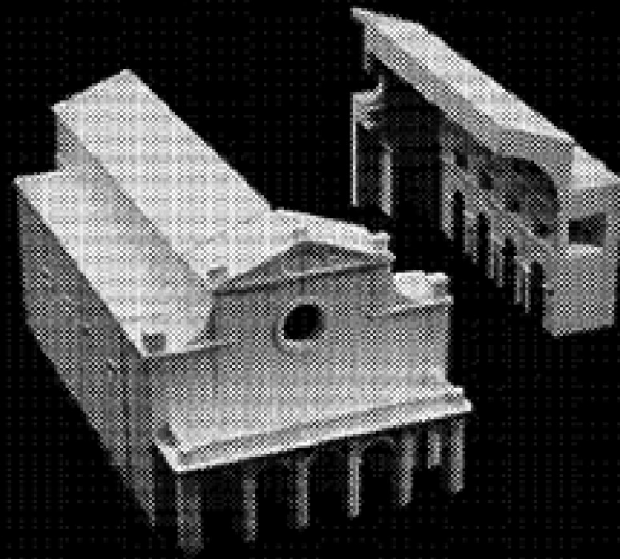


# Bruno Gil

## APROPOS DIGITAL ALBERTI AND PALLADIO VIRTUEL: THE PREPONDERANCE OF THE TOOLS FOR RESEARCHING THE HISTORY OF ARCHITECTURE



S

The present paper aims to reflect on the current research processes in the history of architecture and to assess the instruments' relevance, integrated within methodologies. For this purpose, it will focus on two studies recently developed – *Digital Alberti* and *Palladio Virtuel* – that both return to the Renaissance Humanism, regarding respectively the works of Leon Battista Alberti and Andrea Palladio. As an underlying detail, yet relevant to justify the present paper, is the simultaneity and mutual unawareness of the studies.

R

Both can also be related through their common use of tools that are imported from the computational universe to enhance the research<sup>1</sup>, even if their uses are divergent. Hence, they assume that investigating the historical period is an act eminently conditioned by the current circumstances, and foremost by the researchers' point of view.

Before advancing detailed information on both research projects it is important to recognize the innumerable investigations made around Alberti and Palladio throughout, such as the ones by Wittkower, Tafuri, Choay, besides more recent ones, which will be briefly considered and are, to some extent, predecessors of the studies referred in this paper.

E

Alberti and palladio are timeless

The research project *Digital Alberti*, coordinated by Mário Krüger and developed since 2010, focuses on Alberti particularly through the treatise *De re aedificatoria* (1485). Although the original treatise was deployed from illustrations, this research acknowledges the rules outlined by Alberti, namely the proportional ones, as potential codes for form generation that allow variability. Thus, recognizing that "Alberti refers principally to the processes of conception on the art of building"<sup>2</sup> (Krüger, 2011, p.29). Essentially, the project aims to clarify the influence of Alberti's principles on the Portuguese counter-reformation churches.

For the transformation of Alberti's coded language into visual language, researchers incorporate shape grammars, theorized by George Stiny and James Gips (1972), as an instrument to decode the treatise. Stiny already developed with William Mitchell – who had written the seminal essay *Vitruvius Computatus* (1973) – a Palladian grammar (1978) that applied 72 rules to generate the plan of Villa Foscari at Malcontenta<sup>3</sup>. Actually, in their published paper, while perceiving the odd-number of openings in the east-west elevations, they recalled Alberti's analogy between building and body mentioning "that the supports of ancient buildings were generally even in numbers as animals support themselves on an even number of feet." (Stiny & Mitchell, 1978, pp.15,16).

