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ARCHITECTURAL INTANGIBLE HERITAGE AND GRAPHIC RECONSTRUCTION. TERMINOLOGICAL AND PHILOLOGICAL NOTES

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Abstract

UNESCO's extension of the concept of heritage to intangible has been changing the status of architectural designs and the operative frame of the practice of architectural reconstruction. The variety of reconstruction cases requires specific procedures and terms. The terms are here investigated by an analysis of the historical and theoretical roots of such a practice, focusing on the role of Quatremère de Quincy; the procedures are discussed by means of a series of personal experiences concerning with literary architecture, architectural projects, and fictive architecture. They are retrospectively analysed from the point of view of the sources – to define both the content and the appearance – which can be 'endogenous' to the document/monument (and priority) or 'exogenous', with a focus on the transparency of procedure.

Keywords

Intangible heritage, Architectural reconstruction, Restitution

1. *Intangible Heritage and Architecture*

In 1972, the Convention on Protection of the World Cultural and Natural Heritage, General Conference of the United Nations Educational, Scientific and Cultural Organization (hereinafter referred to as UNESCO), certified a shared feeling towards the past. It had developed through the restoring and reconstructive practices after the World War II and the world-wide cooperation in surveying and transferring Egyptian and Nubian monuments from the basin of the Aswan Dam in 1954. UNESCO promoted not only a list of World Heritage Sites, which is yearly updated, but also a systematic investigation on the meaning and nature of heritage. Thought initially limited to folklore (Kirshenblatt-Gimblett, 2004), intangible heritage gradually expanded its extension taking advantage of a general shift of the focus from the monuments to the communities of people.

The UNESCO General Conference held in Paris, from 29 September to 17 October 2003, produced the Convention for the Safeguarding of Intangible Cultural Heritage. The article 2.1 of the Convention defines intangible heritage as the "'practices, representations, expressions, knowledge and skills' present in a culture, along with 'instruments, objects, artefacts and cultural spaces associated therewith'" (Byrne, 2008). Convention specifically says that "Cultural heritage does not end at monuments and collections of objects. It also includes traditions or living expressions inherited from our ancestors and passed on to our descendants, such as oral traditions, performing arts, social practices, rituals, festive events, knowledge and practices concerning nature and the universe or the knowledge and skills to produce traditional crafts".

When dealing with intangible heritage, one has to face with a fundamental contradiction: somehow, it is necessary to provide a material reference to heritage, inevitably producing an objectification of something that is largely intangible. This is a consequence of categories and languages invented to deal with a material, tangible (and sensible) world and tools designed to measure and communicate physical properties rather than feelings or concepts (Groote, Haarsten, 2008).

In the field of architecture, materiality might seem to be an evident, almost tautological element; in this sense, such an objectification would be only part of a natural process of reconstruction of something that is lost. Yet, the issue is not so linear. Actually, one must consider that not all of the architectural expressions were designed to be built. Some were designed only to

be depicted on a wall, visualized on paper or even envisioned in our minds. In this sense, the digital tools seem to be the most appropriate to explore the intangible heritage – incidentally, it would be interesting to investigate how much the dissemination of the digital experience, which is properly immaterial and intangible, from the 1980s onwards may have promoted this growing sensitiveness and the extension of intangible heritage concept.

Surely, digital tools are worldwide used to explore both tangible and intangible heritage, promoting innovative fields of study devoted to Digital Heritage and Virtual Heritage and to enhance the conservation, knowledge, and accessibility of monumental sites, artworks, and documents. In such a plenty of missions, however, a fundamental difference between the Digital Heritage (DH) and the Virtual Heritage (VH) seems to emerge. In my opinion, the DH identifies a digital copy or twin of the document, work, or monument, from the digital photograph of the Declaration of Independence to the numeric model after a laser-scan of a rock-cut monastery in Cappadocia. Conversely, VH identifies a systematic exploration and development of the heritage, which generally results in critical outcomes. While the former focuses on the apparent, present form, the latter focuses on the contents (lost or latent forms) and gives a sensible, diachronic and 'explorable' form to them. This latent issue is evident in the practice of digital reconstruction of architecture, which mostly deals with representations of spatial concepts.

The extension of the notion of heritage to intangible had also the consequence to reframe theoretically and operatively the work of architects and scholars involved in visual reconstructions. Tangible heritage often presents cases of architectural remains that requires partial or total reconstructions, both digital and real. In these cases, any reconstruction generates from the survey of the existing elements to develop the missing parts, of course. Conversely, intangible heritage is generally deprived of remains or place. In this sense, it includes lost cities or buildings (but also landscapes, gardens, furnishings, artworks, etc.) and ephemeral structures and exhibitions, which are designed to exist for a very short time. Added to these, it includes unbuilt projects, architectural concepts and models, and even literary and fantastic architecture. In this sense, the descriptions, drawings and models the architectural (and not only) archives preserve are both visual documents and sources of spatial information to be explored and developed in the many typologies of (visual) models.

In the practice of reconstruction, which has been progressively ruled according to the standards of the Virtual Archaeology formulated by the Charts of London (2008) and Seville (2011), the scientist and the artist are somehow called to collaborate. As stated by Giuseppe di Napoli (2004), their missions are somehow complementary. The scientist's mission is to order, to name, to make intelligible (to translate into ideas) and classify what is only sensible, as a natural or anthropic phenomenon; the artist's mission is to reveal, to give a sensible form to what is insensible, only a concept or a feeling. The artist's work, which can translate the intangible into tangible or sensible, is central when approaching intangible heritage, where the threshold between history and fiction and between data dissemination and storytelling is often thin and blurred. As Graham and Howard (2008, p. 32) remind, "heritage is less about tangible material artifacts or other intangible forms of the past than about the meaning placed upon them and the representation that can be created from them".

2. *Reconstruction, Restitution, and Rendering*

Words are a fundamental ingredient of any scientific work and the operative frame provided by the intangible heritage about the reconstructions requires some lexical considerations (Online Etymology Dictionary). For example, "intangible" and "imaginary" are factually synonyms. Actually, "intangible" (impossible to touch, to describe exactly, or to give an exact value, like "impalpable") is for incapable of being perceived by the senses or incorporeal, while "imaginary" (unreal, non-existent, fictional, fictitious) is created by and exists only in the mind (of the artist). In this sense, intangible seems to refer primarily to what is no more tangible while imaginary to what was never tangible or even to what cannot become tangible, indirectly categorising the reconstruction according to the type of subject.

