualities of those fictitious architectures, ideally an integral part of the environments that incorporate them.

In order to reach the correct interpretation of spatiality evoked by perspective images, which are in many rooms of the villa, it appeared necessary to employ rigorous procedures of photogrammetry, by virtue of which we obtain all formal and metrical information, later useful to define the infographical models [11]. It should be noted that to transform the projective image of the painted scene, in orthogonal projections we had to retrace, in reverse, the process of the space's drawing. And this process presupposes a critical approach, which often goes beyond the simple metrical interpretation derived through geometrical procedures.

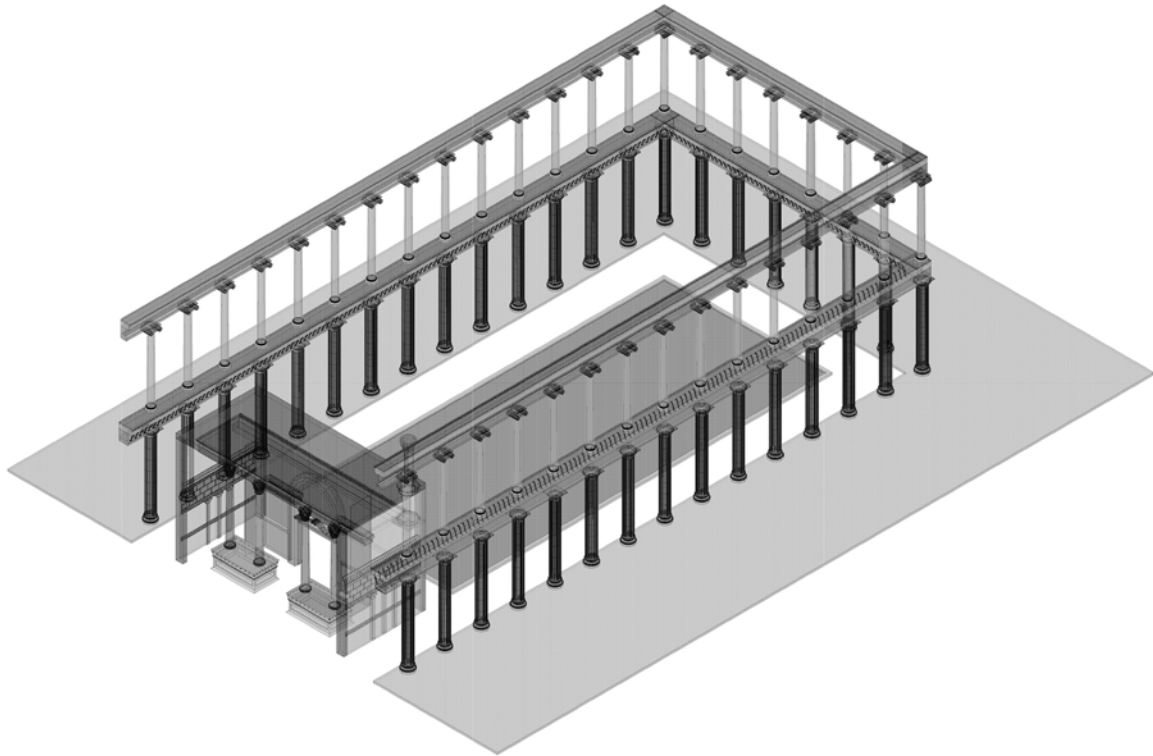


Fig. 6: Oplontis, villa of Poppea. A digital re-construction of the illusory architectures painted in the “*salone*” (Processed by G. Manzo; coordination B. Messina, M.I. Pascariello)

These are not photographic images with a unique point of view – which allows the use of automatic straightening techniques through specific photogrammetric software. In fact, on closer analysis, the Pompeian perspectives of Oplontis, although optically well controlled, show inconsistencies typical of the perspective images generally produced by the Roman art [12].

Obviously, this implies the need to intervene on the re-constructed space, refining the raw data, directly obtained by the photogrammetric process, or providing for the metrical correction of some elements, which are not consistent with the whole figuration, and that required to be resized in function of a module, taken as reference of the entire composition, but always in accordance with the architectural principles and rules theorized since Roman times. The volumetric interpretation of the designed spaces requires, in any case, a verification of the spatial coherence, with reference to the individual elements and of each part in relation to the whole. Only in this way it is hypothesized, that is, proceeding to the metric correction. In this way the illusory architectures, which sometimes would include not feasible spaces or clearly 'oversized' elements, can be made compatible with hypothetical real architecture [13], contemporary to structures that house them. Thus, the process of visual integration between the real and the simulated space is simplified.