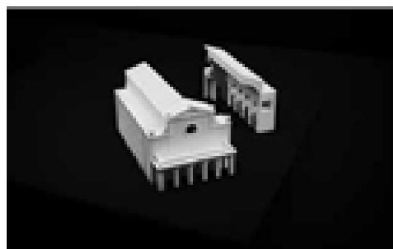
*Palladio Virtuel*, a research coordinated by Peter Eisenman that culminated in an exhibition in 2012, focuses on Palladio through an analytical reassessment of his villas, grounded on the buildings and drawings of *I Quattro Libri dell'Architettura* (1570). The first steps of this research were already announced in 2004, when Eisenman published the article *Digital Scrambler* in *Perspecta*.



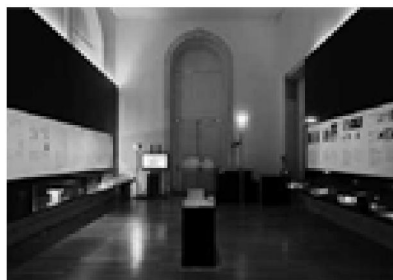
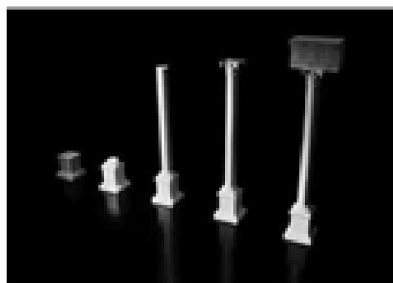
1. Digital Alberti, exhibition in the Science Museum of the University of Coimbra, April-June, 2013. Scientific coordination by Mário Krüger. Photo Credit: bruno Gil



2. Palladio Virtuel, exhibition at the Yale School of Architecture, August-October 2012. Scientific coordination by Peter Eisenman. Photo Credit: William Sacco, Yale Photo + Design



3. Digital Alberti's exhibition. Physical Model of the Espirito Santo Church in Évora. Photo Credit: do mal o menos



4 & 5. Digital Alberti, exhibition in the Science Museum of the University of Coimbra, April-June, 2013. Scientific coordination by Mário Krüger. Photo Credit: do mal o menos

We may trace back this analysis to Rudolf Wittkower's book *Architectural Principles in the Age of Humanism* (1949) and Colin Rowe's essay *The Mathematics of the Ideal Villa* (1947). It is well-known that Rowe's research on the late classical villa and the modernist one were mostly the outcome of having Wittkower as his mentor, especially from his studies at the Warburg Institute. Hence, the transition from Wittkower's diagrammatic charts — a grid of an ABABA pattern concerning the plans of Palladian Villas — to Rowe's study — an analytical comparison of Palladio's Villa Foscari and Le Corbusier's Villa Stein — was a natural outcome.

Moreover, Rowe's cross-temporal studies would influence his contemporary practice. In the 1950s, while sharing with John Hejduk the context of the architecture school in Texas, Rowe's research might well have inspired Hejduk's designs for the Texas houses. In these houses, it is possible to unveil the "nine square matrix", a methodological input that would be recurrently introduced in pedagogical exercises, until the Cooper Union. The plans were transformed into diagrams as a means to recognise their inner relations, where at the same time an interpretation on this was developed. Ultimately, history was theorized to invigorate the contemporary practice.

Rowe would be Eisenman's mentor, in the transition to the 1960s, in Cambridge. In fact, Eisenman in his PhD thesis *The Formal Basis of Modern Architecture* (1963), under the supervision of Leslie Martin, was trying "to establish that considerations of a logical and objective nature can provide a conceptual, formal basis for any architecture." (Eisenman, 1963, p.17). So, his study was not solely on the modern architecture, but mainly on its form. He decontextualized architecture, identified its elementary wireframe and analysed its formal intricacy. From the complex "architectural equation" <sup>4</sup> he elected "form" to occupy the top position of the hierarchy. Therefore, he was concerned with formal conception as a pure logical consistency, considering "buildings as a structure of logical discourse" (Eisenman, 1963, p.17).