Dealing with a wide range of cases, from an archaeological site with architectural ruins to a literary architecture described in a novel, the process of architectural reconstruction and its potential aims and outcomes may diverge

remarkably. The name of the process is questionable, too. Is "reconstruction" the only term we have to identify so different processes?

"Reconstruction" is rather a young word. The verb "to reconstruct", from the Latin *re*, "back, again", and "construct", is attested to mean "build anew, build again" by 1768, while, the current meaning "to restore (something) mentally" is attested from 1862. It seems to possess a wide semantic field and is related to a number of disciplines. In this sense, its use is often generic but recently more and more related to the digital archaeology.

Exploring the roots of this practice, the term "restitution" surfaces. From the original Latin word *restitutio*, first "restitucioun" and then "restitution" (14th c.) mean "making good or giving equivalent for crime, debt, injury, etc.". It partially takes on also the meaning of *restaurare*, another Latin verb, a combination of *re*, "back" and *statuere*, "to set up", which is for "set up again, restore, rebuild, replace, revive, reinstate, re-establish". In the wide field of architecture, it has a number of meanings. 'Restitution' also defines the process of drawing orthogonal projections after measuring an existing building, as an early visualisation (and graphic verification) of a survey. 'Restitution' also defines the inverse process of the perspective drawing (perspective restitution), which is used to obtain single measures or a whole plan-and-elevation drawing of a building after its image drafted or painted. Implicitly alluding to the existence of a preliminary consistent architectural project, this is particularly relevant in case of projective pictures, like photographs (photographic restitution) or photogrammetric survey (photogrammetric restitution).

However, the historical sense of 'restitution' is that of a visual restoration of an ancient, transformed, ruined, or lost building. A few years ago, Wragge Morley (2010, p. 247) still defined restitution as "the formal architectural description, which is generally a visual illustration, of ancient buildings that are known only through ancient accounts or descriptions or in a ruined or altered state". 'Restitution' may express the idea to give back a building or the ruin of it something that was lost or "stolen", that is its former (original) shape or image. It may also involve the idea of substitution of something that is irretrievably lost with something of equivalent, in terms of money or some other measure unity. In this sense, also a mock-up of a lost building built in the original site might be considered a 'restitution'. Distinct from "restoration", which is adopted for the effective construction, 'restitution' resembles the jurisprudential concept of *restitutio in integrum*, an extraordinary act able to nullify the effects of a legal measure and is strictly connected with the verb "to render" and the word "rendering". Both of them derive from the Medieval Latin *rendere* that is for "give back, return, restore". It comes from the original Latin combination of *re,* "back", and *dare*, "to give" through the Old French *render*, "give back, present, yield" (10th c.) and the Old English *rendren*, *rendre*, "to repeat, say again, recite; translate" (late 14th c.), "to return" thanks or a verdict as well as "to make or cause to be" (15th c.). Gradually, the verb "to render" and the noun "rendering" took also the meaning of "reproduction, representation, depict", first in dramatic arts field and then in the visual arts and architecture. In the early 20th century handbooks on drawings, "rendering" refers to the art of visualising a building through a combination of lines and patches abstractly representing textures, colours, shades and shadows. In the last decades, a "rendering" is a generic three-dimensional visualisation of a project, generally a computer-generated one.

3. The Historical Practice of Reconstruction

The practice of reconstruction or restitution is a major achievement of the Renaissance architects. In the attempt to root their work in the wake of Vitruvius and ancient builders, they developed graphical tools to investigate and represent first the antiquities, often after questionable descriptions, and then the "modern" buildings and projects. One could mention the 16th century architect Sebastiano Serlio, whose richly illustrated *Books* show invariably complete buildings, no matter if they are remote or lost antiquities, transformed monuments or projects under construction, like Villa Madama or the Basilica of St. Peter.

The case of Rome is interesting as its architecture was rarely observed and described for what it was, like in the celebrated sketches of Maarten van Heemskerck, but more often for what it had been or as a function of what it was. This frequent asynchrony is the result of the experience of ruins, which revealed ancient constructive criteria and inspired original representation techniques. Inextricably associated with the landscape and with Roman memory, ruins also

constituted a continuous reminder of the lost greatness and the incompleteness of the antiquities stimulated its reconstruction. As Antoine Quatremère de Quincy (1936, p. 21) once wrote, "What is the ancient in Rome, if not a great book whose pages time has destroyed or dispersed, and of which modern research will someday fill the voids, and repair the gaps?".

Somehow, a specific approach to the architecture of Rome originated around the many antiquities that "were asking" to be understood and completed, even if only graphically. According to Heuer (2009, p. 400), this developed a kind of "antiquarian virtuality" which also affected modern architecture. Parallel to this, thanks to the mythologising of artists such as Raphael and Michelangelo, some High Renaissance buildings (and then the Baroque ones) were considered as incomplete or corrupted antiquities that had to be "reconstructed". This became a central task of those who had been trained primarily on archaeological issues in the academies. The *restitutio*, as the art of reproducing lost elements and buildings through the "intuitive process of comparison between the only verbal descriptions of the Vitruvian buildings and the observation of the ancient ruins" (Braghieri 2013, p. 126), is the true foundation of the artistic cultural education from the Renaissance onwards.

Studying the historical events of the Farnesina ai Baullari, a small Renaissance palace attributed to Antonio da Sangallo the Younger, I collected a number of drawings produced by the artists who dedicated themselves to revealing and representing it. In most cases, these are restitutions in the sense of the monument to which the 'original' (or former) form is returned.

