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From projection to building and vice versa

Perception scale of *trompe l'oeil* and its resurgence in a particular kind of contemporary architecture

Introduction

After three decades of formal experimentation guided by digital design tools, it is interesting to observe the return of architectural *trompe l'oeil* in some projects. This presumably indicates a desire to establish a crossplay between architectural design canonical projections (plan / section / elevation / perspective) and the constructed space. Insofar as this device is mainly based on the use and diversion of architectural drawing projective principles, it is interesting to question its resurgence in architectural design contemporary technological context.

This paper is driven by two concerns. On one hand, to understand how projective (and perspective) devices in architectural drawing can influence our physical perception of the world and its scale; and, on the other hand, to consider the architectural survey as a moment of knowledge (Lo Buglio and De Luca, 2011). While these two concerns may seem to have little in common, they both question the persistence of projections in the architectural object and their ability to disrupt our perception. Through studying the functioning of a singular accelerated perspective (forced perspective), this paper intends to understand why this particular type of projective device (architectural *trompe l'oeil*) is reappearing in a particular kind of contemporary architectural production.

In order to examine this link, we propose first to observe Seneffe castle's small theatre (late eighteenth century, Belgium), a singular accelerated perspective project built by French architect Charles De Wailly. One of the peculiarities of this small building is its interior space, which proposes an accelerated perspective (special case of *trompe l'oeil*). This optical illusion, mainly used during the Baroque period, plays with monocular perspective to distort a space and our comprehension of its scale in order to make it look longer or shorter than it really is.

The question we attempt to answer is: what does this illusion tell us about the built space and its scale? This question underlies the study of projections in the conceptual act and the way these approaches still find an echo in a number of contemporary architectural practices. In this sense, the survey of the theatre could allow us to better apprehend the accelerated perspective particular device and consequently the role of drawing in the project. Based on that, the question arises of using a *trompe l'oeil* for a building that could have been built without optical distortion due to the space available around the building (fig.3). Considering the architect first proposes a conceptual posture, this obviously leads us to question the place of projections as a composition paradigm. The accelerated perspective, more than any other approach, highlights the close link between projection and constructed space. Even though we

do find examples of forced perspective or other optic illusion in many fields (such as the theater, painting, photography or the cinema), it is in architecture, more than anywhere else, that the accelerated perspective transforms the physicality of our relationship to the material space.

By examining this projective system, which is mainly found in Baroque architecture, it is tempting to try and understand what such a comeback can mean in particular contemporary projects. This is all the more relevant as the current digital context tends to erase the cultural and conceptual contribution of canonical projection systems that have existed in architectural design for five centuries. Beyond the aesthetic dimension, some recent European projects suggest a gradual return of *trompe l'oeil* devices, which seems to reflect a desire to re-establish a dialogue between space and projections. In the context of technological increase and the gradual domination in design of 3D visualisation tools, the return and transgressive use of canonical projective systems probably reflect the need to place the project at the heart of a cultural practice of architecture. It has been built over the last five centuries by developing drawing methods that allow to downplay the project's complexity to abstract and synthetic representations. This last point also suggests examining some recent projects that help understand the re-emergence of this link between projection and constructed space.

To summarize, the following points intend:

- a. to explain the process used to survey and analyze – through representation – the accelerated perspective of the Seneffe castle (Belgium) (fig. 1),
- b. to deconstruct it in order to find the space undistorted by the *trompe l'oeil*, hence the building's "real" projected scale (fig. 2),
- c. to understand what a *trompe l'oeil* induces spatially and to evaluate its relevance in contemporary production.

Study of an accelerated perspective

The survey of the Seneffe castle's small theatre

In order to understand what an accelerated perspective is and how it is constructed, the survey of the Seneffe castle's small theatre was carried out by a group of students from the ULB Faculty of Architecture La Cambre-Horta, as part of the course entitled "survey and architectural representation". This building was designed in the 18th century by Charles De Wailly, the renowned French architect who designed the Royal Castle of Laeken, the royal family of Belgium's residence.

