Stellingen

behorend bij het proefschrift:

Precedents and Design Thinking in an Age of Relativization. The Transformations of the Normative Discourse on the Orders of Architecture in France between 1650 and 1793

Denis BILODEAU

1. "Tabula rasa" is niet een voorwaarde voor creatief ontwerpen.

2. De bestudering en het gebruik van precedenten zou een centrale plaats moeten innemen in de huidige bouwkundige opleiding.

3. Precedenten zouden in de eerste plaats moeten worden beschouwd als een raamwerk voor het afbakenen van regels en normen binnen de ontwerp-praktijk.

4. Het gebruik van architectonische precedenten is slechts een bijzondere vorm van het toepassen van analogisch denken in het ontwerpen.

5. Precedenten vormen definitive gezagsbronnen in het ontwerpen.

6. De confrontatie van "case-based" met "rule-based" ontwerpdenken is een belangrijk thema in de huidige architectonische discussies.

7. Ontwerpen is een puur rationeel proces van probleemoplossing.

8. De religieuze concepten van wederopstanding, wedergeboorte en transubstantiatie zijn vormen van "precedent-based" ontwerpdenken.

9. Architecten moeten zich concentreren op het bestuderen van precedenten in plaats van op de studie van de architectuurgeschiedenis omdat de laatste geen kennis oplevert die voor het ontwerpen van belang is.

10. Imitatie is de basis van elke opleiding.

11. Het bestaan van klassieken wijst op het sociaal-ordenende vermogen van precedenten in de samenleving.

12. Het bestuderen van cognitieve thema's zou moeten dienen als een raamwerk voor het scheppen van eenheid in de architectuuropleiding van de verschillende scholen.

13. Omdat Descartes het leuk vond om naar de bedrijvigheid op de kanalen te kijken, kwam hij naar Nederland.
Propositions

attached to the thesis:

Precedents and Design Thinking in an Age of Relativization. The Transformations of the Normative Discourse on the Orders of Architecture in France between 1650 and 1793

Denis BILODEAU

1. "Tabula rasa" is not a condition for creative design.

2. The study and use of precedents should be a central aspect of contemporary architectural education.

3. Precedents should be primarily conceived as a framework for defining rules and norms in design practice.

4. The use of architectural precedents is just one particular form of the application of analogical thinking in design.

5. Precedents constitute definitive sources of authority in design.

6. The confrontation between case-based and rule-based design thinking is a central issue in contemporary architectural debates.

7. Design is a pure rational process of problem solving.

8. The religious concepts of resurrection, reincarnation, and transubstantiation constitute forms of precedent-based design thinking.

9. Architects should concentrate on the study of precedents instead of the study of architectural history, because the latter provides no useful knowledge for design.

10. Imitation is the basis of education.

11. The existence of classics demonstrates the community structuring potential of precedents in society.

12. The study of cognitive issues should serve as a framework for the reunification of the architectural curriculum in schools today.

13. Descartes came to Holland, because he enjoyed looking at the activity on the canals
PRECEDENTS AND DESIGN THINKING
IN AN AGE OF RELATIVIZATION

The Transformations of the Normative
Discourse on the Orders of Architecture
in France Between 1650 and 1793

PROEFSCHRIFT

ter verkrijging van de graad van doctor
aan de Technische Universiteit Delft,
op gezag van de Rector Magnificus Prof. dr. ir. J. Blaauwendraad,
in het openbaar te verdedigen ten overstaan van een commissie
door het College van Dekanen aangewezen,
op dinsdag 28 januari 1997 te 16:00 uur

door Denis BILODEAU

M.Arts, M.Phil. Columbia University
geboren te Quebec, Canada
Dit proefschrift is goedgekeurd door de promotoren:
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Samenstelling promotiecommissie:

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Published by Publikatieburo Bouwkunde
Facility of Architecture
Delft University of Technology
Berlageweg 1 / 2628 CR Delft
Telephone (015) 278 47 37
Fax (015) 278 30 30

CIP-gegevens Koninklijke Bibliotheek,
Den Haag

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à Sylvie et Alice
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PREFACE

My interest in the French architectural discourse of the Ancien Régime, and in the analysis of the conceptual systems of architecture, began in 1980, when I was doing my master degree at the Faculté d'aménagement of the University of Montreal. It was there that I was introduced to the history and analysis of architectural discourse and began to study, from a global perspective, the phenomenon of the emergence and development of the discourse in France between the Renaissance and the end of the eighteenth century. I got involved in an exhaustive process of documentary research on the French publications of this period, which led to the production a first essay of my categorization of genres and quantitative analysis of the evolution of book production on architecture in the early modern era. Following this, I was invited to pursue my research as a Fellow at the Faculty of Architecture, Delft University of Technology. Between September 1982 and 1983, I carried out research on architectural representation in books. This work was integrated into a study on the poetics of classical architecture, mainly based on the analysis of architectural illustrations in treatises. This research gave birth to a book which I had the pleasure to co-author with Professor Tzonis and Liane Lefaivre. De taal van de klassicistische architectuur was published by SUN in Nijmegen in 1983. The book was eventually translated into several languages including French, Spanish, German and English.

Back in Montreal, I joined the Canadian Centre for Architecture, where I worked on organizing the French collection of architectural books, and participated in the production of the opening exhibition on architectural representation in 1987. From 1986 to 1991, I continued to study architectural history in the Department of Art History and Archaeology at Columbia University in New York City, where I earned two graduate
degrees (MA and M.Phil.) with works focusing mainly on modern French architectural history and theory. Finally, in 1992, I became Research Associate of the Design Knowledge Systems Research Group (DKS) in the Faculty of Architecture, Delft University of Technology. It is in that context, in the research section on Architectural Domain Documentation and Analysis (A.D.D.A.), that the following study was carried out.

In the meantime, I got involved in the teaching of architectural design, theory and history at the School of architecture at the University of Montréal. This had an important impact on the orientation of my research. Didactic and methodological issues are the principal motivations behind the study on the role of precedents in design argumentation, which led me to the present research.

My debt to Professor Tzonis is beyond his function as a supervisor. I have been working with him throughout fifteen years in various stages of my development as a student at the University of Montreal, a collaborator in Delft the first time, and as a Research Associate of the Design Knowledge Systems Research Group. I am grateful to Liane Lefaivre and Alexander Tzonis for their intellectual support, friendship and generous hospitality.

I wish to express my gratitude to Professor S. J. Doorman who acted as co-director of my dissertation, and whose extraordinary ability to get down to the essentials was of great value in the consolidation of my approach and the clarification of my thesis.

Special thanks are due to the other members of my advisory committee, Professor D.A. Schön (MIT), whose writings were a direct source of inspiration, Professor F.W. van Voorden (DUT), Professor J.C.J.A. Klamt (U.Utrecht), Professor K. Ottenheym (U. Utrecht), and

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Doctor O. Maçel (DUT), for their sympathetic reception of my research, and constructive suggestions.

I am also indebted to Martin Bressani from Carleton University, a friend and dedicated scholar, who for many years has been a key interlocutor, and whose comments and encouragement in the most difficult moments of my research have been invaluable.

A doctorate is a costly enterprise which would have been beyond my resources without the financial support of the Canadian Centre for Architecture in Montreal, and the Fonds pour la Formation et l'Aide à la Recherche (FCAR) from the Quebec Government. I also wish to thank my colleagues from DKS, John Heintz and Peter Scrive for their help in the preparation of the book.

Finally, to Sylvie and Alice, who were patient and loving enough to stand beside me during all these years of hard work, this book is dedicated.

Denis Bilodeau
Montreal, 1996
PRECEDES AND DESIGN THINKING IN AN AGE OF RELATIVIZATION
Chapter 1

Introduction

1.1 The problem: Precedents and Design Reasoning

The role of precedents in architectural design is generally acknowledged but has not yet received much critical attention. Architects and historians often describe the relation between the architectural production of a period and previous realizations in terms of influence and inspiration. These concepts however, do not provide sufficient tools for comprehending how an architect has consciously used his knowledge of existing cases in the conception of an original work. In order to grasp the modes of reception of past architecture in design thinking, one needs to penetrate the modalities of architectural thinking and practice, and, more specifically, to isolate how precedents actually enter into the reasoning and decision making process. This problem is the general subject of this dissertation.

There are several ways to study this problem from empirical datum. One consists in identifying the role played by precedents in the conception of a building through a careful and exhaustive collection and analysis of documents related to its production. This method heavily depends on the existence of relevant archival material. Moreover, there are no guarantees that the material available will allow us to trace the sources of the architect's design or to understand the way he may have used them in the conceptual process.

Another method consists in studying the architectural discourse of a period in order to extract from it indications pertaining to the role of precedents in the definition of design directives, that is, the formalisation of models, types, rules and principles for design. This method, which rarely provides information on specific building design processes, nevertheless
allows us to reconstruct and understand the conceptual framework within which the selection and use of precedents tend to be constrained.

Although these two types of studies must be conceived in complementary terms – the later providing the framework for the former – each of them may be carried out separately. The following study adopts the second approach.

1.2 The Transformation of the Normative Discourse on the Orders of Architecture in France between 1650 and 1793: An Historical Case Study in Precedent-Based Design Reasoning

The thesis examines the normative aspect of design discourse in architectural books in France between 1650 and 1800. Specifically it documents changes in the rules about the architectural orders elaborated in the writings of the major figures of the Académie Royale d'Architecture and by the circle of architects close to this institution.¹

The debates on the use of the five classical orders in French architectural treatises constitute a privileged terrain for the study of the evolution of normative thinking in architecture. The rules related to the orders were seen as the essence of classical architecture and their correct application was the main acceptable method for architectural composition. They were therefore the object of intense scrutiny for the establishment of prescriptive (and proscriptive) rules of form and proportion.

Debates on these issues can be traced to the very first moments of the Renaissance in Italy. Alberti, Serlio, Palladio and Vignola all involved themselves in some form of rule definition. Indeed the work of the Italians

¹ A complete bibliography of primary sources is included at the end of this book.
formed the basis for the study and regulation of the classical orders in France which began in the second half of the sixteenth century.

From 1650, where my study begins, the nature of the architectural discourse changes: with the institutionalization of the French academies, a new desire for the establishment of definitive norm for the well founded and unified use of the classical orders emerges. In the Renaissance, the easily observable differences in the various manifestations of classical architecture, thought to be characteristic of a rich diversity, was a source of profound curiosity and even admiration. The unearthed antique fragments of buildings on the Italian soil were an exhilarating discovery for fifteenth and sixteenth-century humanists, one that led to playful invention and experimentation. 2 In distant France, however, the creation of the academies in the seventeenth-century established a more mature and more controlling relationship with antique architecture: the varied interpretation of the classical orders was seen as a problem to be dealt with. The mandate of the Academician, was to establish les règles de la belle architecture, once and for all. 3

The chief means for the establishment of academic norms was in the confrontation of a systematic, rigourous, and empirical approach with the diversity of classical production. Canonical models, systems of rules of proportions, and general principles for expression were conjured to elude or

---

2 This playful attitude and the heuristic role of precedent in architectural design in the Renaissance is particularly well exemplified in the works and writings of Leon Battista Alberti. On this matter see Liane Lefaivre, Leon Battista Alberti’s Hypnerotomachia Poliphili, (Cambridge Mass., forthcoming April 1997). The book, Hypnerotomachia Poliphili usually attributed to Francesco Colonna and more recently to Alberti himself, is representative of such conception of architectural composition.

3 "Les traités français de la période (16th century and early 17th century) sont compilateurs, en quoi ils se distinguent des traités sélectifs et normatifs qui commencent à paraître dans les années 1640–1650: pour les premiers ils s’agissaient d’abord de rassembler le plus de recettes possibles; pour les seconds plutôt de dégager les bonnes formules." See Jean-Marie Péruse de Montclos, Histoire de l’architecture française, (Paris, 1989), 124
absorb the troublesome array of available precedents. The first figure in our dissertation for instance, Fréart de Chambray, initiated a critical comparative method which confronts the antique and modern use of the orders, striving towards a "purification" of classical elements and proportions. Rather than a norm, his is an un-systematic collection of Antique fragments seen to hold transcendental authority. In comparison, the theory developed by the archaeologist/architect Julien David Leroy at the end of our period of study, does away with the sacro-saint proportions of the classical orders in favour of the general design motif of the colonnade conceived as source of the greatest effect on the senses. The search for objective norms led Leroy to the more affective but also inherently subjective domain of human experience.

In both cases, however, and all through the period examined, architectural theory proposes a profound questioning of the relation between modern practice and ancient buildings in seeking a way to support the use of classical elements. The orders were never truly standardized during this

---

4 See Roland Fréart de Chambray, Parallèle de l'architecture antique avec la moderne: avec un recueil des dix principaux auteurs qui ont écrit des cinq ordres; scénavoir Palladio et Scamozzi, Serlio et Vignola, D. Barbaro et Callameo, L.B. Alberti et Viola, Bulian et de l'Orme comparé entre eux..., (Paris, 1650). Fréart de Chambray is a standard figure in almost any history of 17th century French architecture but we still miss a complete monograph on him and his contribution to the development of the arts.

5 See Julien David Le Roy, Les ruines des plus beaux monuments de la Grèce, (Paris, 1758, second revised edition 1770). Julien David Le Roy has also been neglected by historians of architecture although he appears briefly in almost every monograph on 18th century French architecture. The most extensive discussion on Les Ruines is in Dora Wiebenson, The Sources of Greek Revival, (London, 1969)

6 The problem of the relation between ancient and modern architecture in 17th and 18th century France has been investigated by many authors who, in general, consider the question from the point of view of the history of ideas and through the analysis of the famous Querelle des anciens et des modernes. See especially Wolfgang Herrmann, The Theory of Claude Perrault, (London, 1973), Joseph Rykwert, The First Moderns, (Cambridge, Mass., 1980), Alberto Perez Gomez, Introduction to Claude Perrault, Ordonnance of the Five Kind of Columns after the Method of the Ancients, (Santa Monica, 1993). The approach adopted in this dissertation focusses on cognitive and methodological aspects of the problem and not so much on ideological or aesthetic issues.
period since no grounds were stable enough to unify their use by the whole community of architects. It is this ceaseless debate which makes the study of the period so fascinating from the point of view of architectural cognition: it allows us to examine in detail the mechanism of architectural thought, tracing the shifting relations between rules for conceiving and justifying design an design precedents. The result of these shifts was finally an epistemological transformation, that led ultimately to the radical relativization of architectural norms.

1.3 Rationalization and Precedent: Reflections on Design Practice in an Age of Relativization

The strong polarization between rationalized design thinking and the blind obedience to the authority of precedents at the heart of seventeenth and eighteenth century architectural debates strangely fades away in the nineteenth century. Durand's radical instrumentalization of neo-classical rules of composition in which precedents are reduced to a series of abstract case studies devoid of any true historical substance7 (a method generally adopted at the École des Beaux-Arts)8, is counter by an equally radical


8 Durand's Recueil was a major reference book at the École des Beaux-Arts until 1968. See Wiebenson, op. cit., (1993), 175. Architectural composition at the École des Beaux Arts was generally conceived as an assemblage of preexisting functional building types devoid of any real historical significance. This attitude is still very clearly exemplified in Julien Guadet's Éléments et théorie de l'architecture in the early 1900s. On the design method and the teaching of architectural composition at the École des Beaux Arts see especially David van Zanten, "Architectural Composition at the École des Beaux-Arts from Charles Percier to Charles Garnier", in A. Drexler (ed.) The Architecture of the École des Beaux Arts, (New York, 1977), 111–324.
strategy, this time entirely absorbed within the dictates of historicism: rationalization is inconceivable outside the framework of historical development, thus leading to the formation of a historically legitimated style. Even Labrouste and Viollet le Duc's analytical approaches are inseparable from their particular philosophical interpretation of the past. Despite his claim of establishing a rational methodology, Viollet-le-Duc's design method is far from a purely deductive thinking and follows the most tyrannical historical determinism.9

In contrast, the pendulum swings in the opposite direction in the twentieth century: the avant-garde of the twenties and thirties calls for a tabula rasa conceived as a complete rupture with history and establishing a ground for either pure artistic ideals or rigorous rationalist design methodologies and programming.10 Contemporary architectural thought still lives largely in the aftermath of this extreme position. Even the extensive use of citations of historical buildings in the post–modernism of the 1970s and 1980s never truly constituted a legitimate appropriation of architectural precedents. In particular, the most visible players in the United States, Eisenman, Graves, Hedjuk, Meier, and Rowe,11 aimed chiefly at the

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10 The discourse of Joanes Iten, Walter Gropius and Hannes Meyer at the Bauhaus for instance represents these two radical modernist attitudes.

11 See for instance C. Rowe's formalist reading of Gropius's building of the Bauhaus and Le Corbusier's project for the Palais des Nations in Geneva. "It (this essay) is not intended to suggest that phenomenal transparency (for all its Cubist descent) is a necessary constituent of
establishment of a new formalist avant-garde in contrast to the rationalization of the design process by Gropius and Mies van der Rohe. Their return to modernist precedents served only as a spring board for arbitrary spatial-pictorial manipulations. It was the dictates of the "innocent eye" (at times the "cynical eye") that determined the new architectural formalism. This method of design lacks the accountability of a truly rationalized design process while at the same time forgoing any possibility of establishing a sense of continuity with the past through an evaluation of precedents.

A number of contemporary theorists such as Stanford Anderson, Peter Collins, John Hancock and Alexander Tzonis emphasize the need for a rational design process integrated with the use of precedent. This dissertation supports that premise: it seems to me particularly urgent to realize that neither reason nor precedents should or can stand on their own. Rules, models, and principles are never created ex nihilo as the product of a pure, rational, deductive process. They are necessarily embedded in cultural assumptions and evolved from a knowledge of precedents either unconsciously received or intentionally and critically determined. From such implicit or explicit attitudes towards the past derive what is selected


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and rejected, defining how precedents, and the knowledge derived from them are represented and used.

Over the course of the last three hundred years of architectural discourse — a period arguably labelled modern — it is surprisingly the French academic debates of the seventeenth and eighteenth century that have demonstrated with greatest sophistication the relations that can exist between the need for rationalization and the use of precedents. Alexander Tzonis, in his work on conceptual systems in architecture of 1975, underscores the relevance of this historical period to the study of architectural reasoning and design logic. Following a similar line of inquiry, this dissertation explores the use of precedents in relation to a systematic architectural discourse. If architectural design judgement is to pretend not only to some rationality but also to social validity, it must be based on a knowledge and a critical evaluation of precedents.

Peter Collins is the modern architectural theorist who has most eloquently argued for the importance of precedents in design. In his book Architectural Judgement, of 1971, he compares the use of precedents in law and architecture, a parallel which, interestingly enough, was largely inspired by the pedagogic techniques of "case-studies" developed by the French eighteenth-century academician Jacques-François Blondel. According to


14 Collins does not discuss Blondel's pedagogical method in detail but refers to it in a significant way. "The development of the "case-study" method in law throws an interesting new light on the eighteenth century pedagogical technique of Jacques François Blondel who made a regular habit of taking his student on weekly tours of Paris, explaining the relative merits and defects of the various buildings they visited... Whatever the pace of change in architecture during the next fifty years, Blondel's pedagogical technique must inevitably be relevant to current architectural problems." op.cit., (1971) 100–101.
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Collins, a judicial precedent should be defined according to the Common Law tradition as "a judgement or decision of a court of law cited as an authority for deciding a similar state of facts in the same manner, or on the same principle by analogy". The instrumental value of the precedent depends on the possibility of establishing a relevant analogy with a particular case in a specific situation. But the actual authority of the precedent depends on a system of law which has been historically and socially constructed and around which a consensus exists regarding its validity. In Common Law, the authoritative body of precedents available to jurists evolves in time. New cases and decisions may generate new precedents while others become obsolete and are abandoned. On the whole however, the validity of the system depends on its continuity and its capacity to adapt and integrate changes.

Collins proposes that architectural creativity should be similarly bounded and nourished by the critical evaluation of precedents. For him, the modern emphasis on originality obscures the liberty which the choice of precedent bestows. Indeed, he claims that "the only genuine and fruitful originality derives precisely from the accurate, vigorous and imaginative manner in which precedents are analyzed and compared." In this regard, Collins specifically refers to the French classical tradition before 1750 when "the selection of precedents and their adaptation created far more originality than we now perceive, in that, for example, the proportions of columns and entablatures varied considerably in accordance with the different requirements and locality of each specific building."
According to Collins, this attitude towards creativity is what differentiates the professional architect from the individual artist. "The educational system of any profession," writes Collins, "has as its main duty, to inculcate and synthesize the criteria by which all judgements are made; and society is cheated if architectural design is treated like painting and sculpture, whereby the artist is ultimately to be regarded as the sole judge as to whether or not his creation is right."