For centuries, the palace was represented not for what it was but for what it had been, was thought to have been, or was supposed to be conceived of. The late-17th century survey by Nicodemus Tessin the Younger is one of the most faithful to the actual conditions of the building. Yet, when compared with the others, such an exception is a consequence of his 'innocent' Swedish gaze of a young student. Conversely, when looking at

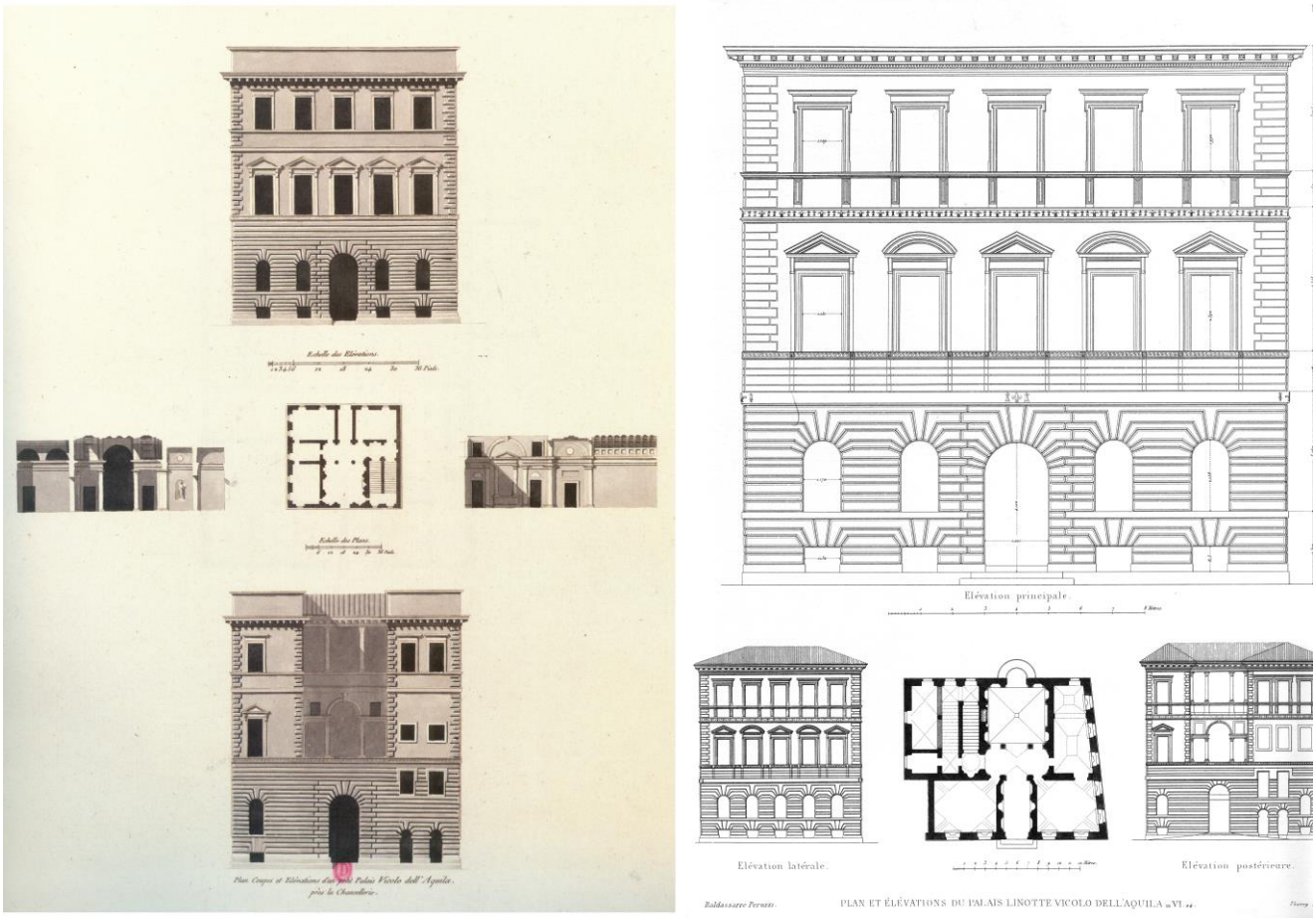

Fig. 1: The Farnesina ai Baullari in Rome: a comparison between the versions of Percier & Fontaine (Percier, Fontaine & Garric 2006, n.p.) and Letarouilly (Letarouilly & Selvafolta 1992, Pl. 49).

Percier and Fontaine's drawings published in 1792, one literally sees another palace. It is not even a restitution but an abstraction, which one could define as the restitution of the design concept deprived of the adaptations and deformations required to insert it in a specific place (Percier, Fontaine & Garric 2008). Different again, Paul-Marie Letarouilly's drawings of the Farnesina, from shortly before the early photographic age, show that, despite the precise measurements taken, they are restitutions visually restoring the presumed original state of the building (Letarouilly & Selvafolta 1992) (Fig. 1).

4. Quatremère de Quincy's Idea of Restitution

The practice of restitution was systematised and formalised by the early architects-archaeologists-restorers properly in the years of Letarouilly. In 1832, *The Historical Dictionary of Architecture* of Antoine-Chrysostome Quatremère de Quincy included a section dedicated to *Imitation*, *Restitution and Restoration*. According to him (Quatremère de Quincy 1999, pp. 62-67, 69, 217-220), "There are two manners of imitating the antique. The first, improperly called imitation […], consists in reproducing only the appearance through copies. The second consists, on the part of the imitator, in appropriating the principles of the antique and consequently its genius or its causes, along with their consequences […]. The true manner of imitating the antique consists, then, in a wise penetration of the spirit and the reasons behind its works; in an understanding of the motives that once caused the artist to employ certain means of execution; and in discovering the veritable causes of the impressions that we receive from such and such a combination of correlations, dimensions, or decorations. […] But the imitation is not the copy. Consequently, the difference in customs and in practice in the new compositions of the art of building, could only pose a difficulty for one who has not learned to read the great book of antiquity, or one who understands only material evidence".

Quatremère introduces the concept of 'restitution', comparing it with that of 'restoration': "One restores a dilapidated or partially destroyed work of art, based on the surviving remains that allow, more or less, the repetition of what is missing; one restitutes a work or a monument that has entirely disappeared based on the authority of descriptions, or sometimes based on indications furnished by other works of the same kind". Actually, he considers the case of restituting a temple from a single column or capital, anyway from some remains.

Then he alerts his readers against the risks of such a practice: "In devoting oneself in restitutions to a kind of research whose nature – that always includes some element of instinctive foresight – is at once attractive and hazardous, one must not shut one's eyes to relevant reservations in order to avoid the dangers that surround this work. Before all else, the general theory of imitation must teach us to distinguish between the works of art described by writers – those that find counterparts amid existing works, or where the narrative transmits an authentic image – from those whose ensemble and details elude all forms of language". At the same time, he strongly promotes the diffusion of such a practice: "Besides, if such restitutions do not increase the number of original architectural models for artists and students, they will always offer the advantage of expanding the knowledge that pertains to this art; enlighten its taste with a large number of parallels; facilitate the understanding of texts; furnish authentic facts to the history of art; and offer diverse materials for criticism, which, without this research would remain unknown, and, so to speak, lost. […] The restitution of monuments based on the descriptions of writers, is therefore not a fruitless task or a simple curiosity, even if these descriptions do not permit reproducing with complete faithfulness the totality of the true relations or the qualities that made the merit of the originals".