The unique layout of the *Petit Théâtre du Château de Seneffe*'s interior space is mainly due to the presence of a *trompe l'oeil* arrangement that results in making the stage look longer than it actually is. This accelerated perspective is constructed to exaggerate the optical narrowing between the foreground and the background of the stage. While many *trompe l'oeil* designs were found during the Baroque period, they were essentially wall frescoes whose effect was to modify our perception of physical space. Apart from some famous great examples such as the Scala Regia at the Vatican (Antonio da Sangallo the Younger) or the Palazzo Spada (Francesco Borromini), fewer *trompe l'oeil* design directly apply the monocular perspective principles to the

built space. Though it is a late example, the Little Theater is therefore a singular case of anamorphosis directly applied to architecture.

In order to understand the construction and the deformations inherent in the place, the lasergrammetric and photogrammetric surveys of the interior and exterior spaces were carried out. While lasergrammetry is an indirect measurement technology commonly used today, photogrammetry is increasingly being developed when it comes to conducting heritage surveys. In terms of documenting architectural elements, photomodelling (surveying, 3D modelling and representations from images) has reached a point where costs, accessibility, quality and the diversity of results can meet many surveys' needs and constraints at architectural (technical and disciplinary) scale (Lo Buglio, 2018).

The surveys of the small theatre reveal a neoclassical ensemble with a cross plan made up of three square spaces adjoining a central space, also with a square plan. In the main axis stands a colonnade; each column's sections and their centre distance decrease as one moves away from the central space (fig.1). While it looks like a deformation from the side wings, it becomes visually coherent when taking up position in the centre of the building.

From this point of view, the stage seems to take on another scale (longer and wider than it really is). Another interesting aspect is that the *trompe l'oeil* illusion seems to work not only from the central axis but from whatever position from the central space.

Deconstruction of an Accelerated Perspective and Construction of the Induced Space



Fig. 01. Transversal and longitudinal section coming from the lasergrammetric survey of the interior space of Seneffe castle's small theatre.

Source: David Lo Buglio/ Alexandre Van Dongen / Arnaud Schenkel / Henry-Louis Guillaume, 2020

The survey not only made it possible to precisely document the existing situation but also to deconstruct the accelerated perspective of the stage. It is all about determining the viewer's ideal position but also understanding the geometric principles used to design that space.

Looking at the section's orthogonal projection (fig.1, left-hand side) naturally seems to reveal the conical perspective of a space with a larger scale (or depth) than perceived. However, on the basis of these documents and the plan re-drawn during

the survey, the challenge is first to locate the respective positions of the vanishing point, the picture plane and the observer.

If the picture plane is at the intersection of the building's central space (not deformed) and the stage of the theatre, the vanishing point can be determined by extending the path of the colonnade's shortened perspective projected on the plan (and the section) of the survey. Things are somewhat different when determining the observer's position. It can only be located by knowing the distance point vis-a-vis the picture plane. Obviously, from the section showing the shortened perspective, it is already possible to draw the diagonal from the picture plane to the distance point on the horizon line (fig. 2, the upper part of the figure).