Similarly, *Palladio Virtuel* "is not about the work of Andrea Palladio, per se" (Eisenman, 2012), but one more contribution to his investigation on the invisibility of a formal consistency on architecture. It is a lifetime investigation that, conversely, could be named as *Architecture Virtuel*, since 1963 with an emphasis on Le Corbusier, then Terragni and finally Palladio in 2012. Therefore, the analysis on *Palladio Virtuel* resorts to the same structural research methodology. Already in 1961 and 1962, during his journeys through Italy with Rowe, Eisenman searched for an inner structure of his surroundings. His analytical decoding kept unchanged either before Palladio's buildings as before Terragni's Casa del Fascio: "Rowe sitting in an outdoor café drinking an aranciata, while I stood in the sun on a 95-degree day, looking, as I had been instructed, to find something that could not be seen." (Eisenman, 2012).

# S R E P A P

## Between the virtual and the digital

The introduction of the digital universe within *Digital Alberti* and *Palladio Virtuel* research projects is actually divergent. This may result from a deviating critical position considering an evolution on the studies of language, right from the early sixties. The notion of language as a hidden order of the architectural design derives from the early structuralist studies by Ferdinand de Saussure on literature. But, mostly from the paradigmatic approach by Noam Chomsky (1957), which would determine the generalization of structuralism, reaching several disciplines in the sixties.

It is actually this recognition that Eisenman experiments since his time in Cambridge in the early sixties, where Leslie Martin envisioned architecture as a discipline within university. In the same place where Wittgenstein had already discussed the arithmetic of forms, Christopher Alexander and Lionel March tested a scientification of architecture and its adaptation to computer design. This overly eccentric position would cause a theoretical conflict with Eisenman's more implicit use of language.

If Eisenman understood language in the design through operations of tension, compression or elongation, as non-evident rules that implicitly transformed the architectural volumes, for Stiny and Gips the transformations of sequential shapes would occur through evident rules, explicitly. Hence, even if both approaches acknowledged language and its syntactic rules as the method to generate form <sup>5</sup>, they also made a different disciplinary use of what Tafuri named the "autonomy of language".

This difference is crucial to understand what distances the *digital* approach of the *Digital Alberti* research project and the *virtual* approach of *Palladio Virtuel*, making use of the digital tools, mainly to produce its outcomes.

The computational approach of *Palladio Virtuel* is consciously implicit, thus virtual. Reintroducing Eisenman's formal analysis methodologies, the research adds a third dimension to Rowe's original study and reassesses the twenty villas included in the study through an ABCBA pattern. Differently from the ideal sequence ABABA that Wittkower revealed from Palladio's villas, the present research questions the long time ideal relations between traditional components, by introducing a volumetric analysis to that sequence: the classical portico, the transition space and the main central space <sup>6</sup>. Through the use of virtual models the research tests the hypothesis that Palladio's villas result from a disaggregation of those ideal components (Eisenman & Roman, 2012).

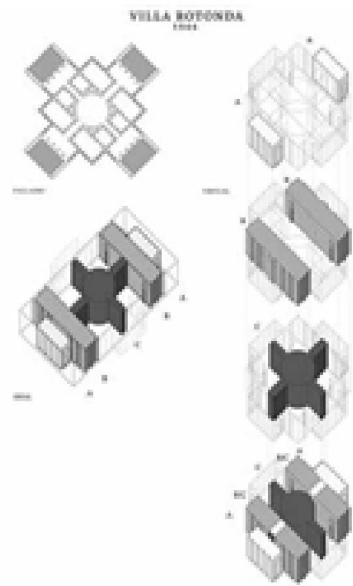
The reading of the villas starts from Villa Rotonda considered as best representing the ABCBA key, until Villa Sarego understood as the least canonical; thus "re-envisioning Palladio as an endlessly parametric experimenter, as opposed to the pure geometrician he has been seen to be" (Vidler, 2012).