The argument is further developed by John Hancock, a student of Peter Collins, in his 1986 article "Between History and Tradition: Notes Toward a Theory of Precedents." Drawing from the theory of paradigm change in the history of sciences conceived by Kuhn and Popper, Hancock attempts an explanation of the dynamics of continuity and change in the architectural discipline.

In *The Structure of Scientific Revolutions* (1962) Thomas Kuhn argues that a scientific tradition, represented by a functional body of thought and opinions, sustains itself by continuing to provide solutions to new problems in such a way that it remains plausible to the community of expert opinion. Its flexibility to absorb changes without loosing coherence ensures its durability. If new problems arise that are beyond the capacity of the tradition, a dynamic is induced that may force a revolution. The old tradition collapses, but continual effort eventually reveals a growing consensus around a new tradition.

Karl Popper, for his part, emphasizes the dominance of forces of continuity with regard to revolutionary ones. New works are validated by

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18 Ibid., 33.


20 See J. Hancock, *op. cit.*, (1986) 68.
their insertion within a pre-existing line of inquiry, even if they critically engage that established way. The knowledge of previous practices together with rational criticism ensure incremental growth and the long term durability of a work.\textsuperscript{21}

In large measure, Hancock's problem is to define whether there can be, in architecture, anything like the convictions about the correctness or functionality of precedents such as operate in scientific investigation and jurisprudence. While he notes the fact that there are more variables and more situational contexts for choices and justifications in architectural design, he also maintains that, in an age of relativization, a critically maintained continuity of precedent is the only convincing ground architects have for valid action and belief in design. He proposes the use of precedents as a basis for a theory of design—thinking where interpretation and action could be durable without being dogmatic, justifiable without being absolutely true. This could allow us to navigate our design decisions between the pitfalls of both static objectivism and idiosyncratic subjectivism.\textsuperscript{22}

The debates on the use of the five classical orders in the French Académie Royale played precisely this stabilizing role described by Hancock: they maintained a continuity within a context of important epistemological instability leading to a major paradigm shift. Continuity, in this case, did not imply a static or dogmatic formulations. On the contrary, the use of precedents provided a foil that ensured the readability of successive re-castings of the grounds for design decisions. Perrault, for instance, reframes the complex array of systems of rules inherited from the

\textsuperscript{21} Ibid., 69.
\textsuperscript{22} See J. Hancock, op. cit., p. 70.
Vitruvian tradition towards greater clarity and simplicity of use. Half a century later Briseux in turn critically assesses the overly instrumental thinking of Perrault's system in order to re-endow it with a natural aesthetic value. Both cases are transformations of a specific pre-existing set of rules. Neither Perrault nor Briseux pretend to offer an ex nihilo creation without anchoring within a larger framework. Both consciously and overtly make the use of precedents the validating ground for their theoretical conclusions. They conceive of their work as part of a dialogue within a larger disciplinary field aimed at the establishment of a consensus, thereby seeking a consolidation of the conceptual foundations of the profession and, indirectly, of its legitimacy and status.

It is in light of such questions that this study concentrates on the relation between rationalism as a specifically modern type of cognitive project, and the inherently adaptable formal discipline of classicism. I wish to underscore the need for precedents to lie within the framework of architectural reasoning rather than be a static memory bank of prescribed design solutions. Reasoning without conscious reference to precedents is


On the cognitive significance of dialogue for professional communities and other social formations see Hoang-Ell Jeng, *A Dialogical Model for Participatory Design*, (Delft, 1995), 9. "The sequence of statements, interpretations, and interrogations that comprises a dialogue between two or more parties can be regarded as a collective representation of thinking." On institutional forms of architectural knowledge see also Peter Scriverv, *Rationalization, Standardization and Control in Design. A Cognitive Historical Study of Architectural Design and Planning in the Public Works Department of British India, 1855–1901*, (Delft, 1994). On the role of the discourse in the conservation and regeneration of social and institutional structures in general, see especially Mary Douglas, *How Institutions Think*, (Syracuse 1992) This work belongs to a long series of research on the connection between cognitive and institutional structures that begins with Emil Durkheim in the first half of this century and includes among other works Michel Foucault *Les mots et les choses*, (Paris, 1966) and *L'archéologie du savoir*, (Paris 1969).
always at risk of muteness, while the use of precedents without critical reasoning is prone to fall into sterile imitation.

1.4 Historiographic Significance of the Case: Rationalism, Classical Precedents and the Problem of the Rise of Modern Design Thinking

The relation between reason — *la raison* — and precedents inherited from the classical tradition is at the centre of the debate over the problem of the birth of modern architecture in the historiography of seventeenth and eighteenth century architecture in France. As we will see, many historians tend to emphasize the rational dimension of modern thinking understood in opposition to tradition. For although the relation of modernism to history and past architecture has recently been re-examined, on the whole, the dynamic connection between reason and tradition in architecture remains misunderstood. The attachment of French architects to the classical tradition is generally taken for granted, while the role of reasoning in the modernization of architecture remains for its part ambiguous.

1.4.1 Rationalism as stylistic tendency

The historiography of French architecture makes extensive use of the categories of *raison* and *rationalisme* in its description of artifacts and stylistic tendencies. The terms have been most often applied to characterize the general trend toward formal simplification and clarification in architectural composition that emerged during this period. According to Emil

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26 For a survey of the changing meaning of the concept of "rationalism" in architecture since the eighteenth century see Alan Colquhoun, "Rationalism: A Philosophical Concept in Architecture," in *Modernity and the Classical Tradition*, (Cambridge, Mass., 1989) 57–87. In this study, the concept of rationalism will be used in relation to the production of rigorous and systematic forms of design discourse.
Kaufmann for instance the geometric simplicity of the work of Boullée and Ledoux at the end of the eighteenth century anticipated the abstractions of Le Corbusier in the 1920's. This attitude was a "revolution" within the classical tradition and announced the birth of a new, autonomous architecture. The formal characteristics of late eighteenth century French architecture have also triggered iconographic speculations. Emil Kaufmann, Allan Braham and Jean Starobinsky for instance, consider the geometric simplicity of the work of Soufflot, Gondoin, Peyre, and of course Boullée and Ledoux, as concrete symbols of the ideal of reason and clarity attributed to the philosophy of the Enlightenment.27

1.4.2 Rationalism and functionalism

For the historians of ideas, the manifestation of reason in late eighteenth century architecture corresponds in general to what we would call today the emergence of functionalism. In Changing Ideas in Modern Architecture 1750–1950 for instance, Peter Collins suggests that the growth of a scientific approach to building construction under the impact of civil and military engineers, and the implementation of a functionalist approach to planning in the conception of new types of utilitarian building, was part of a general process of modernization of architectural ideals after 1750.28

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Other historians have identified the origin of modern architecture at the beginning of the eighteenth century with the emergence of a tendency in architectural theory to reform the principle of architectural design on the basis of a structural argument related to the expression of a system of building construction. Wolfgang Herrmann and Robin Middleton have studied the rationalist attitude behind the structural refinement of classical architecture in France which happened in the context of a search for an ideal synthesis between Greek and Gothic architecture in architectural literature. This trend began with Abbé de Cordemoy at the beginning of the eighteenth century; it was consolidated after 1750 by Laugier, and continued its development in the nineteenth century in the work of Leonce Raynaud and Viollet-le-Duc.\textsuperscript{29}

1.4.3 Modern reason and ancient tradition

The opposition between reason and tradition was at the core of the \textit{Querelle des anciens et des modernes}, in the doctrinal discourse on science, art and architecture during the seventeenth century. For many interpreters, the architect and physicist Claude Perrault appears as the champion of a rational, progressive and modern approach to architecture, and the head of the opposition against Fréart de Chambray and François Blondel's the mythical respect inspired by the authority of the Ancients.

Rykwert and Perez Gomez, like many historians begin their history of modern architecture with Perrault and the \textit{querelle}, and the debate over the absolute versus the relative value of proportion in architecture. For them,

this episode constitutes a negative beginning because it marks a rupture with the symbolic, metaphysical approach to architecture inherited from the Neoplatonic Renaissance, and corresponds to the birth of a modern pragmatic approach which is the source of all our troubles today. For Antoine Picon, on the other hand, the work of Claude Perrault is at the origin of a positive development in a scientific approach to design that leads to the invention of the modern engineer.\footnote{For interpretations that emphasize the modern, scientific and rationalist dimension of Perrault's work see Antoine Picon, \textit{Claude Perrault ou la curiosité d'un classique}, (Picard, 1988) and A. Perez Gomez, \textit{Architecture and the Crisis of Modern Science}, (Cambridge, Mass., 1985) and \textit{op.cit.}, (1993). For a better appraisal of the conservative and revolutionary aspects of Perrault's thinking see in particular A. Tzonis, \textit{Toward a Non Oppressive Environment}, (New York, 1972) and Herrmann, \textit{op.cit.}, (1973).}

\textbf{1.4.4 Modern architecture and the emergence of a rational conception of tradition}

The origin of modern architecture may be trace to an earlier period in the Italian Renaissance marked by the transformation of the social and intellectual status of the architect which was clearly related to the development of the architectural literature. No doubt the growth of architectural discourse in books in the fifteenth and sixteenth centuries was a crucial episode in the history of the rationalization of architectural knowledge. But normative preoccupations only began to emerge in the architectural literature of the seventeenth century in the context of the institutionalization of architectural knowledge. In France, the project for the normalization and rationalization of the orders derived from a more global program to modernize the state apparatus and expand of its control over the production of the built environment.\footnote{See for instance Philippe Boudon, \textit{Richelieu ville nouvelle}, (Paris, 1978), M. Foucault, B. Fortier and al. \textit{Surveiller et punir}, (Paris, 1975).}
This study will not be concerned with what we might call the "ideological" dimension of the discussion on the orders of architecture in France, that is, its symbolic and instrumental role in the implementation of the cultural policy of absolutism. My purpose is rather to consider the modernity of the normative discourse from a cognitive point of view, and in the framework of the transformation of the relation between architectural reasoning and tradition. More specifically, this study suggests that the emergence of modern architectural thinking can not be comprehended in terms of a rigid opposition between rationalist and traditionalist tendencies; rather it corresponds to what Karl Popper refers to as the formation of a rational approach to tradition.\(^2\)

Thus the historical hypothesis that will be examined in the following study is that the critical, reasoned approach to tradition that emerged in France in the seventeenth and eighteenth centuries, and which we find underlying the debate on the orders of architecture, established the basis for the definition and consolidation of architecture as a modern autonomous professional discipline.

1.5 Methodological Framework

1.5.1 The sources

This study will follow the transformation of the form, function and status of precedents in the argumentations and reasoning processes that led to the establishment of design directives for the five orders of architecture in a selected body of architectural treatises that appeared in France between 1650 and 1793. Their selection was dictated by the fact that all of them

contributed explicitly to the debates on the foundations of the rules of architecture that developed in the context of the Académie Royale d'Architecture and in the circle of the authors close to that institution.

The main figure in this group was Claude Perrault. The central importance of his works on the orders of architecture for the history of ideas is widely acknowledged. He was the first to challenge the essential status of the proportions of the orders and therefore was a key voice in the process that led to the development of a rational and critical approach to precedents and eventually to the relativization of norms in architecture. Thus all the books selected for this study were either directly criticized by Perrault – such as the books by Fréart de Chambray and François Blondel – or explicitly reacted against Perrault's provocative stance, proposing alternative interpretations for the rules of the orders, – such as the books published by Daviler, Boffrand, Briseux, J.F. Blondel, Le Camus de Mézière and Julien David Le Roy.

1.5.2 The framework for analysis: Precedents and the conceptual systems of architecture

The approach used in this study draws from a structuralist method of discursive analysis elaborated in the mid 1970's by Alexander Tzonis and a team of researchers from Harvard University and the Massachusetts Institute of Technology.33 This method of logical analysis of discourse is based on a mentalist approach in the spirit of Chomskian linguistics and

33 A. Tzonis, M. Freeman, L. Lefaivre, O. Salama, R. Berwick, and E. de Cointet, Les systèmes conceptuels de l'architecture. 1650–1800, (Paris, 1975). For a critical appraisal of this book and the limit of the structuralist approach to historical material see Marvin Trachtenberg, "Some observations on Recent Architectural History," Art Bulletin, (June 1988), 237. It must be noted that the analysis of the conceptual systems in architectural treatises does not pretend to reveal the entire conceptual framework within which design decisions are made in architectural practice. It only reveals one aspect of the explicit efforts made to formulate and debate in public the norms and reasoning processes according to which design decisions should be made.
aims to render explicit the structure, components of argumentation networks, and chains of reasoning in texts.

According to this method, prescriptive statements can be described as compounds of two essential branches of reasoning: a factual branch and a deontic branch. The deontic branch comprises three components: a fact, a norm and a directive. Within this terminology, the norm is a prescriptive statement which can be thought of as a goal. The directive is an action to be produced or justified. The fact is a descriptive statement providing support for the reasoning that links a more general state prescribed in the norm and a particular design state aimed for in the directive. An example taken from Le Camus de Mézière's *Le Génie de l'architecture* (1780) will help to understand this model.34

- **Norm** – Create a character that induces tranquillity
- **Fact** – If shadows avoided then tranquillity
- **Directive** – Avoid shadows

The validity of the fact itself depends on the other components in the conceptual system. In the model developed by Tzonis et al, the deontic branch connects to a factual branch which includes, beside the fact itself, a backing and a base which are related to more profound epistemic and axiomatic norms. These constitute different levels of descriptive statements which support the truth or validity of a factual statement. Here is an example:

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Fact — If passage less than twenty feet long, then security

Backing — On account of the fact that in 98% of the cases which recorded passages, less than twenty feet in operation were found secure.

Base — 98% is an acceptable measure of risk

Thus the complete model of the basic structure of a conceptual system is:

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   Norm
   |   
Base — Backing — Fact
   |   
   Directive
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In the example just given above, the higher epistemic norm would be that empirical statistical data in backing are acceptable conditions for establishing the truth of a factual statement. These kinds of elements in architectural argument are of a philosophical nature. They define the general rules of design reasoning and argumentation.

Of course a text may contain several such structures. Furthermore many structures may be joined together to form a consistent chain of argument. But different chains may introduce conflicting attitudes. This occurs especially in period of transition from one conceptual system to another.

This method of discourse analysis was applied to a sample of texts written between 1650 and 1800 in France. The results of this study show for instance the existence of several profound conceptual discontinuities between the discourse produced at the beginning and the end of the period under study. One of the most important discontinuities occurred in the discourse
on the orders of architecture. Toward the middle of the seventeenth century, a conceptual system in which the norm of harmony in architecture was related to a number-based prescriptive system founded on the notion of authority began to disintegrate. It was gradually replaced by a new conceptual system within which the directives for the design of the orders were oriented toward the satisfaction of a norm of expression supported by visual effects and in which the value of architecture was founded on empirical experience.\textsuperscript{35}

This major shift in the conceptual framework of architectural reasoning which was gradually carried through the discourse on the orders, was of great consequence for the perception, selection, use and value of precedent cases and precedent rule systems in the definition of design directives. But precedents did not play a passive role; they were not simply affected by more profound conceptual changes. They were fundamental in the argumentation and reasoning process that led to the definition of different design directives. Thus, the tension between the notions of authority and experience as foundations of design directives directly referred to the nature of precedents as a source of authority or a source of experience. Similarly, the norms of beauty, harmony, and expression in the discourse would have made little sense without the existence of prior instances of such norms. Finally most design directives regarding the proportioning and shaping of the orders of architecture were formulated in terms of imitation of particular aspects of single or multiple precedent cases or precedent rules systems. Thus, the main purpose of the following study

\textsuperscript{35} Ibid., 170. It must be noted that during this period of epistemic changes the role and significance of precedents in the conceptual system was affected. Furthermore precedents can operate at a different level in the conceptual system, either as backing – source of authority or experience – or as element implied in the directive – rule or model to imitate for instance. This study addresses these different functions.
is, in large measure the mapping out of the pervasive dimension of precedents in design reasoning.

1.6 Contribution of the Dissertation to the Advancement of Knowledge

This dissertation aims to contribute to the advancement of knowledge in two main domains. From an historical point of view, this study wishes to enlarge our perception of the conditions surrounding the emergence of modern design thinking. It attempts to underscore the role of the debates on the use of precedents in the definition of design directives for the orders of architecture in France during the seventeenth and eighteenth centuries and in the formation of a critical and reasoned approach to designing.

From the point of view of design methodology, this study proposes an alternative to the conception of the role of precedents as a static memory bank in design thinking. It argues that precedents do not merely constitute collections of potential models for designers, but can play a much more pervasive, critical and creative function, when integrated at different levels into the design reasoning process.

Finally, as a way of proposing further research developments, this study suggests, in a kuhnian mode, that precedents can play an incremental role in the production of architectural knowledge and that they can have a community-structuring power. Precedents can help not only to consolidate the structure of a disciplinary field, but also to assist in the conception of relevant design products by enhancing discussions and dialogues between designers and communities, thus helping to create consensus.
1.7 Outline of the Dissertation

The dissertation is in three parts. The first part (chapter 1 – introduction) presents the subject, the problem, the method and the theoretical framework of the study. The second part (chapter 2) presents the cognitive context, including a general survey of the discourse on architecture produced in France between 1500 and 1800 as an index of the relativisation of architectural norms during this period. The third and main part (chapters 3–11) presents the result of the analysis of the role of precedents in a selected body of discourse on the orders of architecture in France between 1650 and 1800.

The study of the discourse on the orders begins in the third chapter with an analysis of Fréart de Chambray's Parallèle de l'architecture ancienne avec la moderne (1650). In this book, the author proposes to establish the rules of the five orders of architecture on the basis of a selected sample of the best and most regular antique Roman buildings. The authority of the antique model is based on transcendental premises which are said to be confirmed by the experience of those remains and the recognition of modern authorities.

The fourth chapter analyzes François Blondel's Cours d'Architecture (1675–1683). For Blondel, the definitive rules of architecture also belong to a transcendental universe. However, unlike Fréart, Blondel believes in some sort of progress in the search for the perfection of architecture. This tradition of research, represented by Vitruvius and the authors of the Renaissance, tends towards a perfectly regular and rational system. However, by definition, this ideal of perfection will never be reached. The architect can only contribute to the improvement of architecture through a process of selection and assembly of precedents.
Chapter five concentrates on the intervention of Claude Perrault in *Ordonnance des cinq espèces de colonnes selon la méthode des Anciens* (1683). Perrault strongly criticizes Blondel and Fréart de Chambray for their inability to solve the problem of the rationalisation of the proportions of the orders. According to him, the reason why they were not able to arrive at a definitive rational solution was because the very project of rationalization is incompatible with an unconditional respect for the tradition inspired by the quasi-religious belief in the transcendental nature of the rules of beauty. Perrault maintains that the proportions of the orders are not a positive cause of beauty: rather they are conventional and therefore can be rationalized and imposed upon the basis of the authority of instrumental reason. The rationalization of the orders – the complete regularization and simplification of the proportional system – is justified not in terms of beauty, but on the basis of their utility and facility to be remembered. The classical tradition of design cases constitutes a reservoir of conventions which must be integrated in some rational scheme.

With chapter six begins the study of the resistance and response to Claude Perrault's provocative argument in the works of d'Aviler Nativelle and Desgodets. In the eighteenth century, the systems of proportions designed by Palladio and especially Vignola gained in authority. Many authors prescribed slightly corrected versions of the canonical systems, or more often, combinations of the different systems proposed by Vignola and Palladio. They refused to impose an ideal of absolute regularity and accept the relative regularity offered by the classical tradition. They justified the superiority of modern authorities on the basis of their essential connection with antiquity, and the authority of accumulated and codified experience.

Chapter seven discusses Germain Boffrand's ambivalent position between a respect for authority and a need for renewal based on experience.
In his *Livre d’Architecture* (1745) Boffrand proposes a geometric simplification and reduction of the repertory of mouldings on the basis of a principle of natural expression of forms. The transposition into architecture of a linguistic and poetic model inspired by Horace opens the way to a re-appraisal of classical precedents, calling for a return to the simplicity of Greek architecture.