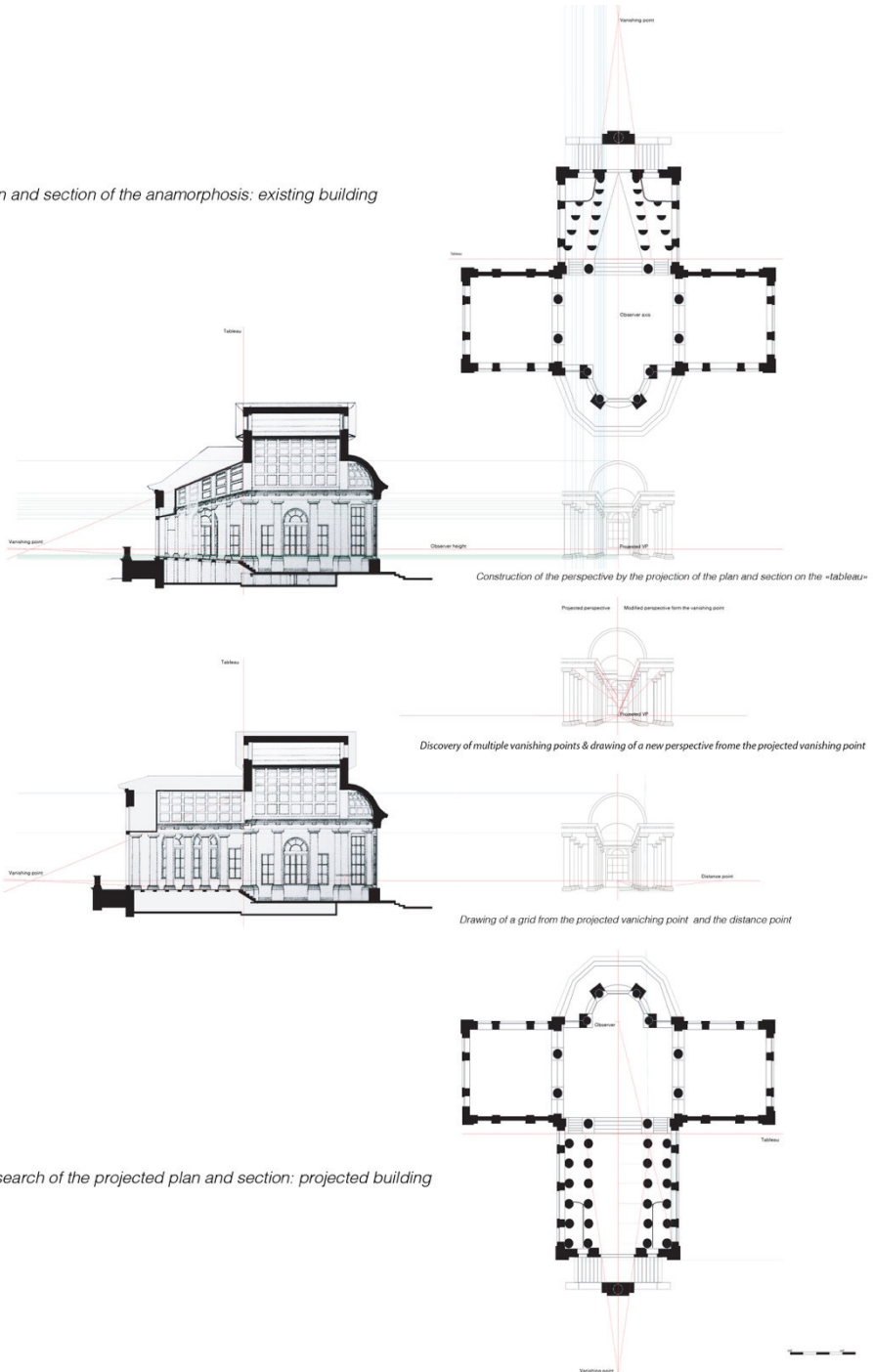
Another solution is to deduce the built space (or the space as it might have been built) without anamorphosis (fig. 2, bottom part). Based on the building's composition in its "non-deformed" parts, the "real" depth of the stage is drawn, in other words, it is the depth without deformation. This new plan allows transferring the distance to the picture plane (previously found on the perspective), to identify the observer's location but also and above all to understand where the best position is to appreciate the *trompe l'oeil*.

This has not yet been mentioned, but unlike the conical perspective drawn from the undeformed building (fig. 2, bottom part), the orthogonal projection of the surveyed anamorphosis reveals several vanishing points (fig. 2). We find three vanishing points on the vertical axis of the scene (on several theoretical horizon lines). If this may seem like an error, the precision of these three points rather suggests a voluntary construction.

It is possible to hypothesise that their existence results in playing with our perception of space. More specifically, these multiple vanishing points extend the area from which the space of the stage appears to be coherent. This principle is also reminiscent of particular Renaissance pictorial constructions, where vanishing points were multiplied, allowing several observers to appreciate the *trompe l'oeil* simultaneously (Panofsky, 1976). In addition to extending the scale of the perceived space, multiple vanishing points increase the physical space from which the anamorphosis works. The painting "*Convito in Casa di Levi*" by Veronese (1573) produced for the refectory of the Dominican convent "*Santi Giovanni e Paolo*" is a good example of this principle.

The study of the painting by Alberto Sdegno et al. reveals the existence of almost 7 perspective vanishing points within the same graphic space (Sdegno and Masserano, 2016) (fig. 3). But what is even more intriguing is that observing the scene generally does not help understand the perspective distortions. Apparently, the painting was meant for the upper part of the wall at the bottom of the refectory, over a width of 13 m. The primary objective of this *trompe l'oeil* and its particular position is to heighten the perspective of the room by the presence of this painted gallery. On the other hand, the multiplication of vanishing points on the vertical axis makes it possible to appreciate the effect of different positions in the space of the room.

