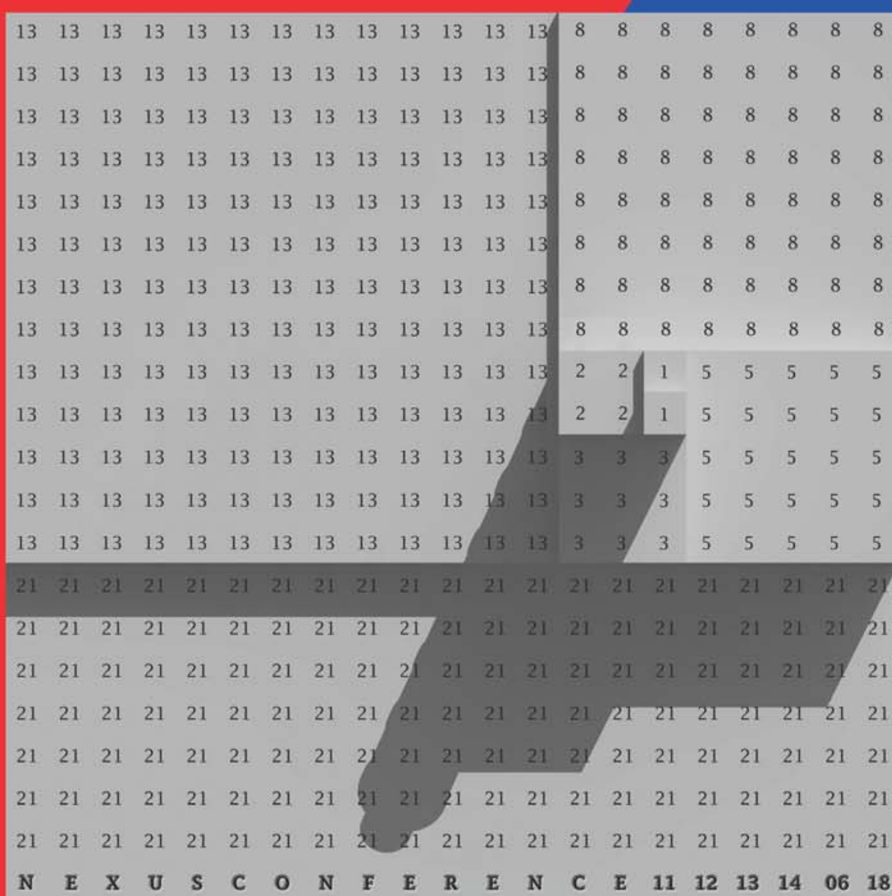
NEXUS 2018

Architecture and Mathematics

Conference Book



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Dipartimento di Ingegneria dell'Energia, dei Sistemi,
del Territorio e delle Costruzioni
University of Pisa

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present

Nexus 2018
Architecture and Mathematics

Conference Book

edited by

Kim Williams and Marco Giorgio Bevilacqua

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Thursday, 14 June 2018
Ph.D. Day

REGOLA AND *LICENTIA* IN THE *EXTRAORDINARIO LIBRO* BY SEBASTIANO SERLIO

Roberta Spallone,[1] ***Marco Vitali***[2]

Introduction

The *Extraordinario Libro* by Sebastiano Serlio, published in Lyon in 1551, is an interesting field of experimentation for the dialectical relationship, central to the Mannerist period, between *Regola* (Rule) and *Licentia* (License). This volume is composed of copper plates engraved with rich captions: "there are thirty doors of rustic work mixed with different orders: and twenty of delicate work of various species" (Serlio 1551: Frontispice).

The book, not foreseen in the original editorial plan for drafting an architectural treatise, is tied with Book IV, concerning architectural orders, which was the first to be published in 1537. Indeed, in the monumental door, or portal, the architraved or arched entrance combines with the order to form an architectural element with a specific functional, formal, and decorative character (Chitham 1985: 99-101).

In the twentieth century, the *Extraordinario Libro* was the object of some historical-critical studies that highlighted the character of "strange collection of portals and capricious cartouches" (Rykwert, in Carpo 1993: 7). However, there are no studies that analyze the geometric structure of the Serlian models, linking them to the modularity of the orders and to the unit of measurement of the period.

The authors of this paper have undertaken this path with the aim not only, as in Fiore's auspices, "to reproduce, following the text, the proposed graphic examples" (Fiore, in Serlio 2001: 17), but also to interpret, represent, and finally relate the proportional criteria underlying the iconographic *corpus* of the book. The geometric-modular relationships that rule the composition of the fifty portals are investigated using graphical analysis, which involves recognition, de-composition and re-composition of the elements, and philological reconstruction, aiming at:

- comparing and classifying Serlian models;
- identifying variants and invariants between proportions of 'rustic' doors and 'delicate' doors;
- establishing connections to the rules of orders stated by Serlio in Book IV;
- highlighting recurrent and exceptional compositional criteria.