Chapter eight deals with Charles Estienne Briseux’s *Traité du beau essentiel dans les arts appliqué particulièrement à l’architecture* (1752). In direct response to Perrault, and with obvious sympathy for Blondel, Briseux seeks to demonstrate the natural origin of harmonic proportions. For him the rules of harmony in music—which have been scientifically demonstrated—confirm the natural character of proportions and their essential value in the experience of beauty. Contrary to Blondel, who sees in the harmonic proportions only a demonstration of the necessity of proportions in architecture, Briseux believes that the proportions in architecture must be based on the principles of proportions in music. Briseux substantiates his position with a demonstration based on selected harmonic precedent. Like Perrault, Briseux is able to provide principles and frameworks for an effective regularisation of the proportions of precedent cases. But unlike Perrault he relates the norm of regularity to the experience of beauty and derives it from natural sources.

Chapter eight focusses on Jacques-François Blondel’s contribution to the debate in *ArchitectureFrançaise* (1752–56) and the *Cours d’architecture* (1771–1777). For J.F. Blondel, the norm of regularity is used as a critical framework that allows for the evaluation of the ensemble of classical and non-classical precedents. The rules of architecture must emerge from an empirical and critical study of the building and theoretical production of the past, for the rich variety of architectural forms represents
a repertory of precedents which can be used as a whole or in part and be adapted to different situations. Their comparison and classification provides empirical data for the justification of the validity and continuity of certain conventions. But for Blondel, the empirical experience of buildings also offers a legitimate way to criticize and change them. Thus precedents form a constituent part of critical reasoning in design.

Chapter nine discusses Le Camus de Mézière's *Le génie de l'architecture* (1780). Le Camus seeks to discover natural principles of expression and define design directives for the characterisation of buildings in the empirical experience of architecture. Le Camus also includes scenography and painting in the sources of knowledge regarding the means of producing and controlling sensation and character through formal composition. Although the proportions of the orders of architecture continue to hold central authority in architecture, the classical discipline of the order is a framework for working out the sensational environment.

This dissertation comes to an end with the subject of the ninth chapter, Julien David Le Roy's theoretical and historical essays published in *Les ruines des plus beaux monuments de la Grèce* (1770), with which is the subject of the ninth chapter. During the eighteenth century, the notion of authority as the basis for the justification of the rules of architecture is gradually undermined. The idea that certain buildings or texts can be accepted as canons in architecture on the basis of their antiquity or the authority of their author is replaced by a growing awareness of architecture's historical and cultural specificity. Unlike Perrault, Julien David Le Roy does not see in the conventionality of architecture a justification for the arbitrary imposition of a rational system of rules. On the contrary, for him history has an origin, a logic and a unity. Each manifestation of a particular style is a reinterpretation of a fundamental, "primitive idea." This "primitive idea" is
not an abstract transcendental entity but a concrete prototype which serves as a principle of development. Furthermore, behind the diversity of styles, there exists another principle which unifies the architecture of different peoples. This principle lies within the natural law of human experience. Ultimately Le Roy sees in classical architecture, and especially in peristyles, both a universal structural prototype and the ultimate device for the creation of sensations. The colonnade appears as a quasi-universal type induced from observation and experience of the diversity of historical precedents and a generic idea for new design. Le Roy's extreme generalization of design principles from precedents offers a solution to the difficult problem of finding an equilibrium between authority and experience. The price to pay for this equilibrium is the sacrifice of the classical tradition of normative thinking based on the five orders of architecture.

The conclusion summarizes the form taken and the role played by precedents in the reasoning leading to the definition of design directives in the architectural discourse on the orders. It explains how the epistemological shift that led to the relativization of architectural norms paradoxically allowed the cognitive framework of architecture to evolve from a limited and style-specific universe of rules and models towards a more inclusive and general framework of critical design thinking with precedents between 1650 and 1800. The discussion expands on the cognitive and philosophical significance of the problem of the use of precedents for contemporary research in design thinking and methodology and suggests further topics of historical and cognitive research.
Chapter 2

The Development of Architectural Discourse and the Relativization of Norms in France between 1500 and 1800.\(^1\)

The significance of the debate on the rules of the orders of architecture in France in the seventeenth and eighteenth centuries must be measured against the general process of relativization of architectural knowledge, and the concomitant proliferation of categories of discourse. The idea of generating rules for modern architectural composition was undermined not only by the objective discovery of a variety of proportions in antique and modern buildings, but also by a series of competing debates that opposed French and Italians, ancients and moderns, architects and engineers, experts and amateurs. These discussions gave rise to a series of theoretical dichotomies that opposed invention to rules, art to science, philosophy to professional practice. These confrontations may have had their source in conflicting professional interests but they also point to more profound conceptual incompatibilities.\(^2\)

Each pole of these dichotomies generated its own distinct corpus of publications. The following chapter is an attempt to map out the general context of the production of discourse as a background for understanding the transformation of attitudes toward precedent in the constitution of a normative theory of the orders.


\(^2\) Tzonis et al., *op.cit.*, (1975), 17–20
2.1 The Reception of the Vitruvius and Italian Renaissance Treatises in France

The rules of the five orders of architecture, like all the main conceptual categories related to the description of classical architectural composition, obviously derived from the *Ten Books on Architecture* written by Vitruvius in antiquity. Indeed most treatises written during the Renaissance emulated directly the famous manuscript by Vitruvius. It is well known, for instance, that Alberti's *De Re Aedificatoria* (1495) — the first modern architectural treatise — attempted a reorganization of the Vitruvian text into a more rigourous structure. The first treatises published in French during the Renaissance were translations of Vitruvius or his Italian emulators. As early as 1530, French editions of portions of Vitruvius' text had appeared in *La raison d'architecture* (1537) (originally published in Spanish by Diego de Sagredo (1529)) — the first architectural treatise available in French. But it was Jean Martin — the secretary of the Cardinal of Denoncourt and a close friend of Du Bellay and the Pleiade — who really introduced the Vitruvian writings in France. In the space of a few years, Martin published Francesco Colonna's *Le songe de Poliphile* (1545), Serlio's *Livre I, II, III and IV* (1545–1553), Vitruvius' *Les dix livres d'architecture* (1547) and Alberti's *L'architecture et art de bien bastir* (1553). These types of translations continued to appear in France during the seventeenth and eighteenth century. Palladio's *I quatro libri dell' architettura* (1570) were translated in part by Pierre Le Muet in 1635 and in full by Fréart de Chambray in 1650. Scamozzi's *L'idea della architettura universale* (1615) and G.B. Vignola's *Regola delle cinque ordini d'architettura* (1562) were published in French by Charles Augustin d'Aviler. The Vignola's text, which was to become the

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architectural best seller of the classical academic tradition, was re-issued no less than twenty times in the eighteenth century through the numerous editions of d'Aviler's *Cours d'architecture* (1rst ed.1691) and also as a standard component in many pattern books.

Many of these works were not simple literal translations but were conceived as forms of emulation and contributions to the understanding of the original works. Many were accompanied by commentaries, notes and illustrations that modified the scope of the original. The illustrations of Jean Martin's edition of Vitruvius, for instance, were taken from Fra Giocondo's Italian edition and completed by a new set of woodcuts by Jean Goujon. These new representations were explicitly intended to clarify obscure passages in the antique text but naturally bore witness to the concerns of the various authors. The most famous translation is Claude Perrault's annotated version of Vitruvius realised for the *Académie Royale d'Architecture* in 1673. Perrault's *Epitome* published in 1684 is equally interesting, proposing a thematic reorganization of the material into useful practical handbooks focusing on the problem of the architectural orders. But with Perrault, of course, it is no longer quite accurate to speak of the *classical* tradition; at least the latter is completely reappropriated on rational and critical ground.

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4. On the illustrations of Jean Martin's translation of Vitruvius see P. Du Colombier, "Jean Goujon et le Vitruve de 1547," *Gazette des Beaux Arts*, (May 1937)

5. On Perrault's Vitruvius see Herrmann, *op.cit.*, (1973) and Picon, *op.cit.*, (1988). These works provide general documentary information on the production of the book but mainly focus on the history of ideas. A cognitive analysis of this masterpiece of seventeenth century philology and scientific criticism remains to be done.

6. See Françoise Choay, *La règle et le modèle: sur la théorie de l'architecture et de l'urbanisme*, (Paris, 1980), 234-235. "Perrault se débarasse de "toutes ces excellentes et curieuses recherches qui sont pour les savants qui trouvent la mille belles choses, tirees d'une infinité d'Auteurs que Vitruve a lus et dont les ouvrages sont à présent perdus" pour conserver "seulement ce qui peut servir à l'architecture en reléguant à part dans une deuxième partie ce qui appartient à l'architecture ancienne et ne nous concerne que d'un point de vue historique." La première partie est "consacrée aux maximes et préceptes qui peuvent s'accomoder à l'architecture moderne." The Abrégé contains three parts: the first on the origins of architecture, the second on construction, and the third and most important on the orders of architecture.
2.2 The Birth of a French Academic Tradition: The Comparative Analysis of the Orders and the Development of Architectural Composition

The intense theoretical activity surrounding the definition of the rules of the five orders of columns in the seventeenth and eighteenth centuries is paradoxically an index of an increasing instability in the Vitruvian tradition in France. To trace the source of such activity one needs to go back to the sixteenth century when Serlio exposed the first system of the five orders of architecture in a text originally published in Venice in 1537 but soon translated in French.\(^7\) The *Reigles générales d'architecture sur les cinq manières d'édifice* which appeared in Paris in 1545 rapidly became a model of inspiration for other theoreticians. Jean Bullant published his *Reigles générales* in 1564, Jacques Androuet du Cerceau, the *Petit traité des cinq ordres de colonnes* in 1583, and Julien Mauclerc, *Le premier livre d'architecture* in 1600.\(^8\) Salomon de Brosses, Pierre Le Muet and many others proposed their own version of the orders.

After Claude Perrault's *Ordonnance des cinq espèces de colonnes* (1683) which offered a fully rationalized proposal, the search continued unabated in the eighteenth century: Cordemoy (1706), Sebastien Le Clerc (1714), Jacques–François Blondel (1752), Charles Estienne Briseux (1752), Marc Antoine Laugier (1753), Amédée François Frézier (1739), Pierre Patte

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THE DEVELOPMENT OF THE ARCHITECTURAL DISCOURSE

(1769), Nicolas Potain (1764), Charles Dupuis (1769), Nicolas Le Camus de Mézières (1780), Ribart de Chamoust (1786) and many others made proposals totaling nearly 60 titles before 1800.

In the second half of the seventeenth century, the consolidation of the absolute state and of its system of academic control of education favors the development of a new normative and critical discourse on the orders. In Fréart de Chambray's *Parallèle de l'architecture ancienne avec la moderne* in 1650, the systematization of the orders of architecture emerges as a central theoretical issue aimed at a normative control of architectural composition. This systematic comparison of the most acclaimed ancient and modern precedents illustrates the retrospective and critical spirit that predominated French academic discourse. This set the tone for the colossal critical retrospective of received architectural knowledge by François Blondel in his *Cours d'Architecture* (1675–1683).

The *Cours* was the first official didactic treatise of the newly founded *Académie Royale d'Architecture*, and the most systematic and thorough analytical review of all systems of rules for the orders established by the major classical authors. It also included discussions on traditional Vitruvian and Renaissance topics such as the design of bridges and triumphal arches as well as a long discussion on the rules of proportions and their optical adjustment. The *Cours d'architecture* published by d'Aviler in 1691 included for its part, a translation and revision of Vignola's *Regola* and a collection of models of ornaments and building plans. While responding to the need for a rationalized system underscored by Perrault it remained well set within the tradition. Nativelle's *Nouveau traité d'architecture* followed in the same vein. Nativelle, however laboured towards a complete

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system of architectural composition regulated by the system of the orders of architecture and their proportional framework, a goal that only Briseux, in his *Traité du beau essentiel dans les arts* (1752) and of course Jacques François Blondel in the *Cours d'architecture civile* (1771–1777) will be able to achieve. Blondel's *Cours* deals with all aspects of design, problems of decoration, distribution and construction and thus summing up more than forty years of architectural teaching at the *École des Arts* and the *Académie Royale d'Architecture* dominated by discussions on the five orders of architecture. However Blondel also proposed, in parallel, a critical approach to the rules of architecture based on the study of concrete precedents which definitely relativized the authority of the Vitruvian tradition. Here the rules were chiefly regulators of expression and therefore required a recourse to direct experience. In this context we should also include Boffrand's *Livre d'architecture* (1745) and Le Camus de Mézières' *Le génie de l'architecture ou l'analogie de cet art avec nos sensations* (1780). Starting with Fréart's parallel of the authorities, and collection of canonical models, the debate has reached an extreme end with Le Camus' conception of the proportions of the orders as a general regulating framework for the composition of visual effects and sensations.

### 2.3 Archaeological Surveys and the Problem of the Diversity of the Orders.

Until the end of seventeenth century in France, Roman antiquities were mainly known through the drawings of Serlio and Palladio. The publication of *Les édifices antiques de Rome* by Antoine Desgodets in 1682 provided the first French collection of precise archaeological surveys of antique
Roman buildings. The precision of his measured drawings was of major concern to Desgodets, and his work showed with devastating fastidiousness that none of the canonic antique buildings admired by modern architects had similar proportions. For Claude Perrault, this evidence demonstrated that neither Vitruvius nor any other modern author should be accepted as a canonical authority in modern design. But Desgodets' work was only a first, and isolated step in a process of archaeological discovery that truly took off in the second half of the eighteenth century, and led to the recognition of the infinite diversity of antique architecture. The rediscovery of the temples of Paestum by G.P.M. Dumont and G. Soufflot in the late 1740's was the beginning of a new wave of archaeological missions which produced numerous publications of drawings and reports on antiquities. Julien David Le Roy realized a monumental account of his travel in Greece in Les ruines des plus beaux monuments de la Grèce in 1757, and Charles Clérissesse published Les ruines de Spalato in 1764 and Les antiquités de la France in 1778. The British surveys of Athens by Stewart and Revett, of Palmyra and Baalbeck by Dawkins and Wood also appeared in French translation during this period.

The growth of first hand knowledge of antiquity after 1778 was officially subsidized by the royal administration which strongly encouraged, and eventually imposed, in 1790, the survey and production of drawings of

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antique buildings by the students in residence at the Académie in Rome. Some of these students were engaged on important archaeological and cultural missions in Italy, Sicily and Greece.

2.4 Travel Accounts and The Fascination with Singularities.

It is in this context that a new type of archaeological publication began to flourish. The "Voyage Pittoresque" was a hybrid type of work including surveys and architectural descriptions as well as historical, geographical, scientific and cultural observations. These observations were contained within a narrative of the traveler's experience, emphasizing the picturesque character of the experience of antiquity. The most elaborate specimens of this genre were the monumental volumes of Choiseul-Gouffier's *Voyage Pittoresque de la Grèce* 1782–1824, Jean Houël's *Voyage Pittoresque des isles de Siciles, Malte et Lipari* 1782–87 and St-Non's *Voyage Pittoresque et description des Royaumes de Naples et de Sicile* 1781–1786.

These works were clearly oriented toward the recording of singularities. For these authors, antiquity was not seen as a source of rules, but rather as a precedent providing legitimate ground for individual fantasy.

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Jean Houel, commenting on a combination of ionic and doric profiles found on a fragment of entablature in Sicily, wrote:

"Cette licence nous prouve que de tous les temps on s'est permis de s'écartner des règles de l'art, de mêler plusieurs ordres ensemble. C'est une erreur une sorte de fanatisme qui fait soutenir obstinément certains modernes, que les anciens étaient invariablement attachés aux loix de leur art, et que chez eux tout avait des convenances déterminées et relatives à l'objet auquel l'édifice était destiné et dont chaque partie était une allégorie... pas de convenance ici,... l'architecte se livrait purement à sa fantaisie."

2.5 The Variety of Modern Architecture

If the period comprised between 1650 and 1800 was characterized by an obsessive determination to established rules for architecture, it was also, in general, a period during which the diversity of the world's architectural production of the past and the present was revealed and appreciated through numerous publications. Apart from works on the classical remains of antiquity, collections of prints and illustrated travel accounts offered new and increasingly important visual documentation on the buildings of Europe and Asia.

In France, publications on national architecture were numerous and began to appear early the Renaissance. The first visual records of the buildings of the monarchy and the nobility were documented in *Les plus excellents bastiments de France* executed by J. Androuet Du Cerceau in

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1576–1579. However, it was only after the mid-seventeenth century that surveys and view of French monarchical building began to be produced on a systematic basis, beginning with Claude Chastillon's *Topographie Française* in 1648. In 1670, Jean Baptiste Colbert created the *Cabinet du Roi*, gathering some of the most gifted draughtsmen and engravers of the time – I. Sylvestre, J. Perelle, J. Le Pautre, J. Marot, S. Le Clerc – in order to have views and plans engraved on a systematic basis, recording the evolution of the buildings of the kingdom. Descriptions were often included with series of prints on a particular subject such as in Félibien's *Description de la Grotte de Versailles* (1676) or Charles Perrault's *Description du Labyrinthe de Versailles*.

At the beginning, the topographical records encompassed mainly the royal household and French military cities, but gradually a more global vision of the French territory was proposed in the works of Georges Louis Le Rouge, Piganiol de la Force and especially Jean Baptiste de Laborde. The latter's vast *Voyage Pittoresque de la France* begun in 1734 and published through 1794, provided a detailed topographical account of the different provinces of France. Plans and atlases of Paris and the French territory were also offered to the public by Blondel and Bullet in 1696, Turgot and Bretez in 1724, Verniquet in 1796, and many others.

In the eighteenth century, the study of modern precedents played an increasingly important role in architectural education. Jacques François Blondel for instance, who used to take his students on tours of the buildings of Paris and its environs, believed that the best way to learn architecture was

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to compare and analyze precedents and not to confine oneself to the study of rules. Blondel's pedagogical method made extensive use of prints and drawings of contemporary buildings. *L'Architecture Françoise* (1752–1756), his first pedagogical work, was in fact a collection of drawings of French modern buildings published with a theoretical introduction and critical commentaries.

The collection contained in the *Architecture Françoise* was begun by Jean Marot in the 1640's. This series of prints representing mostly plans, sections and elevations of Parisian buildings, was enlarged by Jean Mariette, and reissued in 1727. It was edited, updated and published again by Charles Antoine Jombert between 1752 and 1756 with Jacques François Blondel's text.\(^{18}\)

In his *Discours sur la nécessité de l'étude de l'architecture*, first published in 1754 and eventually incorporated in the *Cours d'architecture*, Jacques-François Blondel not only referred to French and Italian precedents but also suggested the study of a series of books "dont l'étude est indispensable aux personnes qui se vouent à la profession de l'architecture..." The list of forty- seven books comprises, in addition to many treatises, collections of prints such as Collin Campbell's *Vitrue Britanique* as well as a *Vitrue Danois, Les délices de Paris et de ses environs, Les Ruines de Palmyre*, and works by Le Pautre and Piranesi, all forming extensive collections of drawings of ancient and modern buildings.\(^{19}\)

J.F. Blondel's new didactic method of comparison, analysis and criticism of existing buildings was a catalyst in the development of publications recording contemporary architecture in general. Gabriel Pierre

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\(^{19}\) See Jacques-François Blondel, *Discours sur la nécessité de l'étude de l'architecture*. (Paris, 1754), 83–89. Blondel also lists names and locations of private collections of books, prints and drawings that can be consulted in Paris.
Martin Dumont for instance, contributed substantially to the development of the case-study method at the Académie Royale and at the Ecole des Arts where he collaborated with J.F. Blondel. He was the author of several important publications of didactic collections of prints on specific buildings and series of cases. His works included among other things: *Parallèle des plans des plus belles salles de spectacles d'Italie et de France...* (1766–1772), *Les vues, plans, coupe, élévations de trois temples antiques faisant partie de l'ancienne ville de Paestum* (1764), *Recueil de divers plans et dessins d'architecture avec les règles des cinq ordres* (1767), *Parallèle de grands entablements et de charpentes à l'italienne* (n.d.), *Recueil de planches d'architecture des églises Sainte–Geneviève de Paris et Notre–Dame de Paris* (1773), and *Détails des plus intéressantes parties d'architecture de la basilique Saint–Pierre de Rome* (1763).