Plan and section of the anamorphosis: existing building



Research of the projected plan and section: projected building

Fig. 02. Survey and analysis of the accelerated perspective of the Seneffe castle's small theatre.
Image : Myriem Saoud / Pauline Virtt, 2019

Returning to the Seneffe castle's small theatre, we realise that, in addition to the principles of monocular perspective, the deformations due to these numerous vanishing points are, in the manner of Veronese's painting, likely to extend the operation of the *trompe l'oeil* in space. While this may seem necessary in the case of a scene observed from many positions, the accelerated perspective applied to the building demonstrates a desire to play with space, its scale and the senses. For the architect, it is undoubtedly a matter of forcing the spatial experience by crystallising the links between the project's composition and the projective medium that are at its origin (fig. 4).

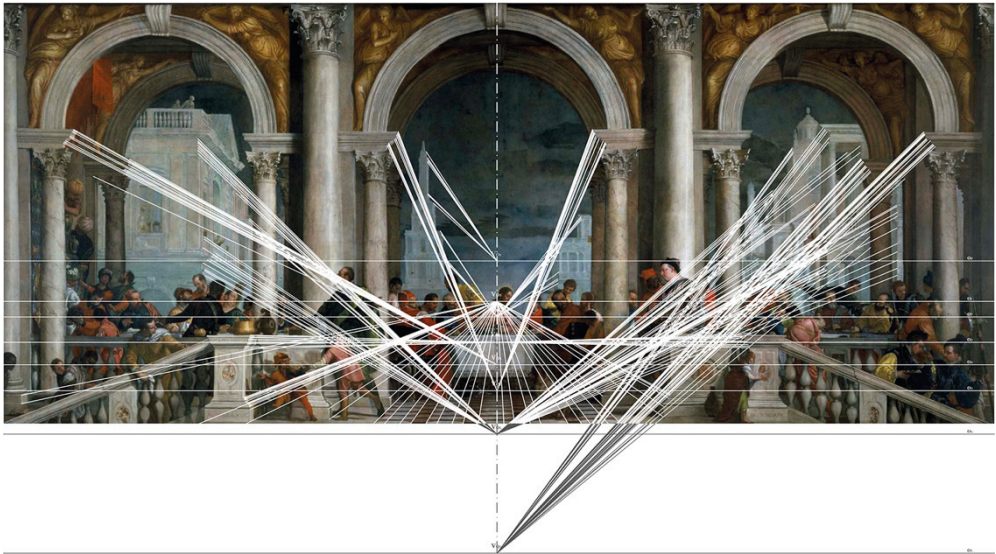


Fig. 03. Perspective study of the painting "Convito in Casa di Levi" (Veronese) by Silvia Masserano and Alberto Sdegno.

Picture: Silvia Masserano and Alberto Sdegno



Fig. 04. 3D printing of the accelerated perspective of the small theatre's inner space.

Model: Valéry Fortune / Valentin Foulon, 2019

The projection as a means of playing and perverting the real and its scale

After three decades of formal experimentation guided by digital design tools, it is interesting to observe the return of architectural *trompe l'oeil* in a number of projects. While the comeback of accelerated perspective or other anamorphic devices seems to have regained a significant place in architectural composition, can we really consider it as a “return” to the Baroque?

One cannot understand Baroque architecture without pointing out a certain praise of unity. As Norberg-Schulz describes, Baroque architecture, “does not exclude any aspect of the overall architectural experience, but it aims at a great synthesis” (Norberg-Schulz, 1997, p. 315). Beyond any plastic or aesthetic dimension, the resurgence of some architectural devices in contemporary architecture echoes various experiments on space, such as those proposed by Francesco Borromini. Norberg-Schulz describes them this way: “He [Borromini] takes the decisive step by deliberately introducing space as the constituent element of architecture [...] these spaces are complex totalities, given as indivisible figures. This characteristic is underlined by all the means at its disposal”. (Norberg-Schulz, 1997, p. 292). This notion of “means” also evokes the place given to projective devices during the Baroque period, not only as a tool for designing the project but as a tool for transforming reality.