Finally, he implicitly advices to educate architects to be able to understand antiquities and to draw their restitutions: "Indeed, it is important, in order to succeed at such restitutions, that the same man be at once the translator and the artist. When the double operation of translating and drawing combines within the activity of one intelligence, then, the translation and the drawing exchange reciprocal influences. The clear and precise intuition of the proper forms of the described object is of marvellous help for the meaning of the words that designate it; and in its turn, the form of the object to be discovered, will emerge more faithfully from the pencil of the artist who appropriated the knowledge of the words and the precise meaning of the description".

Quatremère de Quincy's words emphasise at least three elements that are fundamental in this

research field. First, the practice of restitution is implicitly tied with that of restoration of built remains; second, the process of restitution may produce a number of 'secondary' results, from the simple investigation on the architectural practice of a specific artist or period to the education of the architects themselves, indirectly promoting the cultural debate and awareness; third, it requires architects able both to "translate" the past architecture into contemporary words and to "draw" them in order to let the two procedures influence each other in a reiterative sequence that optimises the results.

It is not a case that architects-historians such as Heinrich von Geymüller (1839-1909) with his gorgeous studies on St. Peter's church (Ploder 1998) (Fig. 2), and many of his colleagues produced a number of reconstructions after preliminary, partial or unbuilt projects by the greatest Renaissance and Baroque architects. In Rome, in particular, the combination between historical investigation, geometric and typological analysis, and architectural design permeated the thought and the practice of the founders of the School of Architecture and a long tradition of architectural reconstructions can be traced through the work of Gustavo Giovannoni, Vincenzo Fasolo, Arnaldo Bruschi, Paolo Portoghesi and Manfredo Tafuri, among the others.

5. *Reconstructing Literary Architecture*

A graphic representation is always to some extent the "re-presentation" of a distant and inaccessible reality. Yet, the transmission of the information it contains unavoidably requires a collaboration between author and reader, who need to share the medium and their cultural environment. In this regard, Abraham Moles proposed a scale of iconicity in 13 degrees which has its maximum denotative power in a three-dimensional model on a 1:1 scale and its minimum in the verbal communication. The possibility of describing a site or building is therefore based on the anticipation of an active participation of the readers which takes place properly in their mental space. At the same time, figuring a consistent building out of an (incomplete) description may require a remarkable connotative contribution by the reader/visualizer.

Quatremère de Quincy's considerations on the restitution were triggered by his year-long study of the legendary sepulchre of the Etruscan leader Porsenna (Quatremère de Quincy 1828, pp. 127-160) (Fig. 3). An immense structure made of three orders of pyramids upon a square plinth, this tomb is known only from a description in the *Historia naturalis* that Pliny states to have quoted from a book by Varro, which is today lost, and presents a number of ambiguous and critical elements

Fig. 3: Heinrich von Geymüller, Graphic reconstruction of Bramante's project for St. Peter's Basilica (Ploder 1998, pl. VIII).

(Colonnese, 2015a). Yet, any enigmatic description of architecture is an irresistible call for finding a consistent spatial configuration. Translating it into images is both a technique to define its parts and a strategy to verify and demonstrate its validity.

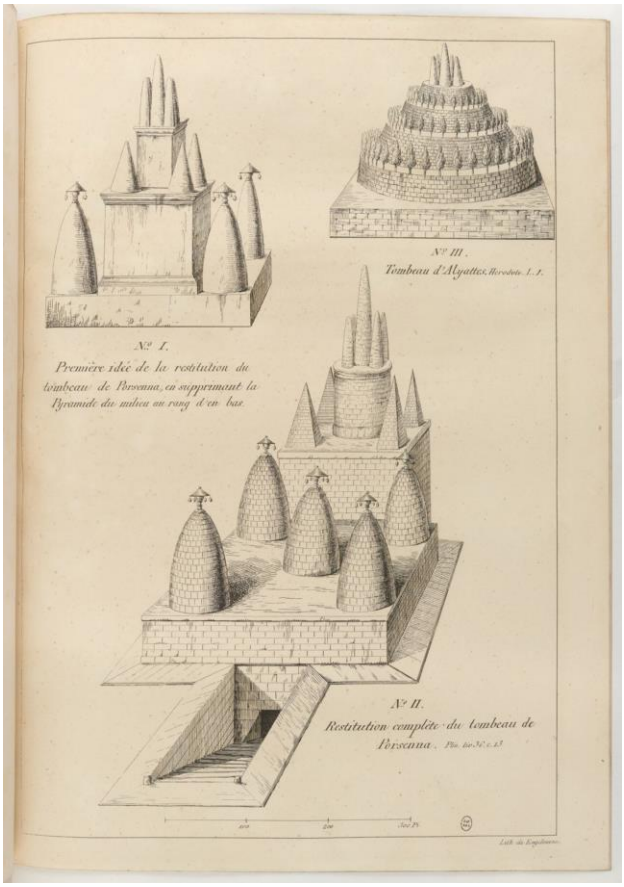

Fig. 3: Auguste Chrisostome Quatremère de Quincy, Restitution of the Tomb of Porsenna, 1826 (Quatremère de Quincy 1828, n.p.).

The tomb is a perfect example of an intangible heritage which eventually had been influencing the culture and architectural research from the 16th century onwards. It also promoted a number of formal contaminations and visual reconstructions, which indirectly demonstrate the layered and metamorphic relationship between text and image. In this sense, Quatremère considerations, which are intended to have a general value, were tempered by a very peculiar (and enigmatic) case of restitution, in which imagination can be challenged by no tangible evidences but only structural logic and stylistic affinities (Belardi, Menchetelli 2017).

While architects like Leon Battista Alberti elaborated a specific language to help the readers of his treatise on architecture envision monuments and mouldings (Carpo 2003), novelists and poets may adopt the incompleteness of the description as an intentional artifice. Studying the Castle of Love and Venus described in the baroque poem *Adonis* (1623), the impossibility of reconstructing the building results as a part of a wider strategy the artist developed to produce a sense of marvel (Colonnese 2021). The building 'designed' by Giovan Battista Marino is initially described in a crystalline way, with clear forms and geometric relationships, as an elementary seed planted in the reader's mind. Gradually, the description gets ambiguous and the parts seem to expand and transform to include the multitude of works and *mirabilia* listed by the artist, eventually amazing the readers who feel somehow overwhelmed by their own imagination.