These collections of engravings were intended to be used in didactic and critical comparative exercises. Measurements on the drawings were given in French feet and numerous details were also included. Dumont wished in general to enlarge the bank of information on specific building types and design problems available to students and designers. In his colossal publication on Saint Peter, Dumont indicated in the introduction that it could be considered "un dictionnaire linéaire de cette basilique. Avec elle ceux qui ont vu ce superbe monument peuvent se le représenter et ceux qui espèrent s'y transporter peuvent en juger d'avance par les notes et les mesures que j'y ai inséré autant que je les ai cru nécessaires. Ce travail ne peu que rendre plus intelligible ce que l'art nous a donné sur cette métropole soit en géométral soit en perspective." (Dumont, 1763 intro.) In a similar didactic spirit, Jacques Gondoin's *Description des Ecoles de Chirurgie* (1780) and Victor Louis' monograph on the Theater of Bordeaux (1781)
contained complete sets of drawings documenting all aspects of the buildings and their urban context.

From the mid-seventeenth to the end of the eighteenth century, the amount of visual material on modern European and even Asian architecture, emphasizing the interest of particular building cases and cultural singularities, completely transformed the perspective from which the rules of architecture were to be considered.

2.6 Invention vs Rules -- From Model Books to Utopias

The frenetic effort to standardize the orders of architecture was counterbalanced by increasing creative activity in design. Collections of designs for architectural elements and ornaments began to be produced early in the sixteenth century and were one of the most flourishing types of publication in the seventeenth and eighteenth centuries. Architects, painters and engravers working independently, for large architectural firms, or for the royal building administration and manufactures, published endless series of inventions aimed to serve as models or simply as a demonstration of an artist's personal mastery of architectural composition.

These works usually contained variations on themes or types of objects. Collections of doorways and window frames were among the favourite subjects. Du Cerceau included many of them in his Second livre d'architecture (1561), as did Hugues Sambin in his De la diversitez des termes dont on use en architecture (1572). In 1640, Alessandro Francini published his Livre contenant plusieurs portiques de différentes inventions sur les cinq ordres de colonnes. Collections of ornamental motives were assembled by such architects as Le Pautre, Berain, D'Aviler, J.F.Blondel and Oppenord to name only a few of them. Painters such as Le Brun and
Delafosse also had extensive collections of architectural compositions published.\(^{20}\)

The publishing of such collections of designs by individual architects became more frequent in the eighteenth century. Juste-Aurelle Meissonnier (1735), Germain Boffrand (1738–1745), Gilles-Marie Oppenord (1748), Emanuel d'Héré (1753), Marie-Joseph Peyre (1765), Contant d'Ivry (1769) had their drawings and buildings engraved. Books of architectural inventions and design for unexecuted projects also proliferated during this period, largely under the influence of the leading figure of the time, Piranesi, the Roman.\(^{21}\) Laurent Le Geay's fantasies for instance, were conceived as autonomous pictorial artworks and personal experimentations without direct practical purpose.\(^{22}\) This kind of invention attracted a large audience of architects and amateurs but was also regarded with suspicion by some professionals and academicians, as it represented a deviation and a threat to architectural orthodoxy.\(^{23}\)

\(^{20}\) See for instance Le Brun, Recueil de dessins de divers pavillons inventez par Sieur Le Brun premier peintre du Roy... Paris: Edelinck (1690) and Delafosse, Nouvelle iconologie historique... Paris: l'auteur (1788).

\(^{21}\) On the influence of Piranesi in France see especially Piranése et les Français, 1740–1790, Exhibition Cat., (Rome, 1976).

\(^{22}\) On Le Geay see especially Gilbert Erouart, L'architecture au pinceau. Jean Laurent Legeay, un Piranestien français dans l'Europe des lumières, (Paris, 1982).

\(^{23}\) Critiques of the architectural fantasies of Oppenord and Meissonnier for instance are legions. The exuberant works and attitude of those two architects in particular embodied everything the academy condemned. Conservative professional architects also criticized the abuse of painting in architectural representation. Indeed picturesque representations were seen as promoting easy visual effects in architectural composition to the detriment of both sound construction and precise proportioning. On this matter see Erouart, op.cit., and Pérouse de Montclos, "Les Prix de Rome" Concours de l'Académie Royale d'Architecture au XVIIIe siècle, (Paris, 1984), p.28. "L'Académie défend aux élèves tant dans les esquisses que dans les dessins au nets, les ciels, les paysages, les perspectives, et en général tout ce qui n'est pas du ressort d'un dessin purement géométral." Rules for the competition of 1786.
The Development of the Architectural Discourse

Toward the end of the century, the search for principles in architecture was in fact largely assimilated within the affirmation and systematization of personal points of views. Indeed J.A. Meissonnier's *Oeuvre d'Architecture* and Germain Boffrand's *Livre d'Architecture* included primary material prepared in view of the eventual publication of treatises. Claude Nicolas Ledoux's *Architecture considérées sous le rapport de l'art, des moeurs et de la législation* published in 1804, is no doubt the most fully achieved example of such treatises organized around the production of an individual architect. The book presents a complete collection of personal inventions for all types of civic buildings reassembled in a utopian scheme for an entire city, built around a saltworks installation. Here, the idea of a system of architecture is completely appropriated within a purely personal, poetic and idiosyncratic world of invention.

2.7 The Relative Importance of the Architectural Orders -- the Discourse on Distribution and Construction

Although France sought to institute the rules of architecture on the basis of a principle of continuity with the classical tradition, the adaptation of the forms of antique architecture to French modern customs and building traditions was always more or less problematic. In particular, in the books dealing with planning, construction and regulations, the hegemony of the orders of architecture in architectural design was gradually undermined.

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2.7.1 Domestic planning and decoration

While it was generally admitted that the Ancients had excelled in the domain of architectural decoration, most French theoreticians believed that the principles of planning used in antiquity were unsuitable for modern architecture. Very early on, books dealing specifically with problems of planning in French domestic architecture began to appear; the first being Jacques Androuet Du Cerceau's Livre d'Architecture I and II (1560's). This collection of plans and elevations for aristocratic country houses was a French adaptation of Serlio's unpublished work on domestic architecture.26 In 1624, Pierre Le Muet, in Manière de bien bastir pour toutes sortes de personnes, proposed series of models for urban dwellings of different sizes and for people of different social and economic conditions.27

Numerous model books on domestic architecture were published in the eighteenth century, including L'Architecture Moderne of 1728 edited by Charles Antoine Jombert28, Jacques-François Blondel's De la distribution et de la decoration des maisons de plaisance (1737–38), Charles-Estienne Briseux's L'art de construire des maisons de campagne (1743), and J.F. Neuforges' Nouveau recueil d'architecture élémentaire (1757–68). In these works, the emphasis is put on the description of the rooms and sequence of

26 See Myra Nan Rosenfeld, Sebastiano Serlio on Domestic Architecture: Different Dwellings from the Meanest to the Most Ornate Palace: The Sixteenth Century Manuscript of Book VI in the Avery Library at Columbia University, (New York, 1978).


spaces in relation to French customs, and on accounts of ingenious inventions for the improvement of domestic comfort.

In the mind of Jacques-François Blondel, the modern art of distribution was in fact a French invention, and it was on this ground that French architecture could pretend to compete with ancient architecture. What can be sensed through the development of the discourse on distribution, is the growing autonomy of French architecture from the authority of antique precedents, and the relativization of the problem of the orders as a foundation for design.

2.7.2 The valorization of technical knowledge and the critique of the orders.

In the *Mémoires critiques d'architecture* of 1702, Michel de Frémin condemned the importance attributed to decoration and especially the orders in the architectural discourse since the Renaissance. According to him, the five orders were the least important aspect of architecture; priority should be given to commodity and construction. Frémin's small manual included discussions on materials, building techniques and regulations, and incorporated a defense of the structural superiority of gothic architecture over classical buildings.

Specialized documents on norms and regulations regarding Parisian building techniques, conventions and practice had been published before.

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30 See Michel de Frémin, *Mémoires critiques d'architecture* (Paris, 1702) *Avertissement*, letter 6th, "la sixième explique les principes de la vraie architecture et l'erreur de croire que tout son art soit renfermé à connaître simplement les cinq ordres, lesquels ne sont que la dernière et moindre partie dans l'architecture."

L'Architecture Françoise (1624) by Louis Savot was the first manual of this type. It was reissued with revisions by François Blondel in 1685. Pierre Bullet published L'architecture pratique in 1691, (2 ed. 1755), and Duplessis, his Traité de la coustume de Paris in 1699. Similar works appeared in the eighteenth century; Les loix des bastiments, written by Desgodets in early 1700's, was revised by Goupy and published in 1749; and Charles Seguin's Manuel d'architecture appeared in 1786. These works often included specifications on prices and methods of "toisé" – the measurement of the volumes of a building and the evaluation of quantities of material needed for a construction. It should be noted that academicians were experts in technical and legal matters relative to building construction, and that a large part of their weekly meeting at the Académie was spent discussing those issues.

Specific building construction techniques were also discussed in many French publications prior to the eighteenth century. Building upon Philibert de l'Orme's Invention pour bien bastir à petit frais (1561)32 which dealt with inexpensive wood frame construction techniques, Mathurin Jousse's wrote L'art de Charpenterie in 1627. The same year he published another book on ironworks – La fidèle ouverture de l'art du serrurier. In the context of the general codification and reassessment of architectural knowledge, academician and mathematician Philippe de la Hire revised Jousse's works and published new technical manuals. André Félibien, - secretary of the Académie Royale d'Architecture, executed in 1676 the first encyclopedic review of the arts and crafts in Principes de l'architecture de

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la peinture et de la sculpture. During the same period, the Académie Royale des Sciences was also asked to work on a general encyclopedia of the arts and crafts in France.

The publication of this kind of work increased significantly after 1750, with works such as N. Potain's Détails des ouvrages de Menuiserie (1749) and Mésange's Traité de Charpenterie (1753), Du Hamel du Monceau's L'art du tuillerie et du briquettier (1763), and the six volumes of l'Art du Menuisier by Roubo (1769–1775). But the consecration of the arts and craft came in Diderot and Alembert's Encyclopédie: here plates describing the tools, space, operation and product of the different crafts and techniques related to building construction were given much more space and importance than architecture itself. Indeed in the discourse of the Enlightenment, modern techniques and craftsmanship were attributed an unprecedented value in respect to the progress of society.4

2.8 Science vs Art

2.8.1 Works on mathematics, geometry and perspective.

In discussions about the rules of the orders of architecture, it was generally assumed that mathematical ratios and geometrical forms embodied either

33 Félibien's knowledge of traditional design and building techniques was thorough. Indeed, it is interesting to note that Félibien's library contained several specialized works, including the famous manuscript written in the 13th century by Villard de Honnecourt, documenting multiple aspects of mediaeval architectural practice. See R. Recht (ed.) Les bâtisseurs de cathédrales gothiques, (Strasbourg, 1989), 359.

transcendental values or the inherent power of aesthetic expression. These ideas were criticized by Claude Perrault in his work on the five orders of columns as an obstacle to the complete rationalization of architecture. For Perrault, mathematical systems of subdivisions and geometry were merely tools for the control of architectural design.

A general trend toward the instrumentalization of mathematics and geometry in architecture is perceptible in the proliferation of technical manuals during this period. Mathematics, geometry and drawing were fundamental disciplines in architectural education and design and were at the origin of continuous discussions, debates and publications. Although geometry and perspective for instance, were often discussed in architectural treatises, most theoretical works on these topics were published as separate manuals. Some publications, such as Serlio’s first book and Le livre de perspective (1560) by Jean Cousin appeared in the Renaissance. But the real development of a specialized architectural literature on perspective and geometry in France began only in the middle of the seventeenth century, in the context of the general movement of mathematization of knowledge, and mostly under the influence of the Jesuits and mathematicians Jousse, Derand, and Niceron.35

The rationalization of the traditional practice of perspective was not an unproblematic affair. For instance, the method elaborated by the mathematician Girard Desargues in his Manière universelle pour pratiquer la perspective par petit pied comme le géometral.... was contested on the basis of the practical tradition. Dom Jacques Dubreuil for instance, published Diverses méthodes universelles... pour faire des perspectives... ce qui servira de réponse aux deux affiches du sieurs Desargues contre la ditte perspective

35 On this topic see especially Martin Kemp, The Science of Art: Optical Themes in Western Art from Brunelleschi to Seurat, (New Haven, 1992).
pratique in 1642. Abraham Bosse took up Desargues' method and tried to implement it at the Académie Royale de Peinture et Sculpture, but in so doing was dismissed of his pedagogical function by Le Brun.

Research on methods of graphic figuration continue to generate treatises and manuals in the eighteenth century such as the Traité de perspective pratique by S. Le Clerc, J. Courtonne, and S. Jeaurat. Architectural drawing conventions were put down on paper, and published for the first time in Buchottes' Les règles du dessin et du lavis in 1722. Finally problems of shadow projections began to receive more attention in works such as Dupain de Montesson's La science des ombres par rapport au dessin in 1750. Most of these books were dedicated to professional draughtsmen, architects or engineers, but some were also conceived for a public comprised of amateurs and autodidacts such as Jombert's Méthode pour apprendre le dessin (1755).

Perspective was a highly debated topic, and was at the origin of a substantial body of literature. But other works related to the use of geometry in surveying, planning and building were also produced during this period such as La géométrie pratique by Jean Boulanger, reviewed by Ozanam in 1690 or the Traité du nivellement and Traité de l'usage du Pantomètre in 1675, by Pierre Bullet.

This instrumental attitude in architectural literature has been interpreted as the source of the disintegration of the classical ideal in the eighteenth century. In fact the relation between the symbolic, aesthetic and instrumental dimensions of mathematics and geometry in architecture
remained ambiguous and a source of tension at least until the end of the eighteenth century.\textsuperscript{36}

2.8.2 Stereotomy

Stereotomy – the description of the geometry of stone cutting – was first introduced in Philibert de l'Orme's *Premier Tome d'Architecture* in 1567. However, a precise description of the geometry of complex assemblages of stones in vaulted structures was not really achieved before the invention of descriptive geometry by Monge in the early nineteenth century. Meanwhile, numerous attempts were made to solve this problem: Jousse (1642), Derand (1643), Desargues (1643), De la Rue (1728,1764) and Frézier (1737–39) published treatises on stereotomy. The latter's *La théorie et la pratique de la coupe des pierres* was reissued in a more synthetic format in 1754, providing a systematic classification and description of different types of assemblage for the construction of vaults and other difficult stereotomic pieces. Although the role of these treatises as real depositories of traditional building techniques is questionable, their place in the creation of the idea of a French national building identity, and in the reform of classical architecture in France, was crucial. As Robin Evans recently argued, stereotomy permeated the divide between ancient and modern and between gothic an classical architecture in France.\textsuperscript{37} The preservation of the medieval

\textsuperscript{36} Compare for instance the poetic and symbolic conception of geometry in Boullée's *Essai sur l'art* (1780's) and J.N.L. Durand instrumental approach to design. On this matter see Perez Gomez *op.cit.*, (1983) Contrary to Perez Gomez however, I believe it is reductive to think about the emergence of modern architecture uniquely in relation to the consolidation of instrumental science and the disintegration of the symbolic and poetic function of architecture. One only needs to think about Le Corbusier's poetics of geometry and numbers to realize that.

art of vault construction within the development of classical architecture in France was a major element in the creation of a truly French modern architecture. Indeed the geometrization of the art of stone-cutting was perceived as a form of classicization of gothic structure. Interestingly, the attention given to the precision of stone-cutting permeated the discourse on the appreciation of classical remains. It gradually became a sign of architectural value in the context of the displacement of critical attention from the problem of proportions toward questions of structural integrity and quality of craftsmanship.

2.9 Architect and Engineer

According to Antoine Picon, the emergence of the profession of the engineer and the development of technological rationality were the principal causes behind the collapse of the classical academic discipline of composition based on the five orders of architecture.\textsuperscript{36} I do not wish to limit the question of the relativization of the orders to such a narrow polarity; it is worth noting, however, that the engineers generated a strong scientific and pragmatic discourse widely disseminated through various publications.

2.9.1 Military architecture

The profession of the engineer originated in military architecture. In the Renaissance, the design of fortifications was in large measure dominated by neo-platonic geometric formalism, exemplified in France by books such as Jacques Perret's collection of designs \textit{Des fortifications et artifices},

\textsuperscript{36} See Picon, \textit{op.cit.}, (1988)
architectures et perspectives... (1601) Gradually however, this approach was criticized and replaced by design methods more responsive to concrete problems raised by the evolution of military tactic. Systematic treatises on the art and science of fortifications based on analytic studies of military strategies of defense and attack such as Charles Ehrard's La fortification réduite en art (1600) and Les fortifications du Chevalier Antoine de Ville (1628) provided mainly geometric maxims and rules for the tracing of regular fortifications and bastions.

In the seventeenth century, the basics of military art began to be taught in Jesuit colleges. The Jesuits contributed significantly to the development of a specialized literature and the rationalization of fortification and with a series of didactic works such as L'art universelle des fortifications (1665) by father Dubreuil, L'art de fortifier, de défendre et d'attaquer les places by Millet de Chasles (1695), and numerous other treatises. The reorganization of the army at the end of the seventeenth century by Colbert, Tellier and Louvois, and the research of Vauban, were catalysts in the advancement of the theory and practice of military architecture. In a short manual published in 1683, the architect and mathematician François Blondel for instance, proposed new principles of bastion design and elaborated a plan for the adjustment of existing fortification systems in France. The proliferation and renewal of military publications occurred during this period with the publication of works such as La fortification tant régulière qu'irrégulière by Manesson Mallet (1684), and Ozanam's La fortification régulière et irrégulière (1695), which dealt

with both regular and irregular types of fortifications adapted to different site conditions.\textsuperscript{40}

The creation of the École de Génie de Mézières in 1747, and the École Militaire in 1751, prompted again a renewal in didactic and scientific publications on military architecture. Bardet de Villeneuve, issued his Cours de la science militaire in 15 volumes between 1740 and 1756, Bernard Forest de Bélidor published La science de l'ingénieur, and a new system of detached forts invented by Montalambert was presented in La Fortification perpendiculaire in 1776.

2.9.2 Hydraulics and mechanics

The profession of civil and hydraulic engineer only emerged in the eighteenth century. The Corps des Ponts et Chaussées was created in 1715, followed by the École de Ponts et Chaussées in 1747.\textsuperscript{41} This institution enabled engineers to receive specialized training in building sciences and the design of infrastructures including bridges, channels, harbours, machinery, and hydraulic installations in general. Of course some of these topics had been discussed by Vitruvius in antiquity. In the Renaissance, Bernard Palissy wrote his Récepte Veritable (1563), Jacques Besson, Le Théâtre des instruments de mathématiques et mécaniques (1578), and Salomon de Caus, La raison des forces mouvantes (1612), but none of these works proceeded from a thorough mathematical understanding of the mechanical phenomena involved in the conception of hydraulic architecture, and all were considered outdated by the eighteenth century. Mechanics and hydraulic were discussed

\textsuperscript{40} On the development of the literature on fortification in the seventeenth century see Martin, \textit{op.cit.}, 852–53.

\textsuperscript{41} The most recent and extensive study on the history of the École des Ponts et Chaussées is Antoine Picon, L'invention de l'ingénieur moderne. L'École des Ponts et Chaussées 1747–1851, (Paris, 1991).
in Noël La Pluche's *Spectacle de la nature* in the early 1700's, it was in Bernard Forest de Bélidor's *Cours d'architecture d'hydraulique* (1737–39) that the first complete survey was offered on the principles of geometry and mechanics applied to hydraulic architecture. Most important, this book also contained an extensive study of precedents based on a systematic survey of ancient installations and modern works in France and the Low Countries.\(^{42}\) The *Cours* was eventually revised and augmented by Gaspard Riche de Prony in 1790–96. Rodolphe Perronet's monumental publications on bridge construction such as *Description des projets et de la construction des ponts de Neulîy, Nantes et Orléans* in 1782–83, as well as Louis de Reguermortes' treatises, constitute other attempts to collect information about existing designs and to rationalize design thinking and construction methods.

A scientific discourse on planning and building problems also began to emerge from research carried mainly in the context of the *Académie Royale des Sciences*. Between 1720 and 1789, the *Histoire de l'Académie Royale des Sciences* produced articles and memoirs on questions of mechanics, chemistry, materials, hydraulics, ventilation, hygiene, and building security by authors such as Blondel, Perrault, De la Hire, Bélidor, and Perronet. Distinguished scientists also contributed to this series: Lavoisier, Condorcet, Tenon, Le Roy, De Lassonne, Bailly, Coulon and Daubarton published series of reports on the problem of hygiene and ventilation in relation to the transfer and rebuilding of the Hôtel-Dieu at the end of the eighteenth century. These researches, mostly based on the premises of physical sciences, proposed convincing alternative principles of planning to the classical precepts of architecture.