Indeed, the matter of proportion or composition cannot be disconnected from perspective, especially since it was theorized precisely during the Baroque period. While it can be considered central during the Renaissance, particularly through Filippo Brunelleschi’s understanding demonstrated in his *Tavoletta* (a wooden panel created for observing the Baptistery of San Giovanni in Florence), the concept of infinity did not yet exist, and its representation through a vanishing point was even less developed (Damisch, 1993, p. 174). The *Tavoletta* suggests the position of an observer and a picture plane where the vanishing point serves as the counter-eye of the composition rather than expressing infinity. While this initial device provides a coherent understanding of perspective, it is only with Leon Battista Alberti’s treatise “*De pictura*” in the 15th century that there emerged an early geometric theorization based on “a scientific rationalization of empirical processes” (Mediati, 2008, p. 72). Therefore, it is in the Baroque period that the spatial representation of infinity is suggested by a vanishing point where all parallels converge, and perspective emancipates itself from the realm of painting to integrate the field of mathematics. It fully frees itself from its symbolic significance thanks to figures like Girard Desargues in the 17th century (and later Gaspard Monge) and becomes an instrument for reproducing the visible world. The projective mastery of perspective was essential to the development of projects such as Francesco Borromini’s gallery at Palazzo Spada (17th century). This accelerated perspective is a perfect example of how composition, space and perspective coexist within a coherent whole. The interplay that Borromini is trying to establish between the building and the scale of its perceived spatiality could not have existed without the diversion and “literal” application to the constructed space of the projective and perspectival drawing systems.

Today, if we look at the architectural production of some young European offices, we note the emergence of an against-the-flow practice that attempts to reintroduce the projective issue into the heart of the conceptual act. In 2008, the OFFICE Kersten Geers and David Van Severen built a bridge spanning one of the canals of the city of Ghent to reach the cultural centre “Handelsbeurs” (OFFICE-KGDVS, 2008). Like Borromini’s gallery, this bridge offers an accelerated perspective whose vocation is to extend its length and, as a corollary, to stage one of the building’s entrances by making it appear more monumental than it is (fig. 5). While being spaced almost three centuries apart, these two projects offer a similar *trompe l’oeil* arrangement. However, beyond the proximity of architectural responses, today the bridge by Office acts primarily as a manifesto. It re-establishes a dialogue between the project, its cultural dimension and representing means that are at the origin of it (Chancel, 2015).

While the use of this type of device in contemporary architectural practice remains marginal, office DVVT’s production could also be observed. Several of their projects tackle the themes of mimicry or copy, but they have in common that they materialise the link between the project and its representation. One of the most singular examples of this merger is that of the Twiggy store (Belgium) (DVVT, 2013). It is a project to extend and refurbish an old building into a commercial store (2013). In order to accommodate a new vertical circulation, part of the building was modified by a simple operation: the orthogonal “translation” of a part of the facade (fig. 6).

Unlike the previous example, which uses the principle of accelerated perspective to deceive the eye, here the gaze is not deceived insofar as one can clearly distinguish the extrusion carried out there. However, even in the absence of anamorphosis, the geometric operation clearly refers to the projection modes of architectural drawing. If trickery there is, it occurs first in the drawing, insofar as it erases any intervention (fig. 6). The extrusion disappears completely and displays an “ordinary” facade. The geometric drawing contains the anamorphosis and the building refers to the abstraction of the drawing. Although the main issue is to maintain the existing one as much as possible, the trickery meant to surprise the spectator is never far off. Here DVVT first proposes a questioning on the place of drawing in the act of conception; a dialogue between a projective system and the real embodied in the building.

This project is a perfect illustration of the place given by some architects to canonical devices but also of their ability to divert them (here the geometric projection) to alter the perception of the building. This discussed posture is obviously not unique to these contemporary architects. Whether it is Eisenman with the anamorphosis of an axonometric impossibility for the model of “house X” or the literal geometric operations by Gordon Matta-Clark on the Office Baroque (Belgium), many examples can be found in the history of architecture that allow us to consider the building as a represented matter (Chancel, 2015). These postures show us heightened awareness on the part of architects to mobilise representation as a medium to act on reality and alter its reading.