Elsewhere, the artist needs the readers can actually understand the architecture in which the story goes with no ambiguity. This is the case of Umberto Eco's *The Name of the Rose* (1980), whose labyrinthine library and the whole monastery around it are illustrated by two plans included in the book. While turning the novel into a sort of board game, the plans provide a tangible iconography that can be combined with the text to envision a three-dimensional reconstruction of the buildings and the narrative events.

While the mental figuration of a literary architecture can even be vague, partial and inconsistent to serve the narration, a graphic visualization needs to be finite and consistent, especially when a three-dimensional modelling is the goal. In this sense, it demands for an important interpretative and critic contribution by the reader/visualizer. Such a contribution varies according to the available data. The data can be either endogenous (internal) to the document, which is the primary 'witness' or source, or exogenous (external) to it, after secondary 'witnesses' or sources.

In the case of a single description, like for Marino's *Adonis*, most of data are obviously exogenous, as every description demands the mind of the readers the mission to visualize the building – and the negotiation of the words (language, lexicon, grammar, syntax, etc.) is fundamental in this "translation". This opens the range of potential procedures and solutions for a reconstruction and forces the scholars to find external references. To be used as sources to build conjectures about the architectural form, these references must be compatible with the education

of the artist, of course. Eventually, this makes a described building very sensitive to the cultural changes along the time. In this sense, when lacking

Fig. 4: The Castle of Venus and Love from Giovan Battista Marino's Adonis, Visual reconstruction of the tower couryard (digital collage by the author).

of consistency, the reconstruction of a literary building can be interpreted either as an "adaptation", in the theatrical or cinematic sense of the term, or as a sort of *collage* of the sources that more or less explicitly the author evokes, like Palazzo Contarini suggested by Hubertus Guenther for the tower of the Palace of Love and Venus (Fig. 4).

This latter solution also visually responds to another fundamental issue: any scientific reconstruction has to be somehow "transparent", in the sense that the sources of data have to be explicit. As a sort of multivariable equation, the selected sources provide hypotheses that contribute to produce a specific solution. By changing the sources (and the hypotheses), the solution would change, of course. Thus, a scientific reconstruction is both a product and a process which is readable and open to further developments.

This idea of transparency is a consequence of the modern concept of restoration, which requires the new interventions to be recognisable from the existing parts. It is already present in the descriptions that Letarouilly added to some of his *Edifices de Rome Moderne* to explain the differences between the actual state of the building and the image he elaborated, and it is now a pillar of the recent procedures of three-dimensional reconstructions. For example, a transparent reconstructive model is expected to express the level of certainty of its parts in function of the adopted source. A general list from the 'certain' to 'conjectural', inspired by the work of Apollonio (2016), might include:

1. site: the site is known or part of the building is still existing and providing metric data;
2. internal similarities: the same artist or circle's designs or buildings;
3. external similarities: coeval artists' design and buildings, architectural style;
4. internal literature: treatises, book or articles of the same artist;
5. external literature: coeval treatises, book or articles;
6. coeval building system: techniques, materials, procedures;
7. secondary literature: following interpretations on treatises, books and articles.
8. personal conjectures and intuitions.

6. *Reconstructing Architectural Projects*

The compresence of text and images, which incidentally result from the same author in the literary version of the "Library of the Rose", provides a binary system of endogenous sources that can be used to correct the lacks or ambiguities of each of them and produce a consistent reconstruction that satisfy most of their parts without recurring to many exogenous sources. This condition generally happens in studying the architectural designs, where the documents, which often present a combination of drawings, texts and numbers, not to talk of physical or photographed models, are sometimes supported by written reports describing intents and forms of the project.

The reconstruction of the "Résidence du président d'un college près Chicago" (Colonnese 2015b) was based on the graphic data included in two sheets Le Corbusier personally drafted and published in the third volume of his *Oeuvre Complete* (Bill 2006, p. 133). They present a combination of drawings – the sketches of four plans (ground floor, first floor, entresol and roof) and a bird's eye view of the house – and text – numbered captions of the functions. These elements, however, constitute a solid base to reconstruct a coherent project for the villa designed for the campus of Olivet College,