\(^{42}\) This aspect of Bélidor's work has been neglected by Antoine Picon who focusses on the mathematization and systematisation of construction. See Picon, *op.cit.*, (1988) and "Les rapports entre sciences et techniques dans l'organisation du savoir. Milieu XVIIe – milieu XIXe siècle," in *Revue de synthèse*, (January – June 1994), 103–120.
2.10 Amateur vs Expert

In addition to professional and technical treatises, manuals, model books, monographs, memoirs, dictionaries and articles, lay publications by amateurs as well as scholars from other fields began to appear in the eighteenth century. Philosophical and historical essays, novels, archaeological books, and criticism dealing with architectural topics, invaded the public universe of architectural discourses with disrupting consequence for the authority of traditional academic expertise.

2.10.1 Essays on aesthetics

In the eighteenth century, a new category of discourse emerged which attempted to establish a common human cognitive and psychological basis for explaining individual aesthetic experience. The experience of architecture was compared with poetry, music, painting and sculpture in an effort to discover universal principles linking the different arts.\footnote{One of the best work on the history of aesthetic ideas remains Władysław Tatarkiewicz, \textit{History of Aesthetics}, (The Hague, 1974).} Works in this category include: Jean Pierre Crousaz's \textit{Traité du Beau} (1715), René Dubos's \textit{Réflexions critiques sur la peinture et la poésie} (1719), Charles Batteux's \textit{Les Beaux Arts réduit à un même principe} (1747), Père André's \textit{Essai sur le Beau} (1759) and Montesquieu's \textit{Essai sur le Goût} among others. These authors questioned the validity of a disciplinary approach to art theory. They suggested that architectural principles for instance, should be discussed by philosophers, while professionals should only be concerned with the execution of architecture. This idea was taken up by many amateurs and \textit{hommes de lettres} in the second half of the eighteenth century, and was determinant in the proliferation of new types of publications on the
principles of architecture such as the celebrated *Essai sur l'architecture* (1753, 1755), by Marc Antoine Laugier, La Font de St-Yenne's response to Laugier in *Examen d'un Essai sur l'architecture* (1753), and Claude Henri Watelet's *Essais sur les jardins* (1774).

2.10.2 Journals and public debates

In comparison to the institutional series of memoirs and articles published in the *Histoire de l'Académie Royale des Sciences* and *Histoire de l'Académie des Inscriptions et Belles Lettres*, journals, although often controlled by institutions, offered a more public-oriented kind of literature. The *Mercure de France*, founded in 1672, the *Journal des Scavants*, and the *Journal de Trévoux ou mémoire pour servir à l'histoire de France*, created by the Jesuit in 1702, reviewed works of the academicians and followed current events such as J.F. Blondel's public lectures on architecture at the Ecole des Arts. The *Mercure* and the *Journal de Trévoux* played an incremental role in the debates that opposed *amateurs* to professionals. For instance, the famous controversy that opposed the *amateurs*, Cordemoy and Laugier, to the professionals, Briseux and Frézier, on the advantage and

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44 As Wolfgang Herrmann pointed out, Laugier belonged to a trend which claimed the philosopher the right of directing, criticizing and advising artists. See Herrmann, *op. cit.*, (1962), 147.

45 The literature on garden planning was also traditionally produced by professional gardeners. Jacques Boyceau de la Barauderie's *Traité du jardinage* (1638), Claude Mollet's *Théâtre des plans et jardinsages* (1652), and Antoine Nicolas Dezallier d'Argenville's *La théorie et la pratique du jardinage* (1713) for instance, were books of models and instructions to lay out formal gardens. The literature on picturesque gardens included books by professionals such as André Moref's *Théorie des jardins* (1776) but was also at the core of the elaboration of a new aesthetic discourse to which many amateurs and philosophers took part. See on this topic Dora Wiebenson, *The Picturesque Garden in France*, (Princeton, 1978), and L. Lefavre and A. Tzonis, "La géométrie du sentiment et le paysage thérapeutique," *Dixhuitième siècle*, (1977).
difficulties of the use of free-standing columns in architecture, was published in the *Journal de Trévoux*. ⁴⁶

2.10.3 Projects and criticism

After 1750, architects, scientists, hommes de lettre, doctors, and engineers were increasingly involved in discussions on architectural projects of civic and public interest. In 1765, Pierre Patte published a folio entirely dedicated to the result of the competition held for the location and design of Place Louis XV in Paris. The work assembles the individual proposals and offers a systematic vision of the possible future embellishment of the City on a single plan. The publication of individual proposals and counterproposals related to particularly crucial architecture and urban planning projects constituted a genre of its own, the proposals were topics of frenetic public speculations. Series of memoirs, observations, critiques debating the philosophical, technical, aesthetic or political and social issues raised by these projects also appeared.

By mid-century, the embellishment of Paris and the termination of the Louvre were being discussed by the likes of Voltaire in *Des embellissements de Paris* (n.d.), La font de Saint Yenne, in *A l'ombre du Grand Colbert* (1756) and Bachaumont, in *Mémoire sur le Louvre* (1749). The construction of Sainte-Geneviève placed architects and engineers in fierce opposition regarding the relative importance of formal and structural logic in design, with Soufflot, Perronet, Gauthier on one side, and Patte,

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Viel and many other architects on the other, engaging in public confrontations. The design of hospitals was also a matter of substantial debate involving not only architects, but doctors, scientists and politicians. Publications included Mémoires sur la nécessité de transférer et reconstruire l'Hotel-Dieu de Paris, suivi d'un projet de translation, by Jean Baptiste Le Roy in 1785, Jacques Renée Tenon’s Mémoire sur les hospitaux de Paris of 1788 and Condorcet's Mémoire sur les hospitaux, in which the principle of public consultation was first introduced.

In the 1780's and 1790's, numerous projects and ideas for civic monuments, public place, and other public works were also published. Bernard Poyet for instance, wrote numerous works, including Mémoire sur la nécessité d'entreprendre de grands travaux publics pour prévenir la ruine totale des arts en France et pour occuper d'une manière utile les artistes et les ouvriers de la capitale, of 1790, Projet pour employer quarante mille personnes à la construction d'une place dédiée à la nation, and Projet de cirque national et de fêtes annuelles, of 1792.

These works were not only witness to a reorientation of architectural preoccupations towards topics of more public interest, but also embodied by


their very nature, genre and origins, what has been recently labeled the emergence of the public sphere at end of the eighteenth century.49

2.11 The Historicization of Architecture and the Relativity of the Rules for the Orders

The relativization of classical architectural norms in the eighteenth century was in large measure related to the emergence of a new historical consciousness. We have already surveyed the publications of archaeological works linked to the architectural profession and the Académie; now, we turn our attention to the development of works leading towards historical knowledge *per se.*50

2.11.1 History of antiquities

Buildings and monuments have played a role in the historiography of empires, peoples, and nations since antiquity. In France, architecture was discussed in chronicles, guides, descriptions and histories before it began to be studied in specialized treatises. Indeed, the very first work to be published in France on an architectural subject was not a professional book, but a guide and description of the medieval antiquities of Paris by a humanist scholar. *La fleur des antiques et singularitez et excellence de la*


50 The development of historical consciousness in the second half of the eighteenth century and its impact on architectural thinking has been investigated by P. Collins in "The Influence of Historiography", in *op.cit.*, (1985) p.29–41, and more recently by A. Vidler in *op.cit.*, (1987), "Part Two: The Interpretation of History".

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plus que noble et triomphante ville et cité de Paris, by Gilles Corrozot appeared in 1532. Such descriptions of Paris and its medieval building were extremely popular. This work in particular was reedited not less than twelve times in the sixteenth and seventeenth centuries. André Duchesne's *Recherches des villes, châteaux, et places remarquables de toute la France*, which appeared in 1610, was reissued eight times. Jacques Dubreuil, André Colletet, André Marolles, André Sauval and Germain Brice published similar books in the seventeenth and eighteenth centuries. *L'histoire et recherche des antiquités de la villes de Paris* by André Sauval for instance, offered systematic updating of the information on antique and modern Paris between 1650 and 1724.

In the middle of the century, series of descriptions and histories of the medieval religious buildings of France began to appear. They were primarily realized by the religious of Saint-Maur, a group of benedictine scholars led by the famous Jean Mabillon officially responsible for the historiography of the monarchy. Abbé Rouillard, Doublet, Bergier, and Pommeraye wrote histories of the Sainte Chapelle, the Church of Saint-Denis, the cathedral of Chartres and Saint-Ouen de Rouen. The most elaborated works in this series were published in the eighteenth century by Bernard de Montfaucon, and include *Les monuments de la monarchie française* (1729–35) and *L'Antiquité expliquée* (1716).51

Most of these works considered architecture as simply part of the context of the history of the monarchy. It was only in the eighteenth century that the idea of a history of architecture really took form.

2.11.2 The emergence of the history of architecture

It is believed that Architecture Françoise, written by Jacques-François Blondel between 1752 and 1756, contained the first text on the history of architecture published in a French treatise.\textsuperscript{52} The text draws from Vitruvius, and ancient and biblical history, as well as from the works of French historians of medieval antiquities, and first hand knowledge of modern architecture. It provides a story of architectural magnificence in the context of the succession of empires since the origin of man, but it does not build into a real history of architectural forms.\textsuperscript{53}

The first explicit attempt to make a history of architectural forms comes from an amateur and antiquarian, A.C.P.M. Caylus, presented in his Recueil d'Antiquités égyptiennes, étrusques grecques et romaines in 1752.\textsuperscript{54} In his introduction, Caylus explains that instead of relying on the writing of ancient historians, he intends to write a history of art on the basis of his observations on the different manners and styles in art. Wincklemann, attributed with the foundation of philosophical art history, acknowledged the importance of Caylus in a french edition of his Geschichte der Kunst des

\textsuperscript{52} In fact Johann Bernhard Fischer von Erlach's bilingual work Entwurf einer historischen architektur ou Essai d'architecture historique was published in 1721. This work included the first fully illustrated comparative historical study of monuments of antiquity and the modern times including buildings of Egypt, China, and Constantinople among others.

\textsuperscript{53} In fact J.F. Blondel's history was very much inspired by Charles Rollin's section on the history of architecture included in his Histoire Ancienne, which began to appear in 1730 and which, together with sections on painting, sculpture, poetry, music, philosophy, agriculture and commerce constitute his greatest innovation. See F. Haskell, op.cit., (1993), 202–203.

Altermuts of 1764. The same year, Julien David Le Roy published his Histoire de la disposition et des formes que les Chrétiens ont donné à leurs temples. This work, which is also incorporated in the 1770 edition of Les Ruines des plus beaux batiments de la Grèce, proposes a genealogical interpretation of architectural forms. In this book, history and its dynamic provides the substance of a new architectural theory.

2.12 Encyclopedism and the Disintegration of the Vitruvian Tradition

Between 1650 and 1800, the Vitruvian tradition was undermined by the formulation of new problems of design and planning, and numerous alternative approaches to architecture. The expansion of the field of architecture, and the diversification of points of view were particularly manifest in the encyclopedic discourse which emerged during this period. The first signs of encyclopedism are perceptible in the proliferation of dictionaries and lexicons which began in the seventeenth century. Not surprisingly, the first work of that type was realized within the Académie by André Félibien in his Principes de l'architecture of 1676. It was soon followed Charles Augustin d'Aviler's Dictionnaire d'architecture which appears as the second volume of his Cours d'architecture, in 1691. More specialized dictionaries also began to appear in the eighteenth century such as Philippe de La Hire's Nomenclature of carpentry, in 1702, François Amédé Frézier's dictionary of stereotomy, in 1737, Desgodets and Goupys

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work on legal terminology related to building construction, in 1740, Bernard Forest de Bélidor's definition of the vocabulary of the engineer, in 1755, and Schabol's dictionary on gardening, published in the 1777 edition of Dezallier d'Argenville's treatise.

Encyclopedias were the most global and relativist type of dictionary. Their purpose was not only to provide general definitions of terms, but also to provide a universal account of knowledge and of points of view. Their were subdivided into constellations of articles and small manuals organized in alphabetical order.

Diderot and d'Alembert's Encyclopédie for instance, contained 372 articles dealing with architectural topics written by authors such as Jacques-François Blondel, Jaucourt, Schabol, Sulzer etc.57 Panckouke's Encyclopédie méthodique des arts et métiers, published in the 1780's represented the ultimate form of development of the architectural encyclopedia in the eighteenth century. Quatremère de Quincy, who was put in charge of the coordination of the project, claimed that the work contained the equivalent of two thousand books dealing extensively with architecture.58

The atomization of architectural knowledge proposed by the encyclopedic model had a disruptive effect on the traditional format of treatises. Jacques-François Blondel's Cours d'architecture civile, which appeared between 1771 and 1777 was the most complete didactic work of the time. It embodied the sum of Blondel's forty years of teaching at the Écoles des Arts and the Académie Royale. The Cours d'architecture addressed for the first time the three fundamental aspects of architecture;


58 "si nous remplissons la tâche que nous nous sommes donnée, nous aurons lieu d'espérer que cet ouvrage pourra tenir lieu de plus de deux mille volumes," in J.C. Quatremère de Quincy, Dictionnaire d'architecture. 3 vol., (Paris, 1788–1725) vol.1, p.i, part of Panckoucke's Encyclopédie Méthodique. On this and the particular impact of encyclopedism on architectural theory see Lavin op.cit., (1994).
decoration, distribution and construction. The section of construction was written by Pierre Patte. The book also included sections on garden design, painting and sculpture, and was conceived as a collection of articles on particular subjects, with no real effort made to unify them under a single theoretical perspective.

Perhaps the most representative treatise affected by the encyclopedic model of organization of knowledge was Pierre Patte's *Mémoires sur les objets les plus importants de l'architecture* of 1769, a series of memoirs on quite unrelated topics including the five orders, the structural reinforcement of entablature, and urban design. This book, according to Françoise Choay, is a *traité en éclats*,\(^\text{59}\) and shows the final disintegration of the traditional Vitruvian treatise.

The *Encyclopedia* also constitute a culminating point in the development of universal access to architectural knowledge in early modern society. As such they constitute an advanced form of expression of the relativization of discourse at the end of the eighteenth century.

### 2.13 Further Indexes of Relativization

#### 2.13.1 The quantity of books

The encyclopedic ambitions formulated by Quatremère de Quincy were not purely rhetorical. Indeed the production of architectural discourse between 1500 and 1800 in France alone generated not less that two thousand publications.\(^\text{60}\) These works dealt with a vast array of subjects and problems

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\(^{59}\) "Le procès de déconstruction de la figure du traité sera illustré par le *Mémoires sur les objets les plus importants de l'architecture* publié en 1769", in Choay, *op.cit.*, (1980), 261–272.

for which Vitruvius had offered no answers. It is interesting to note that the two critical moments in the process leading to the dissolution of the Vitruvian tradition — post-1650 and then post-1750 — correspond to the intensification of publication activity in France. Our recent research on the evolution of architectural book publishing in France has identified significant accelerations in the rhythm of architectural book production during these periods. For instance, before 1630 the average number of architectural publications that appeared every ten years varied between five and ten titles. This rhythm increased gradually to reach approximately 40 titles published between 1640 and 1650, a pace which remained constant until 1670. From 1670 until 1690, a period corresponding to the creation of the Académie Royale d'Architecture and to one of the most intense episodes of the Querelle des anciens et des modernes, we count 135 publications; 55 titles between 1670 and 1680, and 70 titles from 1680 to 1690. A similar pace of production was maintained until the 1750's, when there was a sudden spectacular increase to about 140 architectural publications. This level of production was maintained until the 1780's when a peak was reached between with nearly 160 titles. Then, during the decade following the Revolution of 1789, production dropped to approximately 100 pieces.

On the whole, the development of book production in the seventeenth century may be associated with the evolution of royal patronage. Numerous series of prints and books recording buildings, gardens, and cities of the kingdom were aimed at both an internal and foreign distribution and representation. The institutionalization of professional education for architects and military engineers, and the creation of academies also encouraged the development of specialized literature. By contrast, the multiplication of publications and the metamorphosis of the discourse in the

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61 See D. Bilodeau, _op.cit._, (1982).
eighteenth century were related to the increasing implication of amateurs and people of all social classes and professional origins in public architectural discussions.

2.13.2 The publication of the discourse

This production of architectural publications was concentrated in Paris. Between the early 1500's and 1800, no less than 300 Parisian publishers issued approximately 1750 titles. Most of them undertook only one or two books dealing with architectural topics during their entire commercial career. These minor producers were legions and accounted for close to 60% of the global production. They represented an increasingly diffused market which indicates the relative absence of a direct coercive power entirely controlling the production of the discourse.

On the other hand, the remaining 40% of the market was controlled by a minority of publishing companies, (approximately 10 %), connected in one way or another to the state apparatus. The most important of these was the Imprimerie Royale itself, with at least 107 publications. Most of the other publishers counted between 6 and 18 books to their credit. J.B. Coignard, the official editor of the French Academy for instance, published some of the most remarkable and influential treatises of his time, including Claude Perrault's translation of Vitruvius (1673) and Ordonnance des cinq espèces de colonnes (1683), Antoine Desgodets' Les édifices antiques de Rome (1682), André Félibien's Principes de l'architecture (1676), Charles Augustin d'Aviler's Cours d'architecture (1691) and Cordemoy's Nouveau traité de toute l'architecture (1704).

The most important private publishers of architectural books of the seventeenth and eighteenth centuries in Paris were François Langlois,
books), Pierre, Jean and Pierre Jean Mariette (37 books), and Charles Antoine Jombert (84 books) – who actually formed a dynasty. François Langlois, born in Paris in 1600, was a book and print dealer, and was very active in the art market. He was adviser to Charles I of England, for whom he often purchased artworks. After his death, his business went to the Mariette family. Pierre, Jean and Pierre Jean Mariette established a reputation, not only in the book and print business, but also as engravers, amateurs and art and architectural critics. Pierre Jean is famous for his implication in the Greco–Roman controversy about the origins of classical architecture, which also involved the great architects and archaeologists Giovanni Batista Piranesi and Julien David Le Roy.

Charles Jombert, who was by far the most prolific architectural publisher of the century also combined the activities of books and prints dealer. In addition to his official appointment as "libraire et imprimeur du roi pour l'artillerie et le génie", Jombert had bought the Mariettes' stocks and taken up their business. Active between 1730 and 1790, he reissued many of the works first published by the Mariettes as well as many new titles, which he systematically donated to the Académie Royale d'Architecture. The Mercure de France regularly reviewed the works coming out of his press; furthermore his shop seems to have been one of the most important centre of distribution of architectural books in Paris in the second half of the eighteenth century. Jacques–François Blondel, in his catalogue of the best books on architecture, wrote in 1754: "ces ouvrages se trouvent pour la plupart dans nos bibliothèques publiques... ou enfin chez Charles Antoine Jombert rue Dauphine à Paris."

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62 See H.J. Martin, op.cit., 705.


64 J.F. Blondel, op.cit., (1754), 83.
2.13.3 The geography of the discourse

The provincial publications constituted a relatively marginal contribution to the mass of titles issued before 1800, with a total of less than fifty titles distributed in almost as many cities; including in the sixteenth century La Rochelle, Lyon, Orléans and Toulouse, in the seventeenth century Arras, Bordeaux, Bourges, Caen, Castres, Chambéry, Grenoble, La Fleche, Le Mans, Metz, Reims and Rouen and in the eighteenth century Strasbourg, Dijon, Aix, Avignon, Brest, Lunéville, Montpellier, Nancy, Nantes, Nimes, Reims and Trève. Their extreme dispersion illustrates by contrast the centralized and metropolitan character of the discourse in France during this period.

The foreign market was more prolific, with approximately 200 on 2000 items. In the sixteenth century Antwerp was the main centre of production of French books outside France. In the seventeenth century, works began to appear in London, Frankfurt, Amsterdam, Leiden, The Hague, Geneva, Stockholm, and Brussels. Finally after 1680, and until the end of the eighteenth century, the geography of architectural book publishing expanded towards the eastern parts of Europe in German and Italian cities; Berlin, Breslau Hambourg, Hanover, Leipzig, Munich, Nuremberg, Phillipsburg, Riga, Vienna, Neuchatel, Parma, Rome, Turin, Vicence, and Venice.