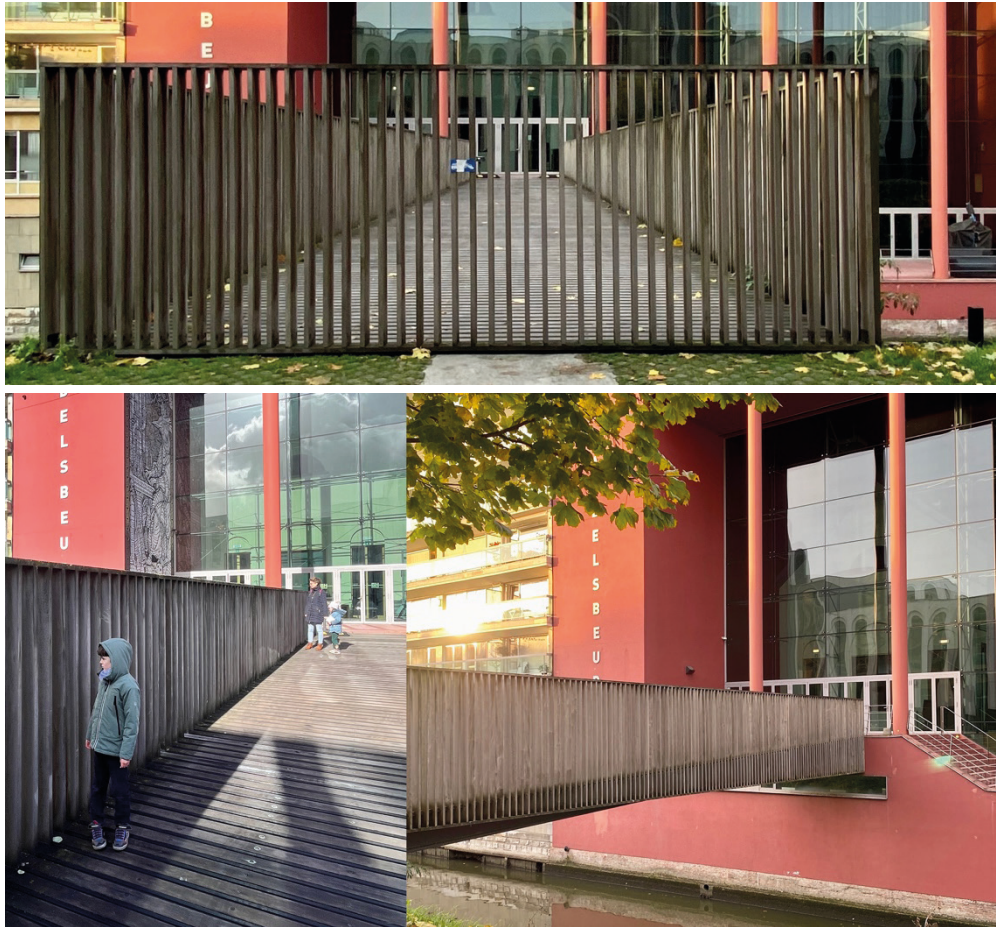


Fig. 05. Bridge of the “Handelsbeurs” cultural centre. OFFICE Kersten Geers office David Van Severen. Ghent, 2008.

Photos: Myriem Saoud (Photographs above and below right) / David Lo Buglio (Photograph at the bottom left), 2023

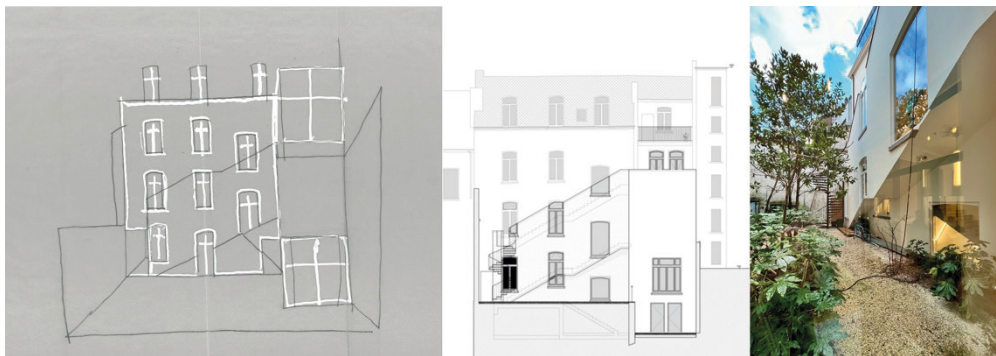


Fig. 06. Twigg store. Architecten De Vylder Vinck Taillieu. Ghent, 2013.