Obtained the needed metrics information, the designed architectures were reconstructed in a computer graphics: the painted illusory space, so, achieves a physically perceptible three-dimensionality, even if only in the digital reality. In operational terms, it should be noted that the elaborated models, firstly, have been treated as *maquettes*, or were processed regardless of the material treatment and the texture's use, because at this stage it is considered necessary to emphasize the quality of the spaces, rather than the nature of the surfaces that make up those spaces. And, on the other hand, a scientific representation must allude to the architectural essence, objectively reconstructing its forms, its mutual relationships and the complexity of its spatial articulation. Only at a later time, or after having caught the sense of the designed space, we have intended to represent all its other perceptive qualities, with the intent of superimposing the digital image on the true reality, or to allow an immersive visualization of the virtual space.

In fact, thanks to the techniques and systems specific of the infographic representation, becomes possible to imagine to live those spaces. That is, in a space-time dimension, absolutely inconceivable at the time, highlight the composition and the design intents, that can be caught by moving in such architectures. Through digital modeling is possible to multiply the space, virtually adding to the real rooms of the villa those fictitious environments drawn in perspective, order to cross the walls' physical limit not only with the imagination, but by living these in a full perception which is characteristic of infographic reality.

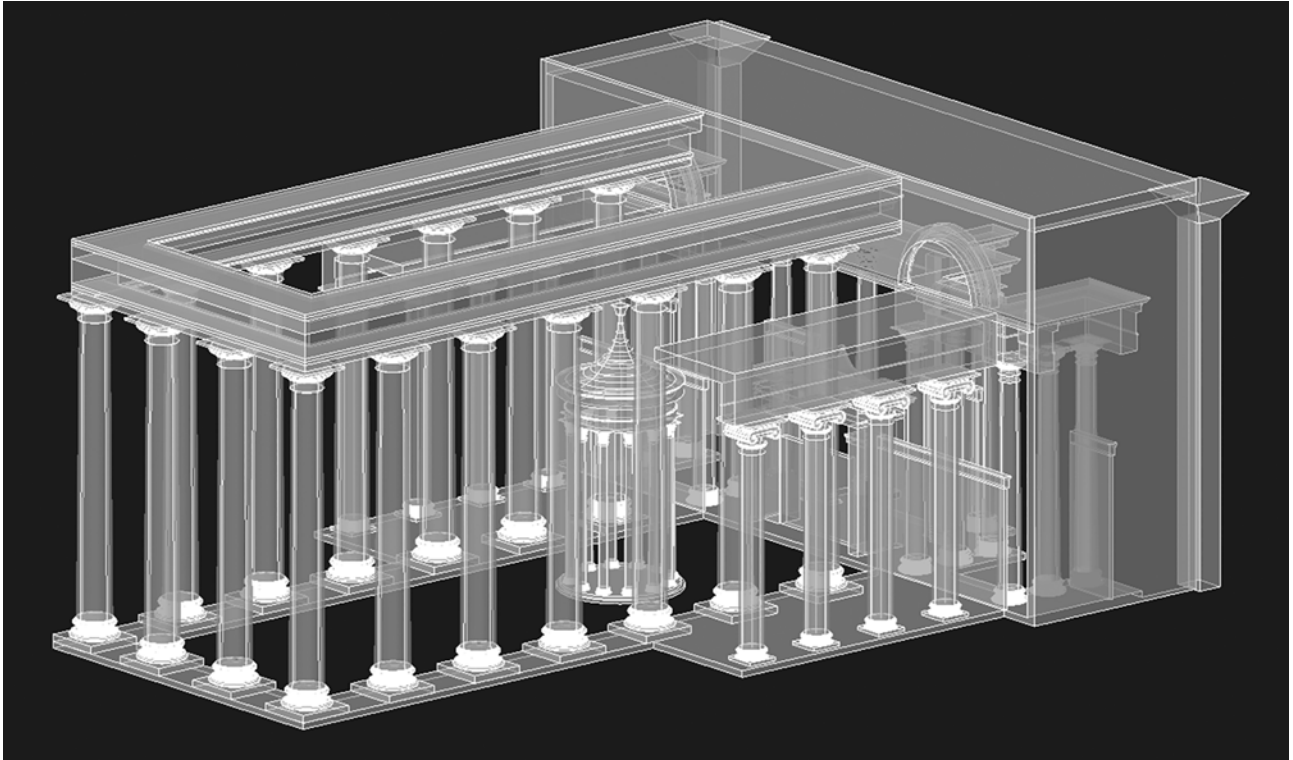


Fig. 7: Oplontis, villa of Poppea. An infographic representation of the imaginative space painted in the *triclinium* (Processed by G. Manzo; coordination B. Messina, M.I Pascariello)

And this, to arrive at a participated fruition of the visitor who, by virtue of a sensory involvement much more effective than the passive viewing of the painted scene, may understand in all its fullness, the artistic and graphic strength of a cultural heritage so sophisticated and valuable.

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