The Research

Now that I have given vent to the oddities of mixed and licentious things, it is quite right that I treat likewise the regular ones —Serlio 1551: *Dilicate* I.

Although Serlio uses this premise to describe the 'delicate' doors, the 'licentious' works are distributed throughout the whole volume.

The 'rustic' work is found in the application of ashlar-work, sometimes banded, while the 'delicate' work is deprived, but this does not imply a strict correspondence with

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'*Licentia*' and '*Regola*' respectively. Indeed, variations in the application of order elements, decoration, and inscription also characterize a good part of the 'delicate' doors. In Book IV, the Rule presents a series of transgressions of Vitruvius's instructions, motivated by direct reference to Roman antiquities. The Rule identifies as a module the column diameter repeated a certain number of times at the 'constructive level', which using the successive partition method, allows for proportioning the elements at the 'functional level' (Migliari 1991: 49-66).
In the *Extraordinario Libro*, in addition to the use of different order elements in the same portal, the License is manifested in the interruption of architrave, frieze, or cornice by breaking of the pediment to place a plaque or a coat of arms in the application of the ashlar-work to columns, pillars, and architraves. Such Licenses must also be contextualized within the pedagogical intent of an architect who declares himself a 'professor' and proposes a series of 'inventions' destined to remain on paper (Thoenes 1989: 12).
In the dedication to the readers (*A gli lettori*), Serlio provides general indications on how to use dimensions: "And because with regard to describing the dimensions I have been very brief, the diligent architect will find them minutely in this way. He will imagine how many feet the door should have to measure, making one of those feet twelve inches (*once*), and one inch (*oncia*) six parts called minutes... With this rule he will find all the dimensions from one side to the other" (Serlio 1551: *A gli lettori*). The reader is warned about the terms of use of the treatise, in which he will find some of the fundamental dimensions, while he will independently have to find those dimensions not specifically indicated: "which dimensions you will find if you are diligent in dividing and measuring" (Serlio 1551: *Rustiche* V).
A description of dimensional/modular references is only made for doors I, II, III, III, V, VII, VIII ('rustic' doors), V, XV, XVI, XVIII, XX ('delicate' doors).
The graphical analysis began from these models, through the connection between drawings and texts, in search of an analysis protocol for the definition of the compositional hierarchy and sequence, the testing the correspondence between modules and dimensions, and the identification of hidden geometries. This protocol was subsequently extended to other models.
Regarding the drafting of this protocol, it is necessary to point out that the dimensions indicated by Serlio always follow the general logic and the sequence stated in the dedication to the readers:

- the dimensions in feet (width and height), of the opening;
- the value of the module, in feet (corresponding to the base diameter of the column shaft);
- the height of the column (including base and capital) and of other elements related to the 'constructive level'.

The reader is left with the task of finding from the drawing the dimensions necessary for the subdivisions of the 'functional level' into base, shaft, and capital (for the column); base, die and cap (for pedestal); architrave, frieze and cornice (for the entablature).
Sometimes the height and width of the elements placed above the entablature are indicated, and more often the dimensions of the lateral bands and the intercolumniation are provided. However, the overall dimensions of the portal and

the related proportional criteria—which are the subject of attention in Book I, on geometry (1545)—are missing. Therefore, modular and dimensional indications freely alternate; the latter are then subdivided, almost always, with a modular criterion, which derives from the division of elements into fractions of the whole.

In relation to the inequality of the information in the captions, Serlio often refers to the 'diligent architect' who is able to integrate the text through the reading of the drawing and to vary the size of the module in order to obtain scalar variations: "To make the measure of the whole, it is possible to imagine how many feet the door has to be wide, dividing one foot in twelve parts: with it, the dimension of everything will be found" (Serlio 1551: *Rustiche* XX). In the same incipit, Serlio specifies: "And so, using the small compass for the small work, and the large compass for the large one, [the architect] will translate the small thing in great shape without fail" (Serlio 1551: *A gli lettori*).

As noted, the doors' theme is recurrent in the books by Serlio: in chronological order, it appears in Book IV (1537), dedicated to the five architectural orders, in Book III (1540), which contains Roman antiquities surveys, in Book I (1545), where the principles of geometry are exposed and, finally, in the *Extraordinario Libro* (1551). The analysis of the theme, according to this sequence, could reveal the progressive maturation of a compositional method, fully applied in the *Extraordinario Libro*.