Pictures: Twigg, Architecten De Vylder Vinck Taillieu, 2012 (on the left) / David Lo Buglio, 2023 (photograph on the right)

Geometry to Reintegrate the Cultural Dimension of Architecture

With regard to these examples, it is interesting to return to one of the questions above: can we speak of a “return” to the Baroque? The few projects mentioned here are obviously not numerous enough to generalise a point of view; nevertheless they highlight the links between architecture and its representation.

Baroque can be seen as a quest for divine perfection through mathematical mastery. Now, the architectural complexity of baroque space is also inseparable from the development of mathematics in general and geometry in particular. In this context, *trompe l'oeil* and the theorization of perspective, like the other devices used during the period spanning the 17th and the 18th centuries, allow to increase the sensitive experience of space. While religious architecture transcends reality in order to tend towards the divine, the spatial amplification of a *trompe l'oeil* also seeks to extend the sensitive experience of architecture by altering the perception of the “real” and its scale.

Baroque cannot be dissociated from its cosmological dimension, which implies a connection between the experience of the sacred and architecture. Nevertheless, “once geometry had lost the symbolic attributes in traditional philosophical speculation, perspective ceased to be the preferred vehicle for transforming the world into a meaningful human order. Instead, it became a mere representation of reality, [...]” (Perez-Gomez and Pelletier, 2000, p. 112). Perez-Gomez’s terms allow us to understand that Baroque architecture cannot be considered only through its symbolic purpose but it also crystallizes a moment of rupture.

Insofar as it is difficult to observe a “return” to the Baroque in some contemporary architects’ spatial experiments, the use of representation to disturb the “real” and our understanding of its scale further reflects the need to restore the design medium at the heart of the architectural discipline. As Robin Evans mentioned, representation (and therefore the tools of geometric transformation) remains the preferred means to access the project. “What might have occurred in architecture – but did not – occurred outside it, and indeed outside painting and sculpture, in so far as these are categorically defined. To insist on direct access to the work, drawing can be designated as the real repository of architectural art” (Evans, 1997, p. 157). For him, the artwork is the most immediate way to access painter’s or sculptor’s “oeuvre”, but this is not necessarily the case for the architect and its building. According to Evans, the architect’s work is primarily accessible to him through drawing and, by extension, the spatial design geometric mediums that contain the project.

Beyond the return of anamorphosis or accelerated perspective in a number of contemporary practices, the transgression of architecture by its mediums first refers to these architects’ cultural positioning. It is legitimate to think that some European offices’ spatial experiments first aim to reintegrate the cultural dimension of architecture at the heart of its practice.

At the same time, this posture also evokes a departure from the digital context. While architecture has been conceived, for centuries, through a projective medium that called upon an important power of abstraction, today, 3D interfaces move design into figurative universes far from any projective notion (Rippinger, 2020). The geometric complexity of designed objects is less and less understood through its

orthogonal projections but directly from the three-dimensional space of the drawing interfaces. While this is not a problem in itself, the completeness necessary for 3D drawing leaves little room for the geometric abstraction inherent to the architectural drawing. The loss of synthesis in favour of an object figuration removes a necessary dimension of architectural design.

In contrast, the projects mentioned above tend to show us practices that try to reinvestigate the abstraction of the figure (Bergilez, 2011) through an exploration at the border of canonical projections and the constructed space. This attitude expresses a departure from the flow of what Antoine Picon calls “digital architecture” (Picon, 2010).

As a first step, this paper discusses the survey as a practice of “reverse design” but also tries to demonstrate the tenuous link between the building and the projection tools used to design it. This reading-key gives new theoretical arguments to locate and refine our understanding of the place left to drawing projections in contemporary production. Here, we wanted to consider the projection, not as a shared convention of drawing in architecture, but as a cultural vector allowing our discipline to find the means of its reinvention within and by itself.

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