While the geographic distribution of the French architectural discourse may merit a detailed analysis, some general observations may already be made in relation to the evolution of the Parisian press. The transformation of the political map of Europe, and especially of the relation between France and other countries, conditioned the publication of French books abroad. For instance, the signature of the Versailles treaty in 1763
opened the way for the publication of French books in Prussia. French books also constituted a lucrative market, which favoured commercial competitions between publishers. Pieter Coecke's French edition of Serlio's Books, published in Antwerpen in 1545 appeared almost simultaneously with the Parisian edition, and was the result of much competition.\(^\text{65}\)

After the Renaissance, and with the gradual centralization of intellectual, commercial, and political life in Paris, the provincial production of books on architecture became marginal. Books that appeared in provincial cities and abroad were often works that could not be published in Paris, sometimes for political reasons. For instance, Androuet Du Cerceau and Bernard Palissy were forced to publish some of their works respectively in Orléans and La Rochelle because of their allegiance to protestantism.\(^\text{66}\) Hugenots also found publishers sympathetic to their cause in the Low Countries, and in some German and Swiss cities.

The precise origin of a book is sometimes to identify, even when the city of publication is indicated. As recent historical research has clearly shown, the names of certain foreign cities were often used as a strategy to

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\(^{66}\) See Pérouse de Montelos, op.cit., (1989), 121, "L'entreprise des Plus excellents bastimens de France (1576–1579)... est menée dans des conditions difficiles dont l'auteur se plaint entre 1560 et 1575, à partir de Montargis ou le Huguenot a trouvé refuge et qu'il ne quitte qu'avec appréhension pour aller dessiner un de ces batiments."
clude the censorship system of the absolute state.\textsuperscript{67} For instance, many of Sebastien Vauban's works on military architecture were printed anonymously in the Hague, because, although they were no longer officially considered state secrets at the time they appeared, their publication was still not permitted in France. Other works which could not be officially sanctioned, were tolerated under similar guise, like the famous Observations sur l'Architecture (1765) by l'Abbé Laugier, which indicates La Haye on the title page.\textsuperscript{68}

In general, the territorial expansion of the production of architectural discourse can be interpreted as a demonstration of the growing autonomy of the discourse in relation to the official structures of production and control. This especially true in the eighteenth century, with a high concentration of production of French discourse in London (31 titles), Amsterdam (49 titles), The Hague (25 titles) and Italian cities. Piranesi's bilingual work on the temples of Paestum (1778) was published in Rome, d'Hancarville sumptuous books on Lord Hamilton's collection of antiquities (1766–67) was issued in Naples, Vingboon's French edition of his Oeuvre d'architecture (1715) appeared in Leiden, and William Chambers' bilingual edition of Dessins des édifices, meubles, habits et ustensiles des Chinois (1757) was produced in London.\textsuperscript{69}


\textsuperscript{68} For a discussion on the condition of publication of Laugier's work and his relation to C.G. Malesherbes (the state supervisor of the printing press) see, W. Herrmann, op.cit., (1962) chap.I.

\textsuperscript{69} On Chambers and his published works see especially John Harris, Sir William Chambers, Knight of the Polar Star, (London, 1970).
2.13.4 The relativization of norms as structural phenomena

The form and content of the architectural discourse in France was certainly strongly conditioned by the Ancien Regime's institutional structures, and politics of Royal magnificence. But the discourse was also increasingly affected by other factors, such as, different social and professional values, and even commercial interests. The system of privileges and censorships which was imposed by the royal administration on the publication of architectural discourse was certainly constraining. However it was also extremely supportive, and became increasingly flexible, allowing major private intellectual initiatives and commercial enterprises to flourish in a business which certainly helped to expand and diversify the content of the architectural discourse. This shows to what extent the relativization of the discourse on architecture was, in fact, a process integrated in the economy, and implicitly sanctioned by the political structure of the Ancien Regime, especially in the eighteenth century. This also explains to a certain extent the emergence of this process of relativization as a new paradigm for thinking and debating architectural issues.
Chapter 3

The Hegemony of Antique Models in Roland Fréart De Chambray's *Parallèle de l'architecture antique avec la moderne* (1650)

3.1 Roland Fréart de Chambray and the Emergence of a Normative Discourse on the Orders

The creation of the *Académie Royale d'Architecture* in 1671 corresponded to the institutionalization of a normative tendency in architecture that had emerged earlier in the seventeenth century. Efforts to establish official norms of beauty in the arts began under the ministry of Richelieu with the foundation of the *Académie Française* in 1635. The creation of this institution was followed by the opening of the *Académie de Peinture et de Sculpture* in 1648, the *Académie de Danse* in 1661, the *Académie des Inscriptions et Belles Lettres* in 1663, the *Académie des Sciences* and the *Académie de France à Rome* in 1666, the *Académie de Musique* in 1669, and finally by the *Académie d'Architecture* in 1671. A specialized normative discourse on architecture began to take form in this institutional context before 1671. The first manifestation of this tendency was the publication of Roland Fréart de Chambray's *Parallèle de l'Architecture Antique avec la Moderne* in 1650.

3.2 Regulating Design Practice

In 1640, Roland Fréart de Chambray and his brother Paul Fréart de Chantallou were sent to Rome by the French Royal Administration. Their mission was to bring back to Paris the best artists of the time, as part of Richelieu's vast project for the edification of France as the new centre of the
arts. They were accompanied by artists and antiquarians in charge of making drawings and taking casts of antique fragments of sculpture and architecture. This material was intended to be used eventually in the renovation and embellishment of the buildings of the monarchy. In 1650, Fréart de Chambray reported:

"... nous apportames une grande diligence à faire former et à ramasser tout ce que le temps et l'occasion de notre voyage nous put fournir des plus excellents antiques, tant d'architecture que de sculpture, dont les principales pièces étaient deux grands chapiteaux, l'un d'une colonne, et l'autre d'un des pilastres angulaires du dedans de la Rotonde, que nous choisissimes comme les plus beaux modèles corinhiens qui soient restés de l'Antiquité : deux médailles d'onze palmes de diamètre tirées de l'Arc de triomphe de Constantin, soixante et dix bas reliefs de la colonne Trajane; et beaucoup d'autres d'histoires particulières quelques uns desquels furent mis en bronze dès l'année suivante: d'autres furent employés en manière d'incrustation au compartiment de la voûte de la grande galerie du Louvre auxquels Monsieur le Poussin les introduisit ingénieusement et avec beaucoup d'adresse et de considération, pour se conformer à la demande qu'on lui fit d'un dessein, non pas le plus magnifique ni le plus superbe qu'il put composer, mais d'un ornement dont l'exécution fut prompte, et d'une dépense modérée, eu esgard au temps, et à l'humeur impatiente de notre nation." (Fréart 1650, Epistre)

In the mind of Fréart de Chambray, those antique fragments of columns and entablatures constituted a treasury of forms to be copied and used, like precious and rare objects, in new compositions. But they were also called on to serve as instruments in a profound movement of reform intended to purify architecture of its mannerist excesses, and to establish the authority of antiquity as a foundation for rules in architecture. The first theoretical result related to this project was the publication of *Le Parallèle de l'architecture antique avec la moderne* by Fréart de Chambray in 1650.
The work was illustrated by the painter Charles Errard, member of the Académie Royale de Peinture et Sculpture and future director of the Académie de France in Rome, and realized with the support of the Surintendant des Bastimens, Mgr. De Noyers.

3.3 Norm and Abuse

In this work, Fréart de Chambray criticized the abusive originality of mannerist architecture. He also questioned the unregulated aspects of the buildings and decorations stemming from the work of artisans. Fréart underscored that, in artisans' minds, the practice of imitation was not held in much esteem. It was generally associated with an early phase of apprenticeship; mature artisans were expected to realize original motives and inventions.

According to him, although freedom of invention seemed to be a condition for the production of good art, the search for creativity in architecture should not be a reason for continually reinventing the basic elements of architecture. Some architects, he wrote:

"pensent que l'imitation est un travail d'apprentis; et que pour être maistres il faut nécessairement produire quelque nouveauté.... ils croient qu'en fantastiquant une espèce de corniche particulière, ou tel autre chose, ils ayent fait un ordre nouveau, et qu'en cela seulement consiste ce qu'on appelle inventer..." (Fréart 1650, p.2)

Fréart did believe that there was place for invention in architectural composition. He did not propose to reduce architecture to a technical exercise of reproduction. But he thought that in order to provide some firm basis for the improvement of the architectural discipline, some standards for
the architectural orders should be defined. Fréart saw architectural composition as a combination of received elements, allowing a balance between invention and imitation.

Voyez", he says, "le Panthéon, ce merveilleux et incomparable édifice qu'on void encore aujourd'hui à Rome... c'est bien une invention de celui qui l'a bâti même s'il n'a rien changé à l'ordre corinthien dont il est entièrement composé". (Fréart 1650, p.3)

But Fréart saw the design of the orders of architecture differently from the composition of whole buildings. According to him, the orders of columns represented only "les détails de l'architecture", and it was precisely because they were only details that Fréart believed they could be standardized. In order to be accepted by architects, however, standards needed to be defined on a very sound basis.

The trend toward normalization that developed in France in the seventeenth century paradoxically transformed the orders of architecture --- "les détails de l'architecture" --- into a subject of crucial importance and deep philosophical debate. Indeed a consensus about the rules of proportions for the orders could only be contemplated if those prescriptions were proved to embody universally acknowledged values. For Fréart, only a few antique examples of architectural orders seemed to possess enough authority to figure as universal models.

3.4 The Purification of Architecture and the Authority of Antique Buildings

Anticipating the work of such eighteenth century theoreticians as Germain Boffrand, Marc—Antoine Laugier and Julien David Le Roy, Fréart derr Chambray proposed to reduce the number of orders to three, corresponding
to the original Greek orders; the doric, the ionic and the corinthian. According to him;

"le dorique, l'ionique et le corinthien...contiennent non seulement tout le beau mais tout le nécessaire de l'architecture, n'y ayant que trois manières de bâtir; la solide, la moyenne, la délicate... Tellement que ces trois ordres fournissent toutes les manières de bastir, sans qu'il soit besoin de recourir au toscan, ny au composite que j'ai toutes deux reservez exprés sur la fin de ce traitté, et détachez de ceux-cy comme supernuméraires et presqu'inutiles..." (Fréart 1650, p.2)

In fact, the Greek and the Roman orders formed two distinct categories of elements and occupied different sections of the book. The former were regarded as essential, while the latters were merely tolerated as conventions. Ultimately, Fréart wished to reduce the ensemble of the principles of architecture to a minimum of essential ideas, as he thought was the case in geometry and mathematics.

"...l'excellence et la perfection d'un art, ne consiste pas en la multiplicité de ses principes; au contraire les plus simples et en moindre quantité le doivent rendre plus admirable, ce que nous voyons en ceux de la géométrie, qui est cependant la base et le magasin général de tous les arts..." (Fréart 1650, p.2)

Le Parallèle de l'architecture antique avec la moderne did not provide such a fully rationalized system of principles. Instead, it contained, on the one hand, a collection of fragments of Roman antique columns, and on the other hand, the orders designed by modern architects and published in the main Italian and French architectural treatises of the sixteenth century. For each order of columns, Fréart illustrated his preferred antique examples,
followed systematically by the different solutions proposed by modern authors, including Palladio and Scamozzi, Serlio and Vignola, Barbaro and Cataneo, Alberti and Viola, Philibert de l'Orme and Bullant (see fig. 3.1). The rules given by Vitruvius were also discussed in relation to the different cases, but they were not illustrated, thus never outdoing the authority of the ancient buildings. Indeed the buildings of antiquity were considered as the ultimate source of rules in architecture.

"je suis aller puiser dans l'Antique mesme avant que d'examiner ce qu'en écrivent les Autheurs modernes... ils sont les meilleurs livres, leur beauté est universellement reconnue depuis deux milles ans, c'est auprès d'eux qu'il faudrait faire ses études." (Fréart 1650, p.5)

Moreover, he thought that architects should consistently and precisely imitate both the proportions and the mouldings of antique models. He wrote;

"il faut suivre précisément les modénatures et les proportions des édifices antiques, qui ont le consentement et l'approbation universelle de ceux de la profession." (Fréart 1650, p.61)

Beginning with the doric order, Fréart proposed the model provided by the column of the Theatre of Marcellus in Rome.
3.1 Roland Fréart de Chambray, Parallèle de l'architecture antique avec la moderne, (Paris, 1650). Parallel of the doric orders by Palladio and Scamozzi.
"je ne veux suivre que l'exemple antique tiré du Théâtre de Marcellus, comme le plus régulier de tous au consentement universel de ceux de la profession, et si conforme à ce que Vitruve écrit des proportions générales de cet ordre"... (Fréart 1650, p.12)

A fragment taken from the Diocletian Baths, and another borrowed from the Church of Santa Maria in Albani, were also suggested. New drawings of these elements made directly in situ by Errard were included in the Parallel. For the ionic order, Fréart referred to the Temple of Fortuna. But since the original monument had suffered many injuries over the centuries, the plate was engraved after a drawing made by Pyrro Ligorio in the sixteenth century.

"... (ce dessins) a donné moyen de vérifier beaucoup de mesures qu'on sauroit quasi prendre aujourd'hui et de redonner à la corniche ses ornements propres, qui sont si gatez de la vieillesse, qu'il est extrêmement difficile de les discerner. C'est donc le modèle que je suiveray et qui servira ici de règle pour cet ordre..." (Fréart 1650, p.35)

This fragment was, according to Fréart, the only model used by the great architect and theoretician Andrea Palladio. This, no doubt, in his eyes, confirmed the great quality of the element. For the corinthian order, Fréart selected the columns of the Portico of the Pantheon, and those of the frontispiece of the Temple of Nero and the Bath of Diocletian. Finally, for the tuscan and composite orders, Fréart proposed to imitate the Trajan column, the column of the Arch of Titus in Rome, and those of the Arch of the Lions in Verona.

Of course de Chambray was not the first theoretician of architecture to perceive antique architecture as a source of rules. Antique models were used in a majority of treatises dealing with the problem of the rules of the orders during the Renaissance. Serlio, Scamozzi, Palladio, Vignola, and in
France, Philandrier, Philibert de l'Orme and Jean Bullant, all made extensive use of ancient fragments. Their approach was relatively eclectic, and they often used only parts of fragments taken from different buildings and reassembled in order to create their own collection of rules. Most authors also relied on Vitruvius for particular prescriptions. Yet none of these authors proposed to adopt integral orders of columns directly copied from antique buildings to constitute a system of the five orders. Fréart was unique and radical in this respect.

3.5 The Relative Authority of Modern Precedent Rule Systems

These antique fragments represented for Fréart "le fanal et la bousolle de la vray architecture." (Fréart 1650 p.6) He considered a direct appreciation of the remains was necessary for the extraction of rules: according to him, those who had measured these monuments had often made mistakes and could not be completely trusted. "Cela doit nous avertir de ne croire pas légèrement ce que les livres nous disent quant on a moyen d'aller à la source s'éclaircir mieux de la vérité." (Fréart 1650, p.5)

In fact, the accuracy with which modern architects had measured and imitated antique architecture was the main criteria for judging the relative value of their rules. For instance, having presented his three canonic antique cases of doric orders, Fréart introduced the rules proposed by modern authors:

"Passons maintenant à la démonstration occulaire du chapitre précédent, par le Parallèle des architectes que j'y rapporte, dont je vais examiner les desseins au paragon de nos trois porfils antiques, afin que selon le plus ou moins de conformité qu'ils auront à ces modèles originaux, on vienne
à juger de leur mérite et voir l'estime qu'on en doit faire."
(Fréart 1650, p.22)

This is how it was decided for instance, that Palladio and Scamozzi should come first in the list of the modern authorities.¹

"C'est par cette considération que j'ai tiré comme hors du pair des autres maîtres, Palladio et Scamozzi, lesquels s'étant proposé l'imitation de l'architecture Antique, par l'étude de ses admirables monuments qui restent encore dans la vicelle Rome, ont suivi une manière beaucoup plus noble et des proportions plus élégantes que ceux de l'échole de Vitruve."
(Fréart 1650, p.22)

Fréart ranked Serlio and Vignola together in second position. Both had studied antique architecture and used specific fragments for different parts of their orders. Both had also modified the proportions of the originals. But while Serlio had adjusted his proportions using the rules of Vitruvius, Vignola had preferred to modify them on the basis of his own authority. This tended to make Serlio superior to Vignola.

"Il ne serait pas juste de tenir en cet examen la même rigueur à Serlio qu'à son compagnon, parce que s'étant proposé de suivre Vitruve, qui est un auteur célèbre et très vénérable aux architectes, il s'en est louablement acquitté; au lieu que Vignole qui avait pris un autre chemin, à la vérité plus noble, et le même que je tiens ici, ne s'y est pas sceu conduire sans se fouroyer. Le profil dorique qu'il donne est tiré du premier ordre du Temple de Marcellus, le digne exemple de cet espèce qui se rencontre parmy les antiquitez de Rome, duquel j'ai fais choix aussi pour être le premier modèle de ce recueil; avec cette différence néanmoins que j'ai observé précisément toutes les mesures et les sacômes de

¹ On French palladianism see Michel Gallet, "Palladio et l'architecture française dans la seconde moitié du XVIIIe siècle," Monuments historiques de la France no.2 (1975), 43-55.
l'original, qui dans cet auteur s'y trouvent bien altérées..."
(Fréart 1650, p.24)

Finally, Jean Bullant and Philibert de l'Orme, who were the only French architects included in this parallel, came at the end of the list, and were basically treated as mere commentators of Vitruvius.2

The series of modern examples illustrated in the Parallèle played, in fact, an important role in Fréart's argumentation about the superiority of antique concrete remains over modern theoretical systems. They also allowed Fréart to justify his admiration for specific models as a function of an historical consensus as indicated in the architectural treatises written by the most celebrated architects of the past. In a sense, these authors had been selected and convened in order to indirectly substantiate Fréart's idea about the the superiority of ancient built sources. It could also be argued that Fréart was merely attempting to reinterpret and justify an emerging design practice involving direct quotations from antique monuments. In fact, his dogmatic position was anchored in a profound system of beliefs based on Neoplatonic premises.

3.6 The Idea and its Instantiation in the Fragment

The normative approach which developed in mid-seventeenth century art theory found in Neoplatonism a powerful framework of philosophical justification. Most theoreticians of art who had been inspired by neo-

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"idea"³, a pure, intellectual, abstract entity representing the essence of the
work of art, from the object itself. Concrete material artworks appeared only
as some clouded and distorted reflection of "ideas". In the Renaissance,
artists' "ideas" were believed to be inspired by the Supreme Being, and were
given a metaphysical status. In the seventeenth century, and especially in
Giovanni Bellori's writings, this status was revised. "Ideas" were said to
originate from sensory perception, and more specifically, from the
observation of nature. The "idea", also called "la belle nature", was to be
extracted from empirical reality. This applied very well to painting and
sculpture; in architecture however, the observation of nature was replaced
by the study of antique buildings, preferably Greek, which figured as quasi-
natural entities embodying, in particular, the "original ideas" of the orders
of architecture. Seventeenth century Neoplatonism combined an abstract
analytical ideal with an empirical and quasi scientific approach, but without
completely rejecting the metaphysical dimension of the Renaissance and
mannerist doctrines of the idea.

Fréart de Chambray was not a sophisticated scholar like Bellori. But
as an amateur, patron and diplomat involved in cultural transactions between
Rome and Paris, he was aware of the evolution of contemporary discourse
on the arts, and recognized the relevance of Neoplatonic principles for
normative speculations. This certainly emerged from his later writings on
painting, which were strongly influenced by Bellori.⁴ But as a close friend

³ The best survey on the history on the concept of "idea" in art theory remains E.
Panofsky's classic study, Idea: A Concept in Art Theory, original German edition (1924), English
edition, (New York, 1968). Panofsky investigates in depth the tension between subject and object,
metaphysics and empiricism, idealism and naturalism embodied in the interpretations of the concept
of idea. Panofsky's study begins in antiquity and ends in the middle of the seventeenth century with
the emergence of a normative aesthetic in Bellori's writings. According to him, Fréart de
Chambray, Du Fresnoy and A. Félibien represent a particularly intolerant classicist position within
the normative position. (p. 244 and fn.24).

⁴ See, Panofsky, op.cit., (1968), 225.
of Poussin and translator of Palladio's *Quarto libri* in 1650, he had been exposed to the inner tension between the idealist and empiricist dimensions of Neoplatonism even before the publication of his *Parallèle*. If Fréart admired Palladio's respectful imitation of concrete antique fragments, he also knew his theory of harmonic proportions. But for Fréart, the relation between abstract rules of proportions and concrete building cases was problematical.