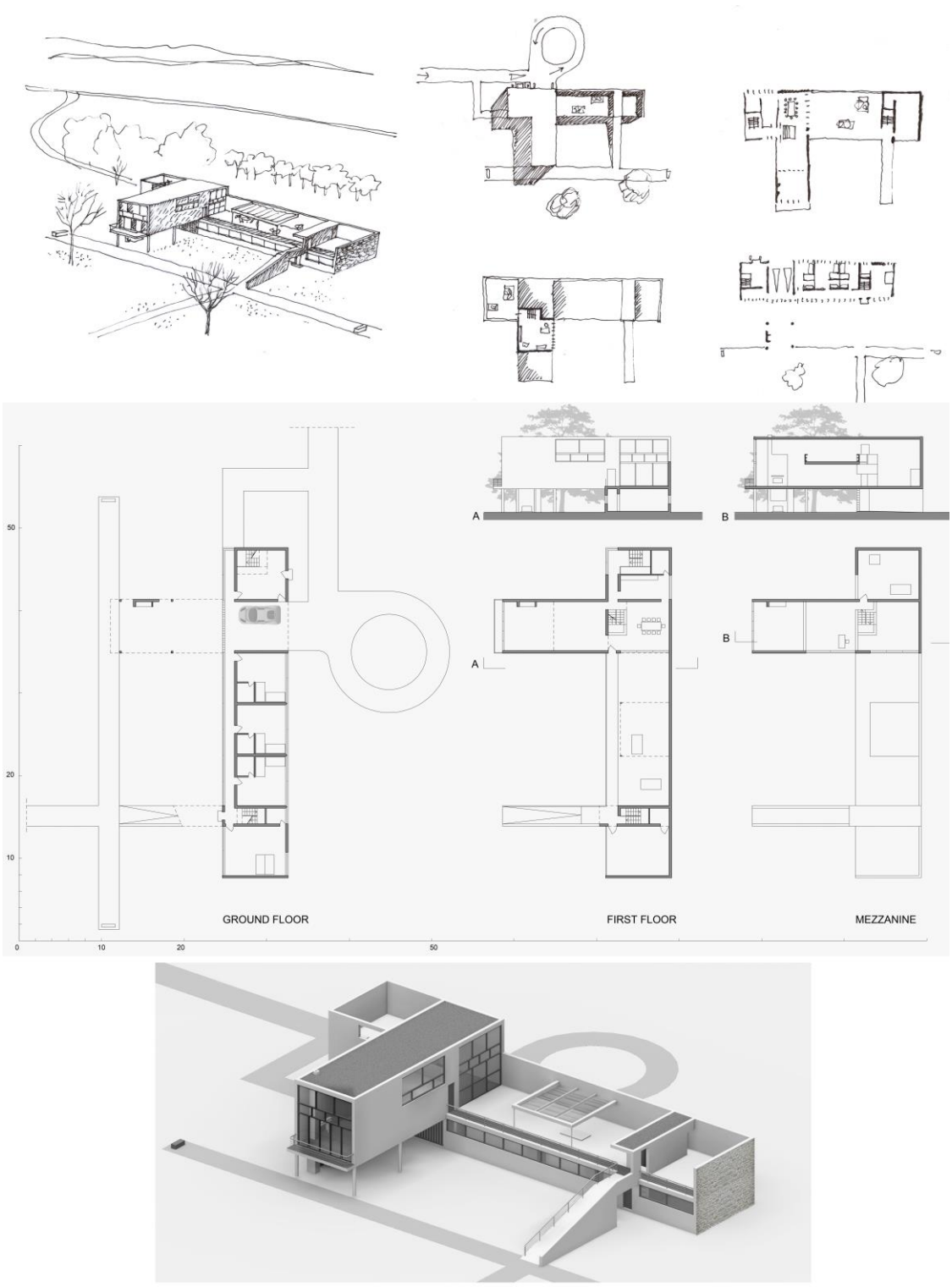

Fig. 5: Le Corbusier's project of a résidence for a director of a college near Chicago: free-hand redrawing of original skecthes on tracing paper; CAD critical redrawing and construction of sections; axonometric view from the solid reconstructive model (drawings by the author, model by S. Gioja).

Michigan, with only little inconsistencies between plans and perspective view. Such a coherence results from the analysis performed through two graphic operations: a free-hand redrawing of the sketches on tracing paper (or, in alternative, a digital tablet can be used) and a critical (digital) redrawing of the plans. The former operation is a copy, an "act of knowing" with a long tradition. It was aimed at replicating the process of drawing performed by Le Corbusier and allowed to

familiarise with the subject, reveal the sequential order of the sketches, and decipher uncertain elements, repentances or subsequent tweaks (but other potential goals are possible). While the former operation can be applied to any kind of subject, the latter operation – a sort of "smart copy" – is specific of architecture and engineering drawing (Fig. 5). This kind of drawing is not simply a digital edition of the drawing, which can be easily produced by automatic digitalisation algorithms. It is rather constructed through the support of an (intangible) geometrical network of axes, construction lines, modules, and alignments. The critical re-drawing of the house consisted of a modular re-organization of the plans by interpreting the lines in terms of dimensional properties and positional relationships such as symmetry, recursion, equidistance, modularity, etc. (preferably related to the units of measurement and scale of reproduction adopted).

The resulting two-dimensional model is a consistent graphic system of conjectures based not only on Le Corbusier's original drawings (endogenous sources) – the back elevation has been designed mostly imitating the main one – but also the knowledge of his modus operandi, of others of his projects and buildings, of the constructive techniques, of his theoretical principles, and so on (exogenous sources) – for example, metal banister and garage glass wall are inspired by Villa Savoye, while the fireplace by his coeval renewal project for Villa Stein. In particular, deriving a vertical section after plans and elevation was a key step to verify the consistency of the whole project and include little adjustements.

The practice of critical redrawing generally demonstrates that any group of sketches concerning a single architectural project may present both inconsistencies and unsolved elements. This often happens also when the project is represented in a system of pseudo-orthogonal views mutually correlated. This is the case of the Gian Lorenzo Bernini's project of a monument for Felipe IV of Spain in the portico of the Basilica of S. Maria Maggiore in Rome. While the bronze statue was eventually made by Girolamo Lucenti and is currently placed at the opposite end of the portico, the surprising solid-perspective sacellum remained unbuilt and is known only through two sheets conserved at the Uffizi and Vatican (Colonnese 2018). Both the sheets – a draft and a presentation drawing – present the monument in correlated plan and elevation. However, the perspectival nature of the structure makes the visible spatial data ambiguous and require a careful and related interpretation of the marks.

Deciphering the representational role of (or the intention behind) each single mark and line on the sheets was allowed by the critical, correlated redrawing of plan and elevation combined with the parallel construction of a longitudinal section, which indirectly verified the spatial model (Fig. 6). This complex process, slowed by ambiguities and inconsistencies, was first supported by the comparison with other perspective drawing of Bernini's atelier. Added to this, Francesco Borromini's drawings were also examined as he had pioneered the baroque research in solid perspective, produced many drawings of Bernini's project and used to draw exclusively plan, elevation and sections.

In the case of the sacellum, the reconstruction was supported also by secondary sources of different type. Besides critical texts individuating precedents and parallels, in this case a fundamental exogenous source was the place. The portion of the portico affected by Bernini's project, which only secondarily differs from the age of the project, is a fundamental part of the process. Such a sacellum at the end of the portico would have illusorily added a further span and enlarged the size of the statue of the King of Spain. At the same time, some elements miss or changed over time to consider the current portico a faithful witness of the age of the project (and an endogenous source).

However, the portico was surveyed and compared with the historical iconography – mainly Father Paolo de Angelis' plan of the basilica of 1621 – to negotiate the critical redrawing with the actual architectural context. Added to this, the existing statue was photographically surveyed. Its 3D model, produced through photo-modelling, was used to integrate the solid model after the critical redrawing, which was eventually used to produce views and animations.

