



French Influence on Guarino Guarini's Theory of Stereotomy

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Abstract

This research concerns stereotomy in Baroque architectural theory. Specifically, it explores French influence on Guarino Guarini's theory of stereotomy. The research argues that the French influence on Guarini's theory of stereotomy was limited. The argument is sustained by the scarcity of references to French sources in Guarini's theory of stereotomy.

Keywords Guarino Guarini · Projective geometry · Architettura civile · Euclides adauctus · Baroque

Introduction

Historically speaking, geometrical descriptions of how to practically handle the cutting of ashlar for various types of constructions have been an integral part of architectural theory. This part of architectural theory is usually termed “stereotomy.” For a comprehensive general study on the science of stereotomy, see José Calvo-López' book on the subject (2020). In the seventeenth century, French theory of stereotomy was undoubtedly in a prominent position within the field, with notable figures such as Girard Desargues, François Derand, Claude François Milliet Dechaies, and Philippe de La Hire. The Theatine Guarino Guarini was one of the first Italians presenting an extensive theory of stereotomy, which is to be found in Tractatus XXVI and XXXII of his *Euclides adauctus* (Guarini 1671: 445–452, 572–596), and Trattato III and IV of his *Architettura civile* (Guarini 1737: 183–265). All the parts except the final chapter of Trattato III of *Architettura civile* (Guarini 1737: 183–190) are compiled by Calvo-López (2020: 96). Various authors have suggested that Guarini was influenced by French sources in his theoretical works on stereotomy; claims of connections

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between Desargues and Guarini (Wittkower 1990: 413), as well as between Derand and Guarini (Carboneri 1968: XXXIV; Müller 1968; Müller 1970), have especially been put forth, without satisfactory arguments to sustain them. Thus the question arises: To what extent was Guarini influenced by French sources in his theoretical works on stereotomy? The claim presented in this paper posits that the influence of French sources on the stereotomy in the theoretical works of Guarini was limited. The claim will be substantiated by showing the rare occurrence of Guarini's references to French sources in the parts of his theoretical works dealing with stereotomy mentioned above, with adhering commentary.

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The number of references to French sources in the parts of Guarini's theoretical works dealing with stereotomy are, as indicated, scarce – in fact there are only two. The first reference is a demonstration of knowledge of the way of joining beams using plaster in flat vaults (*volte piane*), common in France at the time (Guarini 1737: 190). However, he does not concretize the reference any further. The second reference is an exhibition of acquaintance with French theory of stereotomy by stating that cast orthography (*ortografia gettata*) is “admirably used by the French in many instances” (Guarini 1737: 191, my Eng. trans.). Neither in this example does Guarini mention any specific sources. Except for these two references, there are no other mentions of French sources in the theoretical works of Guarini concerning stereotomy.

The two main lines of arguments that have been presented – attempting to sustain the claim of Guarini being influenced by French sources in his theoretical works on stereotomy – are either the fact that Guarini was in Paris between 1662 and 1666 and that he therefore must have encountered French theory of stereotomy there (Müller 1970: 534), or that Derand's method of stereometric projection correlates with Guarini's (Carboneri 1968: XXXIV; Müller 1968: 204; Müller 1970: 535, 537 n.3, 540–542). Despite the fact that important figures within the field of stereotomy, for instance, Philippe de La Hire, were in Paris at the same time as Guarini was there, there exists no evidence supporting Guarini encountering any of them. Neither are there any records of Guarini being exposed to French theory of stereotomy during his stay. As for the similarities between Derand's and Guarini's respective methods of stereometric projection, it has to be pointed out that correlation does not necessarily entail causation.

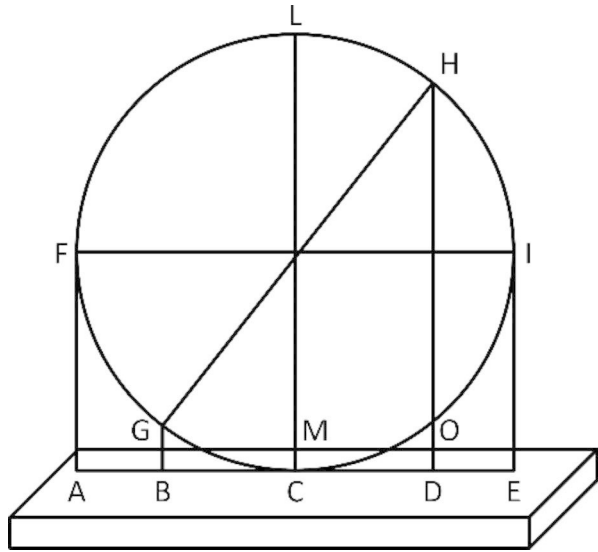
Based on what has been shown so far, in the ensuing paragraphs, commentary on the relationship between Guarini's theory of stereotomy and relevant French sources will be posited. In the commentary, particular emphasis will be put on Desargues and Derand, because those are the only French theorists who by research have been implied having an influence on Guarini's theory of stereotomy. Hypothetically speaking, it is possible that Philibert De l'Orme or Mathurin Jousse could have influenced Guarini's theory of stereotomy, albeit highly unlikely. It is highly unlikely for two reasons. First, because neither are mentioned in Guarini's theory of stereotomy. Second, because of the former's methods of projection on several points are being divergent from Guarini's, and the craft-adhering tonality of the latter's treatise (contrarily

to Guarini's theory of stereotomy). Do also note that La Hire is not once mentioned in neither *Euclides adauctus* nor *Architettura civile*. Dechales is mentioned on several occasions in *Architettura civile* (Guarini 1737: 5, 85, 95, 96, 97, 131). However, in the segments in *Architettura civile* concerning stereotomy there are no mentions of Dechales.