6. Palladio Virtuel, Analytical and Physical Model of Villa rotonda. Credits: Peter Eisenman & Matt roman



7 & 8. Palladio Virtuel, exhibition at the Yale School of Architecture, August-October 2012. Scientific coordination by Peter Eisenman. Photo Credit: William Sacco, Yale Photo + Design



9. Palladio Virtuel, Analytical Diagrams of Villa rotonda, 2012.  
Credits: Peter Eisenman & Matt roman

While, the computational approach of *Digital Alberti* is scientifically digital. It works with computer sciences as means of investigating history, by decoding *Albertian* ideal rules for the system of the column or for the innumerable volumetric possibilities of the temples and while making use of Stiny and Gips's shape grammars. At the same time, the preponderance of the tools is highlighted when the object of research is not only Alberti or the Portuguese churches. It assesses the tools' contribution to the research, and it foresees autonomous theories when it considers the instruments from a basic standpoint.

The project's cultural and historical background mediates this digital approach. Its research tasks also trace the impacts of Alberti's treatise on the theory, the practice, and the teaching of architecture, thus combining cultural and computational approaches. Eventually, it is possible to compare this research process with the *Albertian varietas* (as "variety"). A combination of the parts with the whole is attempted, but carefully balanced through *elegance*. It aims for *concinnitas* (as "congruity" or "harmony") that appears "as a measure of excellence in almost all domains of human life, as architecture, music and literature, which ask for a global appreciation and understanding, holistic and not fragmented of its object."<sup>7</sup> (Krüger, 2011, p.34).

#### Between the ideal and the real

What links both research projects is the uncovering of a virtual condition from the built architecture, as a means to access its implicit order, and to make it evident for interpretation.

Assuming as *ideal* the architecture that follows the canon and as *real* the one that is specific, it is possible to position this *virtual* condition as occupying the middle ground between the *ideal* and the *real*<sup>8</sup>. Even so, the virtual encompasses the two projects from their initial hypotheses.