Fréart de Chambray dreamed of reestablishing the rules of the orders of architecture on the basis of their original Greek idea. He wrote;

"Je voudrais s'il était possible remonter jusqu'à la source des ordres, et y puiser les images et les idées toutes pures de ces admirables maîtres, qui les avoient inventez, et en apprendre l'usage de leur propre bouche." (Fréart 1650, p.2)

At the same time however, direct contact with the origins of the orders was deemed virtually impossible. The origins of the orders seemed irremediably lost in the abyss of time. According to him, a strict imitation of antique architecture constituted the only way to recover, or at least get close to, the original "regular ideas" of the orders. Regarding the doric order for instance, Fréart explains: "l'ordre dorique a été la première idée régulière de l'architecture...". According to Vitruvius "un temple dédié à la déesse Junon bâti dans la ville d'Argos par le prince Dorus fut le premier modèle de cet ordre, à l'imitation duquel les peuples voisins en dressèrent plusieurs autres..." (Fréart, 1650, p.8). Unfortunately these monuments have disappeared.

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But the real problem, Fréart believed, was that classical architecture, since its origins in Greece, had constantly degenerated.

"...sans doute, ils ont bien déchu à mesure qu'ils sont allez s'éloignant de leur principe, et qu'on les a comme transplantez chez les étrangers, ou ils ont dégénéré si notablement qu'ils seroient à peine reconnoissables à leurs auteurs." (Fréart 1650, p.2)

Thus time was a negative factor in the search for the original idea. Moreover, since Fréart did not have access to concrete cases of Greek architecture, he had to satisfy himself with Roman buildings. For him, therefore, their relative antiquity justified their choice as ruling examples.

The Roman fragments represented particular instances of species of beauty that could not be changed. Thus, in the process leading from the original idea to the best antique cases, a loss of perfection had occurred, but not a loss of essence. This, in a sense, explains why these antique fragments could not be dismantled and reassembled differently. They did not form collections of beauties, but, on the contrary, they offered truth manifestations of indivisible original ideas to be preserved in their integrity and cherished as pure treasury.

3.7 The Anatomy of an Idea: Between Authority and Experience

Even though the original idea of the orders seemed ultimately inaccessible, Fréart thought that a general definition of the orders must at least be attempted, and that a rigorous analysis of antique fragments was the best way to achieve that. According to him however, the very term "order" had not yet been clearly defined. He wrote;
"Il est assez difficile de déterminer précisément ce que le nom d'Ordre signifie chez les architectes. De tous les modernes il n'y a que Scamozzi qui ait pensé à en donner la définition... que c'est un genre d'excellence qui accroît beaucoup la bonne grace et la beauté des édifices sacrés ou profanes... Le père Vitruve l'appelle ordonnance, et ce nom est aujourd'hui beaucoup en usage chez les peintres quand ils veulent exprimer l'élégante composition d'un tableau... néanmoins ce n'est pas encore exactement l'intention des architectes, et Vitruve s'efforçant de nous l'expliquer, adjoute que c'est une commodité ou dispensation régulière des membres de l'œuvre séparément et une comparaison de toutes les proportions à la symétrie..." (Fréart 1650, p.6)

Fréart considered these definitions to be too vague to be of any use. He proposed to compensate for the lacunae in the canonical texts by an empirical analysis of concrete works. In order to define the orders, he wrote:

"il faut venir au détail et considérer la chose matériellement par chacune de ses parties, afin qu'elle touche davantage l'imagination, et nous forme distinctement son idée, qui est ce que nous devons chercher, car l'architecture ne consiste pas en des paroles, sa démonstration doit être sensible et occulaire.... Si nous voulons le [l'ordre] définir exactement, et en donner une intelligence bien expresse, il en faut faire comme une manière d'anatomie, et dire que la colonne avec sa base et son chapiteau couronné d'un architrave, frize et corniche forme une espèce de bâtiment qu'on appelle un ordre, puis que cela se rencontre généralement et de même suite en tous les ordres, dont la différence ne consiste qu'en la proportion de ces parties et en la figure de leurs chapiteaux." (Fréart 1650, p.7)

The diverse antique fragments which formed the basis of the normative framework elaborated by Fréart were indeed well illustrated in the Parallèle. The plates included a rendered perspective drawing of the fragments, recalling the tradition of anatomical illustrations and clearly
revealing the corporeality of the built model. Smaller geometric schemes were also included in the plates, providing a glimpse of the "idea" and prescriptions for their imitation.

If the authority of the particular antique fragments was founded on their antiquity and on a consensus from the experts, it was also dependent on a conviction that something from the original idea of the orders could eventually be recovered through empirical experience. Still, he wrote; "Je scay qu'il est libre à chacun d'estimer ce que bon lui semble des arts mixtes tels qu'est celui-cy, dont les principes estans seulement fondez sur l'observation et sur l'authorité des exemples, n'ont point de démonstration précise." (Fréart 1650, p.4)

The apparent rigidity of Fréart's system of rules, based on the imitation of antique canonical models, resulted from a tension between the idealistic and empiricist dimensions of seventeenth century Neoplatonism. This ensemble of fragments preserved an ineffable dimension due to this dual character which ultimately tended to elude a rational explanation and an absolute justification.
Chapter 4

The Authority of Precedent Rule Systems and the Continuity of the Vitruvian Tradition in François Blondel's *Cours d'architecture* (1675 – 1683)

4.1 François Blondel and the Function of the *Cours d'architecture*

The project of reform formulated by Fréart de Chambray in 1650 and supported by the Royal Administration, was given its full institutional expression through the creation of the *Académie Royale d'Architecture* in 1671 by Colbert. In 1675, François Blondel, the director of the Académie and its first appointed professor of architectural theory, wrote:

"il faut dépouiller l'architecture de ses ornements vicieux, retrancher les abus que l'ignorance et la présomption des ouvriers y ont introduit et l'enrichir de ces beautez naturelles et de ces grâces qui l'ont rendue si recommandable parmis les anciens". (Blondel 1675, preface)

The mission given to the Académie by Colbert is the establishment of "la belle architecture" as a system of rules once and for all, that could serve as a suitable instrument for the building policy of absolutism, and as a basis for the education of royal architects. François Blondel was a military engineer, a diplomat, and a professor of mathematics at the Académie Royale des Sciences. The fact that Colbert put him at the head of his new academy in 1671 shows to what extent the minister saw the establishment of a curriculum as a problem of the first order. Indeed Blondel was set to the task immediately, establishing one meeting per week for the members
to debate and define the nature of "le bon goût," and two meetings per week for instructions in the rules—"règlements"—generated by these debates. Lectures in the related fields of geometry, mechanics, hydraulics, fortification, perspective and stone-cutting were also given. Blondel's lecture on architecture were compiled in his *Cours d'architecture*, (see fig. 4.1) which was published in two volumes in 1675 and 1683. This work remained for the rest of the century the principal instrument of the academic doctrine.\(^1\)

Building upon Fréart's de Chambray's *Parallèle*, Blondel discussed and compared the rules given by Vitruvius and the main authors of the Renaissance. Blondel did not intend to define a new system of rules based on a personal synthesis, but relied essentially on a knowledge of precedents. However, contrary to Fréart, Blondel did not attribute a privileged status to the architectural remains of antiquity, and did not believed they should serve as a basis for the establishment of modern design directives. Instead, he relied mainly on past authoritative systems of rules and especially on Vitruvius' *Ten books*, which represented the only available written record of the rules of antique architecture.

As has been recently underscored by G.R. Smith, the *Académie*, in its first years of operation, and François Blondel in particular, tended to disregard the use of concrete building cases in general—ancient and modern—as potential source of rules. Indeed architects were appreciated not on the basis of what they had built, but on how lucid and functional their writings were for use in teaching. Architects of great stature in the fifteenth century, like Bramante, Sangallo or Sansovino and even the great names of the sixteenth century, were give no hearing because they had published nothing.

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COURS D'ARCHITECTURE
ENSEIGNE DANS L'ACADEMIE ROYALE
D'ARCHITECTURE
PREMIERE PARTIE.

OV SONT EXPLIQUEZ LES TERMES,
L'origine & les Principes d'Architecture, & les prati-
ques des cinq Ordres suivant la doctrine de Vitruve &
de ses principaux Sçäteurs, & suivant celle des trois
plus habiles Architectes qui ayent écrit entre les Mo-
dernes, qui sont Vignole, Palladio & Scamozzi.

DEDIE A V ROY.

PAR M. FRANCOIS BLONDEL DE L'ACADEMIE ROYALE
des Sciences, Conseiller Léteur & Professeur du Roy en Mathematique, Pro-
feisseur & Directeur de l'Academie Royale d'Architecture, Marechal de Camp
aux Armées du Roy, & Maistre de Mathematique de Monsieur le
Dauphin.

A PARIS,
De l'imprimerie de Lambert Roulland en la maison d'Antoine Vitré, rue du Foin.
Se vend,
Chez Pierre Auboin & François Clouzier, près l'hôtel de Monseigneur
le Premier Président, Cour de Palais, à la Fleur de Lis.
Et chez les mêmes sur le Quay des Grands Augustins, à la Fleur de Lis'or.

M. D. C. LXXV,
AVEC PRIVILEGE DV ROY.

And the more aberrant talents like Michelangelo and Borromini were altogether condemned not only because they flouted classical usage, and were not recorded in print but because their work could not be translated into any communicable form of prescription.²

The *Cours d'Architecture* was indeed conceived as a repertory of the rules of architecture formulated by the most significant theoreticians since Vitruvius. It was intended,

"à faire entendre quelles sont les pratiques les plus correctes pour l'employe des cinq ordres d'architecture commençant par celles de Vitrue, ... et donner les moyens de mettre en pratique ce que Vitrue et les plus habiles architectes modernes ont dit...". (Blondel 1675, Préface)

Thus the *Cours* included a detailed survey of the precepts formulated by Vitruvius, Palladio, Scamozzi and Vignola, and also used an extensive range of material borrowed from Serlio, Labacco, Barbaro, Viola and many others. The purpose of the work was not merely to provide a collection of rules: students were expected to compare the rules prescribed by the different authorities, in order to develop their own judgement.

"Pour rendre ce travail plus utile, nous allons ... examiner plus particulièrement leurs préceptes et les conférer l'un avec l'autre, afin de connaître par le rapport ou la différence de leurs sentiments ce qui peut être le plus universellement reçu ou rejeté dans leur pratique et nous former un goût" (Blondel 1675, Part 2, p.1 )

This strategy was meant to help extract from the classical tradition, elements of an eventual consensus on good taste.

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Still, in Blondel's mind, a complete consensus on an ideal system of rules remained ultimately inconceivable. The purpose of the Cours was limited to the definition of a general framework of acceptable design solutions for the orders, providing a system of reference and evaluation rather than a definitive solution to the problem of "la belle architecture". Thus the collection of precedent systems of rules studied by Blondel did not serve as a static collection of canonical models; rather they belonged to a dynamic universe of discussion and comparison leading toward an ideal which was not lost in antiquity but rather appeared as a modern intellectual goal. Indeed, contrary to Fréart de Chambray, Blondel's conception of the history of architecture was progressive, and recognized the positive contribution of numerous modern architects to the evolution of architecture.

"il ne faut pas se persuader que l'architecture aux premiers temps de sa naissance ait acquis ce degré de perfection qui se connoit encore à présent et qui ne se regarde qu'avec étonnement dans les restes de quelques uns des édifices anciens... il est bien plus raisonnable de croire qu'elle s'est avancée peu à peu... corrigeant ses défauts avec le temps et changeant dans ses ouvrages ce qu'elle reconnaît devoir être changée." (Blondel 1675, p.3)

Thus Blondel conceived his contribution to the evolution of architectural theory in retrospective terms, as an author building upon an existing tradition initiated by Vitruvius.³ 

³ It is interesting to note that Blondel's retrospective and cumulative understanding of architectural knowledge in the *Cours d'architecte* resembles the incremental conception of knowledge which, according to Thomas Kuhn, is characteristic of scientific text books. Furthermore, the way scientists sustain a conceptual model, according to Kuhn, is by addressing continuously standard and often esoteric problems, in order to refine their model. One can compare this attitude to the obsessive interest in the minutia of architectural proportions in academic design thinking in the seventeenth century. The systematic comparison of precedents constituted a standard thinking practice associated to the *a-posteriori* construction of a sense of tradition and continuity in research. See Kuhn, *op.cit.*, (1962).
4.2 The Reconstruction and Representation of a Vitruvian Tradition

Even though Blondel believed in the progress of architecture, and acknowledged the contribution of many modern authors to the development of architectural knowledge, Vitruvius remained for him the first authority on the orders. In this respect, his attitude embodied the position adopted officially by the Académie in its first meeting, when it was concluded: "Sa doctrine... est admirable en gros et à suivre sans s'en départir, aussi bien que dans la meilleure partie du détail."⁴

The 1673 publication of a new annotated translation of *Les dix livres d'architecture de Vitruve* by Claude Perrault for the Académie, had, as its objective, the reestablishment of the authority of the author of "les véritables règles du beau et du parfait."⁵ Undoubtedly Vitruvius was, for the seventeenth century, as for the preceding centuries, a writer of unique prestige. Vitruvius was still regarded as the father of the architectural discipline, and was acclaimed in such terms by nearly all writers of the time. Fréart de Chambray was an exception, refusing to acknowledge Vitruvius' role as a directing and regulating authority. He thought that Vitruvius' rules and their calculated regularity did not conform to the architectural practice of his time, and he preferred to prescribe the study of antique monuments.⁶

But this attribute of regularity was precisely what Blondel admired in Vitruvius; and it was also in respect to their relative regularity that the rules determined by the modern authorities were evaluated. Blondel basically regarded modern works as a contribution to the development of a yet

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⁵ Perrault, op.cit., (1673), Préface.
incomplete Vitruvian project. Still, the perspective of a progressive Vitruvian tradition was not a given; it had to be reconstructed and validated. First, Vitruvius's own system of rules for the five orders of architecture needed to be clarified.

Vitruvius had never in fact conceived a complete system. For him an individual order with its column, base and entablature, could not be dissociated from the category of temple in which its was originally used. Moreover, the information contained in Les dix livres d'architecture was not complete enough to allow a full reconstruction of the rules for the five orders. As Blondel explained:

"Nous n'avons aucun précepte de l'ordre composé dans Vitruve qui comme il se voit n'a pas cru que ce fut un ordre particulier et différent des autres n'étant fait que du ramos de leur parties ajustées agréablement ensemble." (Blondel 1675, p.10).

Still, Blondel insisted on making up a Vitruvian system of the five orders using the original text, as well as numerous indications included in the published commentaries of Philandrier, Barbaro, Viola, Labaco and others. Furthermore, he authorized himself to compensate for lacunae using data from surveys of antique Roman buildings. On the whole, Vitruvius's system of the five orders illustrated at the beginning of the Cours, was a modern construction (see fig. 4.2).

This sense of a continuous tradition of research and refinement regarding the definition of the rules of the five orders of architecture, was achieved through Blondel's systematic effort to collect, organize and represent the rules of the orders defined by all the best authors considered as followers of Vitruvius.
Blondel began his book with a systematic review of the rules of proportion for the five orders of architecture included in Palladio, Scamozzi, and Vignola's treatises. These were compared to Vitruvius's rules. Books II to VI each treated one particular order – tuscan, doric, ionic, corinthian, composite – indicating the rules prescribed by each author. Thus, for instance, a student interested in the doric order could quickly have access to all pertinent information available on this specific order, without having to consult different treatises. The selection of the most appropriate set of rules was therefore facilitated. Each case was thoroughly described in a text and through schematic modes of numerical and graphic representation. Furthermore, all the procedures needed to reproduce each figure were also indicated (see fig. 4.3).

In order to determine this systematic repertory of rules for each order, Blondel could not literally transcribe what he found in different treatises. First he had to conduct meticulous research in books, and extract, from all available sources, the information needed to provide the most complete and detailed set of rules for each order. Blondel reconstituted a body of rules for each author, based as much on the study of texts as on the analysis of the illustrations of the original treatises. Regarding Scamozzi's rules, for instance, he indicated that:

"le détail de ses mesures n'est pas si particulièrement expliqué dans le texte de l'auteur que nous l'avons fait ici où nous n'avons rien voulu laisser en arrière qui put donner une connaissance parfaite de sa pensée". (Blondel 1675, p.122)

For each author Blondel completed and adjusted the series of precepts given in the texts by an analysis of the original illustrations.
4.2 François Blondel, *Cours d'architecture*, vol.1 (Paris, 1675).
The five orders of architecture according to Vitruvius.
4.3 François Blondel, *Cours d'architecture*, vol.1 (Paris, 1675). Development of the doric order according to Vitruvius.
Blondel was much more analytical in his presentation of the rules than most other authors. The second section of the *Cours* contained a detailed comparative analysis of the different parts of the orders according to each author. Columns, pedestals, entablatures, architraves, frises, cornices, frontispieces, pilasters, balusters and caryatides were each treated separately. The proportions and profiles of each element were discussed and compared with others belonging to the same order and then with elements of different orders. The textual and graphic descriptions of the elements was limited to precise numerical and geometric parameters – height, length, width, contour – condensed in abstract schemas.

The results of this systematic work of reconstruction appeared in series of tables in each chapter, but could also be grasped globally at the end of the second volume of Blondel's *Cours* (1685), where series of numerical tables summarizing each author's doctrine of proportions were included. This represented a unique effort to compress knowledge on the architectural orders for didactic purposes (see fig. 4.4).

Still, this reconstruction of the Vitruvian tradition implied more than cognitive issues: it entailed a selective and critical processing of information. For instance, one of the problems related to comparative analysis was to make things comparable in the first place. One had to decide what would be compared in the selected objects, and then present these objects in such a way that an effective comparison be possible. In the *Cours d'Architecture*, Blondel wished first to compare the proportions and the profile embodied in the rules given by the different authors for each of the orders.

To make the comparison of the proportions and the profiles of the orders more effective, Fréart de Chambray, in the *Parallèle de l'architecture antique avec la moderne*, proposed reducing each figure to a similar scale, using, for all the different cases, a basic unit of modular measurement based
# Cinquième Partie

**Chapitre Premier.**

*Table de la Doctrine des Ordres faite par Vitruve.*

**Colonnes.**

**Toscan, Dorique, Ionique, Corinthien.**

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4.4 François Blondel, *Cours d'architecture*, vol.II, (Paris, 1683). Table of the proportions of the orders of architecture according to Vitruvius.
on the half diameter of the columns. Fréart seemed very proud of this achievement but did not explain why or how it was carried out. François Blondel was more explicit in showing the difficulties inherent in such standardized method of representation of material coming from quite different sources. Like Fréart, he adopted the half diameter of the columns as the unit of measurement. In doing so, he basically adapted the proportioning method used by Vitruvius and Vignola which he applied to the representation of Palladio and Scamozzi's systems, regardless of their peculiarities. For the representation of Palladio's system of proportions, originally based on a modular measure equal to the full diameter of the column, Blondel had simply to double the measurements given by the Italian author. In the case of Scamozzi, however, the problem was more serious, and asked for a complete reshaping of the original — again regardless of its original internal consistency.

"... les mesures particulières des moulures dans tous les ordres de cet architecte sont expliquées sous des nombres qui n'ont aucun rapport qu'avec ceux qui sont d'un même membre. C'est à dire que les nombres qui désignent par exemple les mesures des moulures de la base d'un piédestal n'ont de proportions qu'avec les autres nombres qui marquent les mesures des moulures de la même base, sans avoir aucun rapport avec ceux qui marquent les mesures des moulures des autres membres soit du même piédestal ou de la colonne ou de l'entablement. Et les nombres qui marquent les mesures d'un de ces membres ne sont aucunement proportionnels à ceux des moulures d'aucun autre...." (Blondel 1675, p.59)

Thus Blondel complained; "j'ai du faire des supputations difficiles pour les réduire aux parties du module divisé en trente". (Blondel 1675,

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p.35) If this reframing process benefitted Vitruvius and Vignola, it was certainly prejudicial with regard to Scamozzi.