Regarding the case of Desargues, it is possible that Guarini, as implied by Wittkower (1990: 413), was acquainted with Desargues' essay on conic sections, as it was first distributed in printed manuscript format in 1639 (Desargues 1639). However, the number of manuscripts were few, only 50 copies were originally produced (Field, Gray 1987: 32), and without evidence in Guarini's theoretical works, one cannot with certainty prove that Guarini was explicitly influenced by Desargues. Also, and just as important of a point to be made, there is a significant difference between Desargues and Guarini regarding the philosophical basis of the view of projection per se. In the introduction to his essay on conic sections, Desargues wrote: "Here, every straight line is understood to be extended, if necessary, to infinity on one side and the other. A similar extension at an infinite distance on one side and on the other in a straight line is here represented by a row of points aligned on one side and the other, following this straight line" (Desargues 1639: 1, my Eng. trans.). These prerequisites had implications for Desargues' essay on stonecutting published in 1640. Guarini's point of departure is, contrarily to Desargues', in a literal sense much more contained, as he defines that the extensions of lines are stopped by various planes that they are cast and imprinted onto: "This orthography [cast orthography] is in contrast in name to the preceding one [orthogonal orthography], as well as in its method of operation; because where in the former [orthogonal orthography] the flat surfaces rise with perpendicular lines, to give them body, and form the building, in this [cast orthography], on the contrary, the bodies are suspended above [the flat surface] with perpendicular lines, and reduced into plane to extend their surface ..." (Guarini 1737: 191, my Eng. trans.). Nowhere in the stereotomy in theoretical works of Guarini are there any mentions of projection lines extending to infinity beyond the planes onto where they are projected. In this sense, Guarini is, as expected, in line with Aristotelian rejection of actual infinity, whereas Desargues is not. For an encompassing discussion of the conception of infinity in the theoretical works of Guarini, see Branko Mitrović' forthcoming paper "Guarino Guarini and the Understanding of Space and Place in Early Modern Architectural Theory," to be published by JSAH June 2023. (I am grateful to Branko Mitrović for sharing the text of this paper before its publication.) An example of Guarini stopping the extension of projection lines by the plane where the lines are cast and imprinted onto is shown in Fig. 1.

François Derand is mentioned neither in *Euclides adauctus* nor in *Architettura civile*. Derand's *L'Architecture des voûtes* was first published in 1643, meaning that, like the case was with Desargues, it is possible that Guarini was acquainted with the work of Derand. As Müller correctly explains (1968: 204), there is a correlation between Derand's and Guarini's methods of stereometric projection, and that neither of their methods are equivalent to those of Desargues. Additionally, there are no meta-geometrical differences between Derand and Guarini, like the problem of infinity, as was the case between Desargues and Guarini. However, none of these coinciding aspects are sufficient evidence to prove a direct influence by Derand on

Fig. 1 The tangential lines from F and I are cast and imprinted onto – and stopped by – the plane in the points A and E, respectively. Figure by the author, based on Guarini (1737: Tratt. IV, Lastr. I, Fig. 1)



Guarini. Also, it has to be mentioned, there exist several fundamental differences between their two approaches. This is clear even from the introductory segments of their respective writings on stereotomy. Derand is completely adhering to particularities of stonecutting practice by describing the terms for the various parts of the actual vaults (Derand 1643: 2–6), whereas Guarini attempts to universalize the specific stereotomic issues by abstracting them into pure geometry (Guarini 1737: 183). Then, as a final note, if not from French sources, where did Guarini derive his theory of stereotomy from? Answering this question is, however, beyond the scope of this paper.

Conclusion

As shown by the above-mentioned evidence, there are but two unspecified references to French sources in the parts of Guarini's theoretical works concerning stereotomy. Coinciding aspects, such as Guarini being in Paris at the same time as figures relevant to the field of stereotomy, or his methods of stereometric projection correlating with those of Derand, although being indicative evidence, cannot with certainty prove that there was any exertion of explicit influence by these figures – or particular instances of French theory of stereotomy via these or otherwise – on the stereotomy in the theoretical works by Guarini. In other words, the influence by French sources on the stereotomy in the theoretical works of Guarino Guarini was probably limited.

This paper has sought to nuance established and acknowledged perceptions put forth by research (Müller 1968; Carboneri 1968; Müller 1970; Wittkower 1990) claiming that Guarini was influenced by French sources in his writings on stereotomy.

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