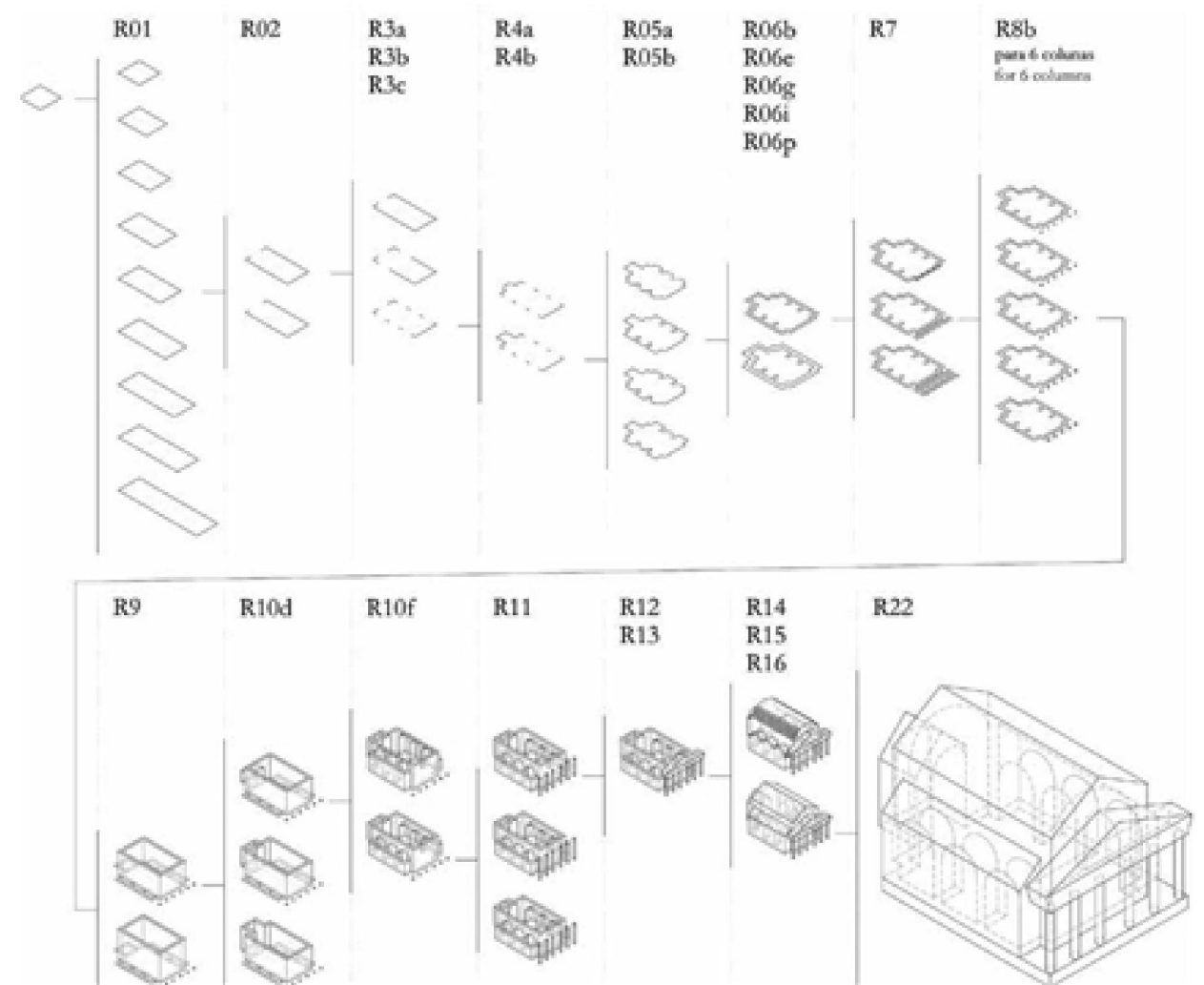
Digital Alberti, aiming at clarifying the existence of a Portuguese renaissance architecture, considers Portuguese churches through their inherent order. While mapping their virtual and implicit state, elements such as the column system or the proportions of the naves and the lateral chapels are rationalized. Deviations from the canon are identified, reaching to a virtual conception. This is where the research gets to a crucial point, in search for the evidence.

Through this process, researchers attempt for similarities between the case studies and the ideal descriptions on *De re aedificatoria*. These similarities are possible to devise when overlaying the visual interpretations of both the treatise and the case studies. They may then appear explicitly, and ultimately both grammars — from the ideal architecture and from the real architecture — are assessed.

For the other side, *Palladio Virtuel* resorts to a similar principle in search for the virtual, when it devises each of the twenty villas in their architectural form versus the canon of the "ideal villa". *Ideal* could also be related to what Eisenman defined as the "generic form"

and *real* as the "specific form". Ultimately, resembling *Digital Alberti's* search for the inherent order of Portuguese churches, "to understand the conceptual basis of architectural form, it is necessary to isolate those properties which relate to generic form in its architectural context." (Eisenman, 1963, p.57)

10. Digital Alberti, Sacred buildings shape grammar, 2013.  
Credits: Digital Alberti and bruno figueiredo



1 ≥ We can recall recent researches that also focused on some architects from the history through the lens of the present computational realm. In Digital Semper, Bernard Cache (1999) imported to his research Gottfried Semper’s theory of Der Stil (1863). Similarly, Henri Labrouste: Structure brought to light (2013), a recent exhibition at MoMA organized by Barry Bergdoll, included a symposium where Labrouste was revisited in the Digital Age.

2 ≥ Free translation from the Portuguese version.

3 ≥ The Palladian Grammar would be developed by Lawrence Sass (2000), rebuilding three-dimensional models of the un-built Villas of Trissino and Mocenigo.