Sometimes, the place also provides elements for the representation of the reconstruction. The reconstruction of the Temple of Divine Wisdom Borromini had designed as an early solution for the apse of S. Ivo alla Sapienza was based only on the general plan at the Archivio di Stato. Lacking an elevation of that project, the plan was related to the vertical elements of the built project. Together with Marcello Fagiolo, two different solutions

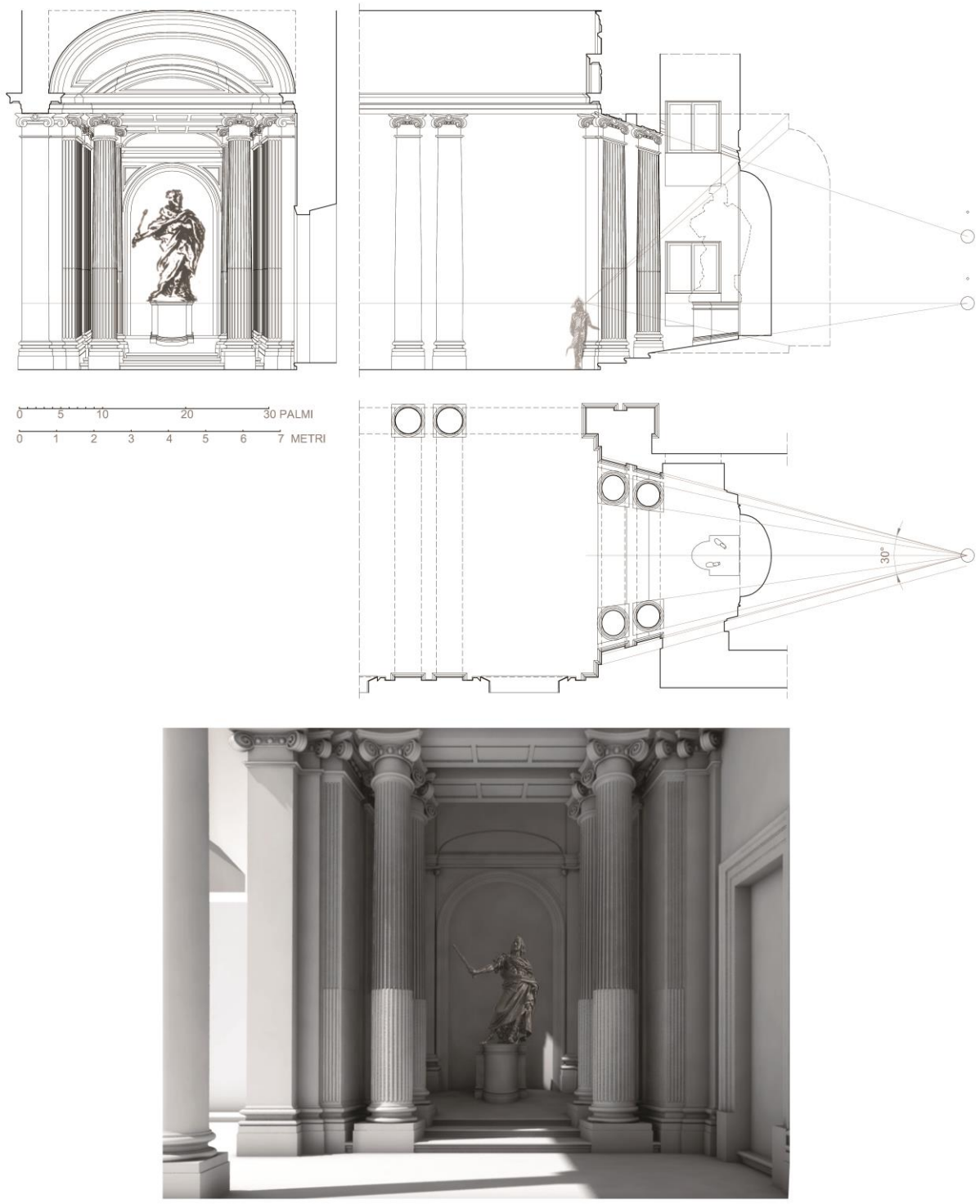

Fig. 6: Gian Lorenzo Bernini's project of a monument of the King of Spain in S. Maria Maggiore: CAD critical redrawing from the original designs and construction of the verification section; view from the solid reconstructive model (drawings by the author, model by Lorenzo Ascani).

were developed and compared to evaluate their visual effect, in particular the backlight effect produced by the window behind the seven free columns staging the Temple. The solutions, studied in existing plans and elevations, were rendered through digital collages after photographs taken in the church and then rectified (Fig. 7). In this sense, the priority of the endogenous data is also valid for the choice of the representation technique, that can be arranged

Fig. 7: Francesco Borromini's unbuilt project for the apse of S. Ivo alla Sapienza: a comparison between two alternative solutions (digital collage by the author).

through the use of elements of the document or the building itself, up to the case of full-scale models or map projecting techniques. This approach indirectly embodies the aesthetic instance Cesare Brandi (2005) had introduced in *Theory of Restoration* in 1963. In this sense, the reconstruction is "a critical-interpretative model that replaces the asset itself and can finally aspire to stylistic unity, never achieved during the construction phase, and leaving the asset, now stuck in its condition and in its historical stratifications, unscathed" (D'Acunto & Friso 2022, p. 532).

7. Reconstructing Fictive Architecture

Half-way between literary architecture and architectural designs, the fictive architecture depicted in paintings or modelled on walls is another category of intangible heritage. The main subject is the structure and space such a vision can evoke, through either a canonical application of linear perspective or other empirical techniques to give the illusion of three-dimensional elements. Unlike Bernini's solid perspective sacellum, fictive architectures can be explored by the gaze but not