In the concluding part of Book I, Serlio illustrates some applications of geometry, among which the *ad quadratum* method used to proportion the main door of a temple. The general dimensions of the door are ruled by the width of the central nave, through the construction of a square where the diagonals and the inscribed isosceles triangle define the two dimensions of the opening and the proportional relations between its width and the cornice, and between its width and the height of the tympanum. Wittkower highlights an essential aspect of this Serlio's geometric layout: the graphic construction leads to finite subdivisions of the square that rules the composition of the door, which does not require a drawing, and concludes that it "follows, rather than precedes, the relationships chosen for the portal "(Wittkower 1994: 123). In Book I another significant passage for this research is related to seven main quadrangular proportions that identify the ratio between the two sides of a rectangle, inspired in part by musical harmonies.

Conclusion

In the incipit of Book I, devoted to geometry, Serlio states: "Whatever is necessary for any person the very art of Geometry can testify to all those who have worked without it, and then have come to some cognition of such art: those who truly confess that all the things they were thinking of and done without Geometry were without any art, adventurously and casually" (Serlio 1545: Dedication to the reader).

This contribution, and in light of the central role that Serlio attributes to geometry in architecture, offers an original analysis that works with the same tools.

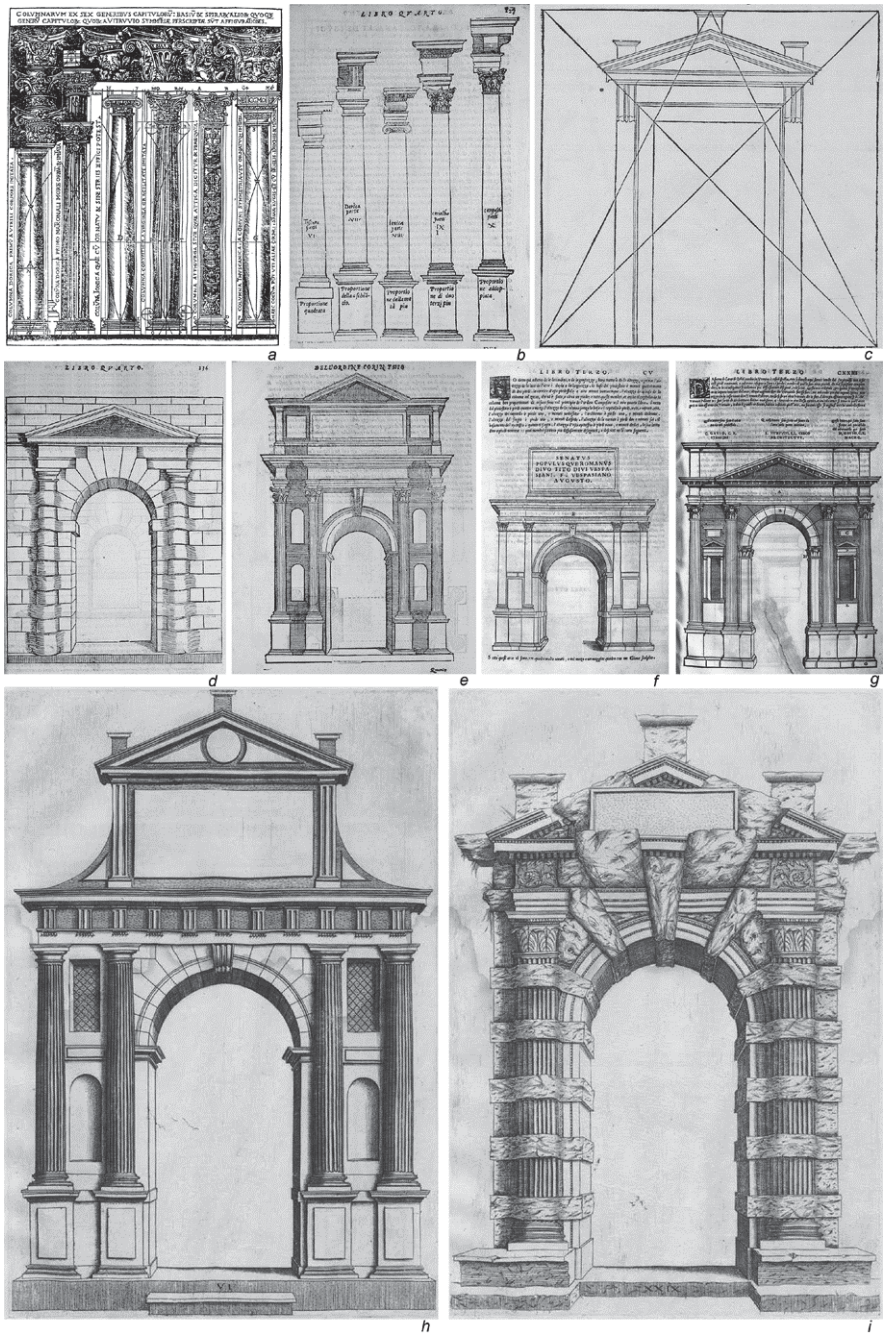

Fig. 1. a) Cesariano, edition of *De architectura* by Vitruvius (1521), synoptic table of the orders; b) Serlio, Book IV (1537), synoptic table of the orders; c) Serlio, Book I (1545), geometric proportion of a portal; d), e) Serlio, Book IV, architectural orders applied to the portals; f), g) Serlio, Book III (1540), surveys of Roman arches; h) Serlio, *Extraordinario Libro* (1551), 'delicate' door; i) Serlio, *Extraordinario Libro* (1551) 'rustic' door

