Chapter 24

About Building Stereotomy: Theory and Practice

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ABSTRACT

This contribution tries to reintroduce Stereotomy within the field of “research by design”: the discipline, in fact, can be used as a means of re-composition of the design, project and execution phases. Starting from the origin of this break-up, the focus moves to the actual value of geometric and formal prefiguration and to the validity criteria that make its re-introduction desirable, both as educational discipline and design tool. In addition, it’s suggested a line of research related to its critical update and the methods through which figure out the possible outcomes of its application. Particular attention is given to the prototype: only the material realization allows to obtain a tangible result to creative speculation. In the last part 7 stone prototypes will be presented. They have been developed during recent years as a result of the attempt to combine multiple instances into a synthetic architectural object.

INTRODUCTION

The word “stereotomy” (literally meaning “cutting of stones”) sums up a complex discipline that work as a link between the theory of geometry and the practice of construction. The direct connection that binds the geometrical tracement with the blocks cutting is embedded in the method itself. In fact, its drawings and templates do not have the purpose to represent the object for its own sake but aim to establish a reference for the actual construction, otherwise impossible.

Indeed, the stereotomic practice allows a preliminary study of the model and its breakdown in parts. The results obtained through this method became more and more audacious because it gives a practical answer to the processing of structures with complex geometry, so to be accused of a sort of unjustified “virtuosity”.

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There will be a reference to the French area because here stereotomy finds a precise definition, but the term can be actually considered in a broader sense and many built examples can be cited in other geographical areas.

However, in France the discipline assumes an academic classification and it is considered a fundamental subject within the schools of architecture.

The research carried out by the authors about the upgrading of stereotomy nowadays aims to demonstrate, through concrete results, that its coherence is not only “educational” but also necessary to allow new design solutions in which the geometry, aesthetic and construction contributions are considered as different sides of the same medal, and in this way simultaneously developed within the project.

Starting from the more traditional introduction of the first part, in which is briefly explained the evolution and nature of stereotomy, it will be clarified the importance of this comprehensive vision and the manner in which, in our opinion, the modern fragmentation between the project phases can be overcome: basically, through the three-dimensional modelling and/or industrial and parametric processes.

In the end, some prototypes developed in recent years will be presented: these are practical results of conceptual speculations and each of them reflects a practical training experience. As part of their implementation, has been possible to recreate an entire design process from concept to construction, from virtual prefiguration to validation of manufacturing processes.

BACKGROUND

Stereotomy is defined very clearly by Frezier in 1760: it is nothing more than an application of the art of \textit{trait geometrique} that carpenters transferred from timber to stone. In a few words, the technique of projective geometry is used with specific reference to the stone vaults processing: stereotomy is based precisely on the codification of \textit{trait} in relation to the needs of material and construction.

Although discipline is developed in the sixteenth century, it is possible to find its prodromes in the Gothic methods that already comprehend overturning plans and templates. Afterwards, especially in France and Spain, there was a proliferation of treatises in which the tracement techniques were systematized and contextualized with a huge series of records.

The life cycle of Stereotomy can be simplified into three essential periods: birth, evolution and decline. If the life of stereotomy was associated to a precise timeframe, just to understand it through a simplified synthesis, this measure can be defined in about three hundred years: born into the sixteenth century with Philibert de l’Orme, fully-developed into the seventeenth century with Girard Desargues, declined into the eighteenth century with the proliferation of repetitive treaties. The death comes, paradoxically, with the achievement of the theoretical apex in the eighteenth century when Gaspard Monge formulated his descriptive geometry theory in the third year of the French Republic: this moment corresponded to the death of stereotomy.

The new theoretical speculation separates practice and conceptual abstraction, focusing more on the latter than the first. The architectural works didn’t guard anymore the magnificence of thought, but that sense of necessity was produced from the abstraction. Moreover, in the different cultural climate, the publication of the “Essay sur l’architecture” of the Abbot Laugier represents a harsh critique against the excessive weirdness of the stereotomic construction, which was followed by other influential voices among which Antoine-Chrysostome Quatremère de Quincy that sarcastically declared: \textit{l’art du trait est baroque}!