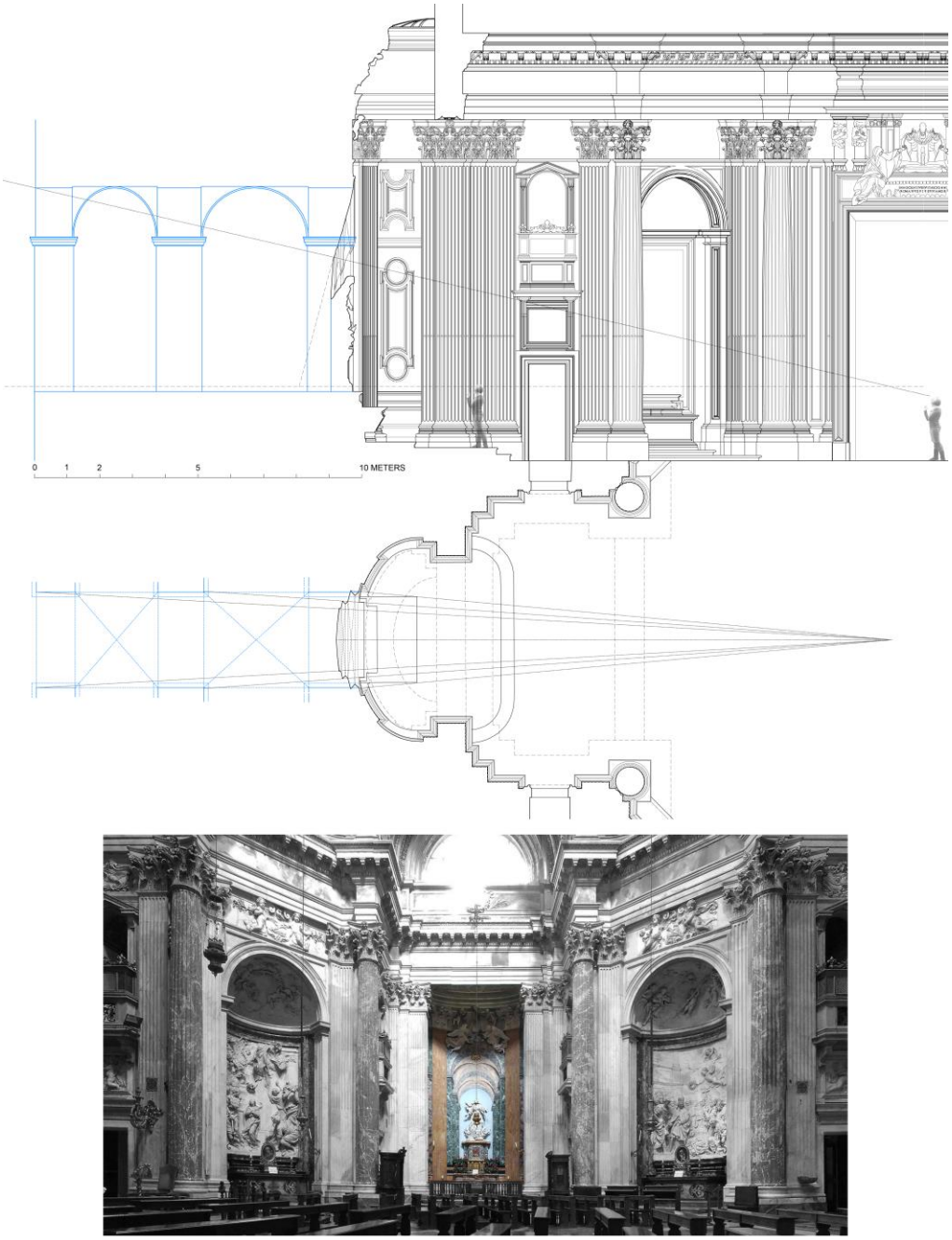

Fig. 8: S. Agnese's altar in the church of S. Agnese in Agone: perspective restitution of the fictive gallery in section and plan with the point of view of the relief-perspective; interior of the church with the altar in colour (photo by the author, drawings by G. Crucetta and the author).

the body, unless to reveal the illusion of 11 meters in only a 120cm-deep choir, like the false perspective Bramante built in S. Maria presso S. Satiro, Milan, in 1486 (Camerota 2006). In this sense, this kind of intangible architecture results of a complex interaction between a visual/perspectival artwork, the surrounding architectural envelope, and the mind of the viewer.

Reconstructing the actual form of a structure in orthogonal projections after a rigorous perspective representation of it requires a perspective restitution. This procedure starts with the individuation of the fundamental elements of the perspective construction (horizon line, vanishing points, main distance, and so on) and an additional element, either a precise measure or a

specific geometric relationship. As most of Renaissance and Baroque perspective constructions are based on square grids, generally individuating a square on the floor or ceiling can trigger the process of perspective restitution through the vanishing point of the 45° inclined lines of diagonals. However, this is an endogenous data, coming from an external source – the modus operandi of the artist, interpreted throught the perspective knowledge of the 21th century. In this sense, it is a hypothesis to make explicit in the process to have a transparent product.

The perspective niche in the chapel of S. Agnese in the church of S. Agnese in Agone, Rome, also allows neither functions nor circulation but provides the illusion of a deep Doric gallery just behind the statue (Colonnese 2016). The photogrammetric survey of the interiors of Rainaldi's and Borromini's church revealed that the marble relief-perspective construction is rigorous, its horizon line as high as the pedestal. At the same time, the perspective analysis revealed that the two spans of the gallery present a different virtual depth. This data affects the perspective restitution, of course. When considering the first span as a square, the virtual gallery results shorter; when considering the second span as a square, the whole results longer. Inserting the two solutions in the general plan of the church contributed to find a key to solve this ambiguity. Unlike the shorter, the depth of the longer gallery coincides with the actual physical distance between the church and the adjacent Pamphilj Palace, evoking an unbuilt corridor Borromini had formerly planned to open. Moreover, the point of view of the relief-perspective coincides with the middle of the domed nave, the exact geometric centre of the whole architectural composition. These two coincidences seem to endorse the longer gallery solution (Fig. 8).

From a methodological point of view, are these data endogenous or exogenous? Are they a part of the 'document' or not? This question is quite delicate. Unlike fictive architecture conceived as a movable artwork, a quadrature or a relief-perspective are generally designed for a specific place and point of view. In this sense, the church, which is coeval to the fictive gallery and unchanged since then, can be considered as part of the original document, a 'monumental' endogenous source. Moreover, the interior of the church and the altar decoration are presumed to have been both supervised, if not strictly designed, by Borromini himself and the coincidence between point of view and geometric centre seems to confirm this.

8. Conclusions

The practice of visual reconstruction of intangible heritage aims at developing the spatial contents of documents, monuments or sites. It includes very different situations and follows different procedures, which are often customised on the specific cases, to accomplish different goals. In this sense, each reconstruction process requires to be designed upon the subject. The brief historical excursus focusing on Quatremère de Quincy suggests that such a work should be performed by a single operator able to both "translating" the contents and representing the form of architecture. The practice of the critical redrawing is exemplary of the skills required to master the process.

It also suggests to use the term "restitution" for what, from an unbuilt project to a perspective quadrature, has been designed by means of a complete project, which is properly restituted. Other terms, like "adaptation" or "visualisation", are to be preferred for the literary architecture, in which rarely exsists a true project and the "intangible" is often "imaginary". While "rendering" seems today oriented to the generic design visualisation, "reconstruction" can be used in all the other cases.

The centrality of the process is what distinguishes a scientific reconstruction; the transparency of the choices and the sources considered is fundamental to ensure its quality. The endogenous data, which belong to the document/monument itself, have a sort of philological priority over the exogenous data, which have to be taken in consideration with caution, according to their reliability. This is also true for the visual material or the reconstructions itself, which can be exampled from the document or the site, whenever it still exists.

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