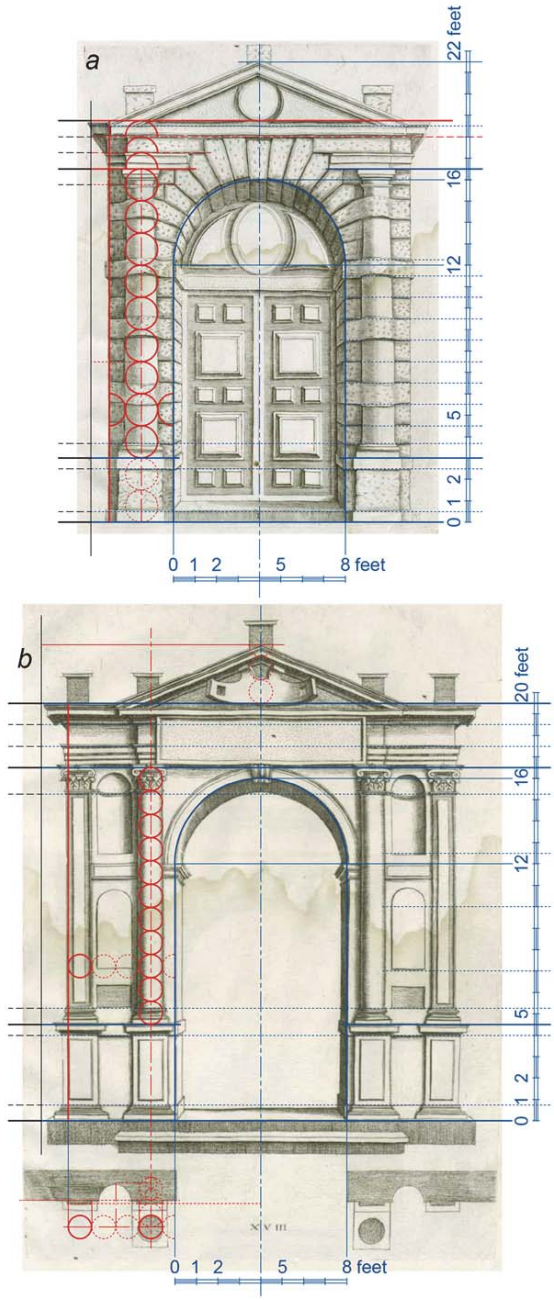

Fig. 2. Graphical analysis applied to the doors 'rustic' I (a) and 'delicate' XVIII (b). The analysis is aimed at comparing text and images of the treatise: it highlights the relationships between the proportional criteria of subsequent partitions of the module and that which refers to dimensions. On the left of the plates the partition into the 'constructive level' (with a black heavy line) and the 'functional level' (with a black thin hidden line). The elements proportioned on the unit of measurement (feet) are in blue and those proportioned on the module are in red. With a heavy line the elements proportioned and described by Serlio in the text, with a dotted line the interpretations on the proportionality made by the authors

Graphical analysis confirms the consistency between text and drawings: it is used as a mediation tool between two proportional criteria: that of subsequent partitions of the module, and that which refers to dimensions. Moreover, the analysis highlights punctual correspondence of the dimensions with the exact fraction of the module.

Wittkower's remarks, together with the fact that in the *Extaordinario Libro* Serlio does not explain the role of geometry as a compositional criterion, but refers to it by establishing additional geometric relations between the parts - for example between height and width of the openings that is a double square- supports the choice to carry out the graphical analysis through both the combination of the metric and modular data reported in the text and the *a posteriori* geometric reading, comparing the results.

In the *Extraordinario Libro* the relationship established between module and unit of measurement make more complex the integration of the two criteria, geometric and modular: in some cases, the *ad quadratum* method is identifiable in determining the openings width, or the keystones height, or the entablatures height, but it seems to lose its value of regulatory criterion of the whole composition.

The interpretative tools based on drawing and geometry confirm, in our opinion, how the creative process adopted by Serlio constantly takes into account the Vitruvian lesson: even when the license is privileged, it produces controlled results, derived from an overall organization that is not evident in the text. Therefore, re-drawing is a heuristic tool that critically goes back to the compositional process of the models and highlights its logic, tracing sequences, structures, and hierarchies through the selection of information and graphical synthesis.

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