4 ≥ “Architecture, as a means of expression, can call upon several elements to contribute to the architectural equation, which can be thought of as: concept or intent; function; structure; technics; form.” (Eisenman, 1963, p.25)

5 ≥ Stiny and Gips, in their fundamental essay on shape grammars (1972), quote Focillon as the one who recognized the generative feature within the visual arts. Also Eisenman in his PhD had recurred to Focillon (1942), admitting additive or reproductive qualities of generic forms that allow them to generate and multiply.

6 ≥ Coded A, B, or C and respectively by white, grey and black colours.

7 ≥ Free translation from the Portuguese version.

8 ≥ “A building which is realised as a specific form must have a generic antecedent. This antecedent relates to the formal aspects of that building: the elementary state of that building and the essence of that state.” (Eisenman, 1963, p.85,87)

Acknowledgments

This paper lies within a PhD research provided with a grant from the Foundation for Science and Technology, Portugal.

For their support and contributions, I would also like to thank to the *Digital Alberti* and *Palladio Virtual* research teams. From *Digital Alberti* I wish to thank Mário Krüger, José P. Duarte, and Gonçalo Canto Moniz, for granting me access to all the project developments and Bruno Figueiredo and Filipe Coutinho for sharing their research outcomes with this paper. From *Palladio Virtual* I would like to thank Peter Eisenman and Matt Roman for sharing their research outcomes and Brian Butterfield for providing me the exhibition’s materials. Finally, I would like to thank Marta Caldeira for her insights on Yale.

references

Alberti, L. B. (1485) [2011]. *Da arte edificatória* (A.M.E. Santo, Trans. & M.J.T. Krüger, Introduction, notes and disciplinary review). Lisboa: Fundação Calouste Gulbenkian.

—

Cache, B. (1999). Digital Semper. In C. Davidson, (2000), *Anytime* (pp.190-197). Cambridge, Mass: MIT Press.

—

Chomsky, N. (1957) [2002] *Syntactic structures*. Berlin: Mouton de Gruyter.

—

Eisenman, P. (1963) [2006]. *The formal basis of modern architecture*. Baden, Switzerland: L. Müller.

—

Eisenman, P. (2004). Digital scrambler: from index to codex. *Perspecta*, 35, 40-53.

—

Eisenman, P. (2012) Palladio in context. In N. Rappaport, P. Eisenman, & M. Roman (eds.) *Palladio Virtual*. New Haven: Yale School of Architecture.

Eisenman, P. & Roman, M. (2012) Inventing the Palladian Project. In N. Rappaport, P. Eisenman, & M. Roman (eds.) *Palladio Virtual*. New Haven: Yale School of Architecture.

—

Focillon, H. (1942). *The life of forms in art*. (C.B. Hogan and G. Kubler, Trans.). New Haven. 1st ed. (1934) *Vie de Formes*. Paris: Librairie Ernest Leroux.

—

Krüger, M. (2011) As Leituras da Arte Edificatória. In Alberti, L. B. (1485) [2011] *Da arte edificatória* (A.M.E. Santo, Trans. & M.J.T. Krüger, Introduction, notes and disciplinary review). Lisboa: Fundação Calouste Gulbenkian.

—

Palladio, A. (1570) [1945] *I quattro libri dell'architettura*. Milano: Ulrico Hoepli.

—

Rowe, C. (1947) The mathematics of the ideal villa: Palladio and Le Corbusier compared. *Architectural review*, 101, 603. 101-104.

Sass, L. (2000) *Reconstructing Palladio's villas: an analysis of Palladio's villa design and construction process*. Doctoral Thesis. Cambridge, Mass: MIT.

—

Stiny, G. & Gips, J. (1972) Shape grammars and the generative specification of painting and sculpture. *Information Processing*. 71, 1460-1465.

—

Stiny, G., & Mitchell, W. (1978) The Palladian grammar. *Environment and Planning B: Planning and Design*, 5, 1, 5-18

—

Vidler, A. (2012). Palladio reassessed by Eisenman. *Architectural Review*, 1389, 88-93.

—

Wittkower, R. (1949). *Architectural principles in the age of humanism*. Sl.: University of London.