The third section of the Cours decisively concluded the discussion on the orders of column. With the same incisive analytical mind, Blondel approached problems of composition such as the rules of intercolumnation and of the superposition of the orders. Here again Blondel's attachment to traditional motives sanctioned by the authority of Vitruvius and modern authors clearly emerged. With regard to the problem of the rules of intercolumnation for instance, Blondel attacked the colonnade of the Louvres for its unorthodoxe doubling of columns. According to him, the classical tradition did not offer examples of double columns used in the context of colonnades. If double columns had been used in combination with pilasters in other design situations, by architects such as Du Cerceau, de l'Orme and Metezeau, this practice was derived from a gothic preference for "dégagement" and was contrary to the taste for "resserrement" that could be found in antique temples, and which was prescribed by Vitruvius. Blondel refuted Perrault's abusive reading of Vitruvius' appreciation of Hermogene's widening of central intercolumnation in temples. According to Vitruvius, the larger proportions given to the intercolumnation of temples by Hermogene in antiquity aimed at providing more opening and a better access to the temples' main entrances. For Blondel, as opposed to Perrault, this did not constitute a precedent authorizing the use of double columns in general, and certainly not in the design of colonnade. Thus in Blondel's mind, the whole grammar of architectural composition was to be submitted to the evaluation of a Vitruvian tradition (see fig. 4.5).

It has been already suggested that the whole cognitive operation of parametric reduction and comparative analysis of the orders achieved in François Blondel's Cours d'architecture implied a universalist and unifying
vision of past knowledge. That knowledge was considered globally as a contribution to a limitless process of refinement of the canons of classical architecture. But the processing mode of the information and commentaries made by Blondel on the different cases also embodied a critical dimension intrinsically related to a particular line of architectural development, represented in a tradition of Vitruvian normative thinking in the treatises on architecture. To a certain extent, Blondel's respect for authorities of the past and his notion of progress combined to create the conditions for a consciousness of a tradition to emerge, and to justify a systematization of past knowledge.

Of course François Blondel was not the only theoretician dealing with the problem of reconciling the respect for the authority of the past and an emerging notion of progress. This was the central issue of the *Querelle des anciens et des modernes* in the second half of the eighteenth century.\(^7\) But the solutions brought to this problem differed considerably from one author to another, and depending on whether they ranked themselves among the ancients, or among the moderns. No doubt Blondel was not a radical modernist, assuming complete autonomy ahead of the tradition. But he did not preach a dogmatic return to antique sources either, as compared to Fréart de Chambray for instance. He stood mid-way between these two opposites, a position which explains in part the retrospective and rather inconclusive nature of his theoretical works.

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COURS D'ARCHITECTURE

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II. REGLE DE SERLIO.

Colonnes l'une sur l'autre, lorsque le nœf de la planèze de dessus répond au nœf du bas de la Colonne de dessous.

4.5 François Blondel, *Cours d'architecture*, vol II (Paris, 1683). A rule for the superposition of the orders according to Serlio combined with the prescriptions for the proportions of the orders according to Vitruvius.
4.3 **The Principle of Regularity and the Authority of the Tradition of Normative Thinking**

Although Blondel manipulated the rules of the orders of architecture in order to complete and unify their representation, he did not modify the norms prescribed by the different authorities, and preferred to leave to architects the choice to follow, or to reject these rules. However, in many commentaries, Blondel introduced criticisms, and suggested modifications to the rules. The general principle which emerged from Blondel's commentaries was no doubt a search for regularity in the proportions, in the geometric profile of the orders, in their progression in different systems, and in the alignment and containment of elements in compositions. It was in these commentaries that the essence as well as the limit of his contribution to the evolution of the Vitruvian tradition emerged.

Regarding the individual orders, Blondel generally preferred the simplicity and regularity of the subdivisions prescribed by Vitruvius and Vignola. Commenting on the latter's rule system, Blondel wrote:

"Cet architecte a ceci de particulier que sur quelque hauteur que l'on puisse déterminer, il applique avec facilité l'ordonnance de sa façade et de ses ornements, posant comme fondement universel en tous ces ordres que le piédestal soit le tiers de la hauteur de la colonne, avec la base et le chapiteau et que la hauteur de l'entablement en soit le quart. Toutes les fois donc qu'une hauteur lui est proposée il n'a qu'à la diviser en 19 parties égales dont les quatre d'en bas sont pour le piédestal, les trois du dessus pour l'entablement... et les douze entre deux pour la colonne, qu'il divise ensuite en tant de parties égales qu'il veut donner de modules à sa hauteur selon l'ordre qu'il veut mettre en oeuvre. Il trouve par ce moyen la grosseur de sa colonne et de tous les autres membres de son ordonnance." (Blondel 1675, p.27)
The principle of regularity also applied to the progression of the proportions within a system. For instance Blondel admired Serlio, who gave to his columns respectively: 6, 7, 8, 9, 10 diameters in height. But Blondel criticized the excessive difference of proportions between the tuscan and the composite orders. "Il faut qu'un architecte ait le jugement de pouvoir se contenter dans certaines bornes pour ne rien produire d'extravagant". (Blondel, 1675 part 2 p.13) In this respect he preferred Palladio's attitude. He explained, "d'autres mieux proportionnées croyant que les colonnes toscanes de six diamètres étaient trop courtes ont mieux aimé en donner sept et faire la hauteur de leurs ordres en cette suite 7,8,9,9.5,10..." However, according to him, "ils auraient été mieux proportionnées s'ils avaient pris les moitié arithmétiques de leurs extrémités 7 et 10 à la manière des premiers, pour déterminer les hauteurs des colonnes dorique, ionique et corinthienne". The proportions would have been 7, 7.75, 8.5, 9.25, 10." diameters. (Blondel 1675, p.9)

Blondel also evaluated the geometric regularity of the forms. In a discussion on the ionic volute of the orders on the Temple of Fortuna, the Theater of Marcellus, and the church of Santa Maria in Trastevere, in Rome — which were considered by Fréart de Chambray and Abraham Bosse as the best antique examples of that element — Blondel argues that their oval shape did not represent a case of antique virtuosity but was rather the result of a lack of control over the form of the volute. He writes; "j'ai fait faire un moule et vérifier au compas le tracé de la volute qui s'est avéré irrégulier." (Blondel 1675, part 2, p.40) In fact, for Blondel, even regular oval shapes were not to be recommended in architecture since they were seen to belong to the mannerist repertory of forms. Still he admired Bosse's attempt to define the geometric rules of oval volutes. For Blondel, the most perfect design for the ionic volute had been conceived by the architect and
mathematician Nicolas Goodmann in the seventeenth century, whose method allowed one to trace both the interior and exterior contour of the spiral in perfect control of the regularity of its progression.

Blondel was indeed essentially interested in developing mathematical and geometric means of control of the formal complexities of architecture. For him, architecture was, after all, a mathematical discipline. The Cours de Mathématiques he prepared for the education of the Dauphin included a section on architecture. In the Résolution des principaux problèmes d'architecture published in 1674, Blondel essentially dealt with problems of geometry and mechanics. Part of this latter work was included in the Cours d'architecture including an extensive treatment of the problem of the geometric drawing of parabolic, hyperbolic and elliptic vaults. Blondel was also very proud of a discovery he had made, based on an instrument designed by Nicomedes in Antiquity, which allowed one to control the regular diminution of the diameter of columns. (Blondel, 1675, chap.4).

It is not surprising therefore, that the solutions for the ionic volute proposed by Vitruvius, Vignola and many others were criticized on the basis of their geometric irregularity and discontinuity.

"Ces manières se font par la recherche de certain points par lesquels ensuite le contour et la flexion de cette ligne sont menés doucement et uniformément.... mais cela ne peut se faire qu'avec difficulté et de telle sorte que quelques soins qu'on y apporte, la description en est toujours défectueuse... En prenant les choses à la rigueur... nous trouvames des méthodes extraordinaires pour servir cette description par le moyen d'instruments simples et faciles qui peuvent dessiner le contour tout d'un trait..." (Blondel 1675, part 2 p.81)

Blondel was not afraid of complexity, and was ready to spend all the time necessary to find adequate methods of description for even the smallest
architectural details of the orders. To a certain extent, this fascination for the mathematical and geometric control of complexity emerged from a mannerist approach to architecture, where such virtuosities were indeed enhanced. But in the particular context of Blondel's discussion of the orders, these mathematical and geometric means of control became instead instruments of correction, control and containment of complexity within a norm of regularity. Ultimately, for Blondel, the norm of regularity served as a critical framework for the evaluation of precedents.

Thus, the linear contours of the elements were expected to fit in a regular geometric form. The combination of mouldings which composed the contour of the order had also to be controllcd by a regular system of proportions. Moreover, in architectural composition, the interpenetration, superposition and fragmentation of elements were prohibited. The principle of regularity also applied to the vertical alignment of the elements within an order or across superposed orders. This translated into specific concepts and prescriptions such as a necessity of vis a vis, aplomb, and a limitation of saillies and porte à faux. For instance Blondel explained that;

"...comme les saillies des bases des colonnes doivent toujours porter sur le vif du piédestal, dont on fait pour ce sujet, le tronc sur le même à plomb de la plinthe des bases: tout de même il ne faut pas que les saillies des bases du

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piédestal porte à faux et sortent en dehors du vif du stéréobate..." (Blondel 1675, part 2, p.43)

Thus, in general, all the elements and parts of an order or a more complex composition had to be contained within the limit, of precise vertical alignment.10

Blondel's critical evaluation of architectural forms and proportions essentially proceeded from a linear graphic logic of regularity which appeared implicitly in the illustrations, and in explicit form though the critical comments formulated in the text. Fréart de Chambray referred to "les idées régulières" of the original Greek orders, but criticized the "sécheresse" of Vitruvius's rules. Blondel, on the contrary, was very fond of Vitruvius' regular system. He made regularity a superior principle for the evaluation of the elements inherited from the tradition, and in doing so created a conceptual ground for the unification of a tradition of normative thinking.

4.4 Precedents' Adjustment and Adaptation

For Blondel "regularity" constituted an a-priori norm. It was considered a universal condition of order, harmony, unity and beauty. Blondel wrote;

"...il n'y a rien de si désagréable à la vue qu'un bâtiment sans art, confus et sans aucune régularité de mesure, parce que notre âme ne trouve rien dans cet amas informe ou mal formé de matériaux qui la puisse arrêter ou dont elle puisse

10 An other parallel with Kuhn's theory of paradigm shift can be established here. Indeed according to Kuhn, the continuous production of studies on standard problems can be compared to rites. They play a central role in the demonstration of acquisition of knowledges, procedures and techniques, which are conditional to the admission of an individual in a community of experts. They are like "puzzles", which serves as a test and demonstration of ingenuity and skill. See Kuhn, op.cit., (1962).
se faire un notion universelle ou une idée d'unité qui la satisfasse. Et comme au contraire elle se sent intégralement affectée et touchée d’un sentiment de plaisir extérieur à l'aspect de ces bâtiments augustes qui sont construit avec les mêmes matériaux suivant les règles et les proportions de la belle architecture..." (Blondel 1683, p 785)

If the norm of regularity could be theoretically achieved through the use of mathematics and geometry, the rules and proportions of "la belle architecture" however, could not be directly generated from those disciplines. Following Alberti and Palladio, Blondel believed in the Platonic conception of numerical harmony, and in the existence of ideal harmonic ratios in architecture, as in music. However, unlike in music, these ratios in architecture are not exactly known. Although he believed that the most beautiful monuments of antiquity and the rules given by the modern authorities embodied the essence of these rules, their precise formulation remained to be discovered. According to him, despite their significant differences of proportions, those buildings and systems which had been admired for centuries were all inspired by some primary essential rules. However, the knowledge of these rules and their application were only intuitive. Thus for Blondel, as for Fréart de Chambray, the works of the great architects only represented particular manifestations of essential rules. But unlike Fréart, Blondel did not believe that those rules that were revealed to architects in antiquity were lost for ever. On the contrary, he thought that those rules could eventually be rediscovered, and that the best way to work toward this goal was through an extensive study of the rules' numerous particular manifestations. Still in this research process it seemed to Blondel more profitable to build on the tradition of those theoreticians who had tried to discover these rules through reflective works, rather than to go back directly to the observation of particular buildings.
According to him, the numerous differences of proportions noticed among those precedents could be attributed to adjustments that were needed to transpose the abstract notion of regularity in the actual visual world of experience. The various possible positions that columns could occupy in a composition had been a source of countless adjustments of proportions. Endorsing the theory of Vitruvius and of most of his commentators, Blondel believed that the perception of the proportions was affected by the distance or relative height of the columns. The superposition of the orders was a major cause of distortion. But more minor differences in the composition could also have an impact on the visual appreciation of proportions. As Blondel explained;

"si on veut ajouter à ce calcul les diverses mutations qui peuvent arriver aux mêmes ordonnances lorsque les unes sont avec piédestal et les autres sans piédestal, lorsqu'elles portent sur des socles, des marches, ou gradins, ou lorsqu'elles sont élevées plus ou moins en d'autre manière; l'on pourra facilement connaître d'ou vient en partie cette si grande variété que nous avons trouvée dans les mesures des colonnes et les ordonnances en tous les exemples anciens et modernes que nous avons rapportés. (Blondel 1683, Part.1, p.312)

Thus, in order to compensate for those optical distortions, architects should adjust the proportion of their buildings. So in reality, for Blondel, the image of regularity which was responsible for the experience of beauty was more important than the actual proportions of the building. As he explained; "ce qui paraît irrégulier dans le dessin sur papier, est corrigé par la disposition du lieu où il se trouve dans l'ouvrage..." (Blondel 1683, p.115)

11 On this aspect of Blondel's theory and on Perrault's opposition to the principle of optical adjustment see especially, Herrmann, op.cit., (1973) chap.III.
It is because he maintained this Vitruvian distinction between the observer's experience and the actual proportions of the architectural object that Blondel was able to accept the existence of a superior norm of regularity as a framework for critical evaluation, and as an aesthetic ideal, without fundamentally questioning the authority of precedents. Furthermore, if the principle of regularity did not allow Blondel to come to terms with a definitive system of rules, but was only effective as an instrument of adjustment and adaptation, it was probably because Blondel knew too well the crucial role played by precedents and tradition in the establishment of the authority of the modern architect.

4.5 Precedents in Design Reasoning and the Limits of Norms

The intricacy of the cognitive and philosophical issues involved in the problem of the definition of design directives and norms for the orders of architecture must be contrasted with the relatively unregulated use of precedents in design thinking in general in the second half of the seventeenth century. François Blondel is known for two main realizations, the Cours d'Architecture, written for the Académie Royale, and the Porte Saint-Denis, built in Paris in 1672. As we have seen, the Cours d'architecture concentrated on the rules of proportion and assemblage for the five orders of architecture. But Blondel also treated other topics, including the design of staircases, vaults, bridges and triumphal arches. The literature on these subjects was limited in the seventeenth century, and although Blondel referred to this pre-existing body of material, he often preferred to discuss actual precedent cases. The design of triumphal arches in particular, for which, according to Blondel, no one except Alberti had really attempted
to define rules, was approached through the study of precedents. In the second volume of the *Cours* Blondel explained;

"Il y aurait un grand plaisir de discours sur le sujet des Arcs de Triomphe, si nous avions une ample connaissance de ceux qui ont été autrefois construit tant au dedans qu'au dehors de la ville de Rome... Mais comme nous avons perdu la plus grande partie de ces ouvrages, il faut que nous tachions de nous instruire sur ce sujet par ceux qui nous restent, choisissant les exemples les plus parfaits dans chacune de leur espèce, c'est à dire parmi ceux qui n'ont qu'une ouverture, ou qui ont trois portes ou qui n'en n'ont que deux afin d'en examiner les mesures." (Blondel 1683, p.578)

Blondel mentions for instance that his design of the Porte Saint-Denis was based on the Arch of Titus in Rome, which, with its one single opening and square proportions, he considered the most beautiful of all antique cases. In fact Blondel pretended that his design was superior to the original model because it was larger and more precisely proportioned. More significant with respect to the creative use of precedents were his designs for the ornaments of Porte Saint-Denis.

"J'ai cherché avec soins, que le peu d'ornements dont elle est parées fut extraordinaire et choisi parmi ceux qui ont eu et qui ont encore le plus de réputation dans les ouvrages des Anciens. Et comme tout le monde tombe d'accord qu'il n'y a rien de plus beau parmis les restes de l'Antique que la colonne Trajanne, que les obélisques qui ont été transférés d'Egypte en la ville de Rome, et ce reste de la Colonne Rostrale que l'on voie encore au Capitol, j'ai voulu que l'ornement de la Porte Saint-Denis fut composé de parties copiées sur ces beaux originaux. Pour cet effet, j'ai placé deux Pyramides au coté de l'ouverture de la Porte que j'ai engagé suffisamment dans le mur du massif qui posées sur des piedestaux semblable à celui de la Colonne Trajanne,
s'étendent avec leur amortissement jusqu'au dedans de l'architrave du grand entablement et qui tiennent pour ainsi dire la place des Colonnes sans pour autant être obligés de ne rien porter, parce que l'entablement n'a de saillie que ce qu'il faut pour être distingué du massif, sur lequel il est entièrement assis. Et pour donner plus de grâce aux pyramides, je les ai fait accompagner de trois rangs de Rostres, c'est à dire de Proues ou de Poupes de Galères Anciennes pareilles à celles de la Colonne Rostrale." (Blondel 1683, p.618–619)

The attitude illustrated in this passage is clearly reminiscent of Fréart de Chambray's description of the use of antique fragments in modern composition by Poussin at the Louvre. Blondel had a comparable admiration for some antique models, and as in the case of the composition realized on the ceiling of the Louvre, Blondel's use of precedent fragments was stimulated as much by the intention to create a new composition as by a will to conform to a consensus about the value of certain antique cases.

This attitude was also perceptible in the way he described the evolution of the design process. Blondel explains, for instance, that after discussion with the Provost of the merchant of the city of Paris, the type of naval decoration -- rostra -- he had first proposed for the arch, was decided to be unsuited for a work dedicated to the celebration of Louis XIV's military conquests in Holland and Germany, and was finally replaced by trophies. The Provost also asked Blondel to create lateral openings in the main body of the arch so as to allow protected passage for pedestrians in addition to carriages and coaches. Blondel's response to this request took the form of a negotiation between precedent cases and established rules for deciding and justifying the new design. Blondel wrote:

"Il a néanmoins fallu se rendre et j'y suis d'autant plus résolu que dans le vray, le peu d'espace que ces ouvertures
occupent dans la largeur du dé du piédestal n'en peu aucunement affaiblir la résistance, et que l'architecte de la Colonne Trajanne, en a fait autant dans son piedestal. J'y ai même été confirmé par l'exemple de celui qui nous a donné ces admirables descriptions de morceaux d'architecture que l'on voit dans le livre des Songes de Polyphile, ou l'architecte n'a point balancé d'ouvrir une porte très spacieuse et magnifique dans le milieu de la masse qui sert de soubassement à cette pyramide si surprenante qu'il a élevé entre deux montagnes et cette ouverture est justement où il y a apparence de plus grand fardeau." (Blondel 1683, p.672)

Precedent cases can have multiple purposes in design thinking and not the least important is that they can authorize deviations from norms and rules on the basis of experience. Clearly Blondel was not quite comfortable with this possibility when he discussed the rules of the orders, and was more at ease with prescribing norms and directives on the basis of precedent rule systems. In fact, the domain of the speculation on the rules of the orders of architecture constituted for Blondel a world somehow located apart from the reality and constraints of design practice.
PRECEDENTS AND DESIGN THINKING IN AN AGE OF RELATIVIZATION
Chapter 5

The Instrumentalization of Precedents in Claude Perrault’s *Ordonnance des cinq espèces de colonnes* (1683)

5.1 Norms and Conventions

François Blondel’s excursus into the philosophical intricacies of the debate on the cognitive and transcendent value of proportions, in the second volume of his *Cours* in 1683, was a response to Claude Perrault’s provocative stance on the relative value of proportions in architecture, first hinted at in his annotations to Vitruvius.¹ The result of Blondel’s reaction was an immediate counter-attack by Perrault in his *Ordonnance des cinq espèces de colonnes selon la méthode des anciens* published also in 1683.² Claude Perrault argued that the canonical approach of Fréart de Chambray and François Blondel did not offer any suitable solution to the problem of the establishment of design directives and norms for modern French architecture. While de Chambray and Blondel perceived, in the great diversity of proportions prescribed and used by ancient and modern architects, series of particular manifestations and adaptations of a universal rule, Perrault, on the contrary, considered the variety of precedent cases and rule systems produced throughout history as a demonstration that universal rules of beauty for the proportions of the orders never actually existed. Therefore he saw no good reason to attribute any superior, definitive value


² The debate between François Blondel and Claude Perrault has been extensively covered by historians. See in particular Tzonis, *op.cit.*, (1972), Herrmann, *op.cit.*, (1973), Rykwert, *op.cit.*, (1980), Perez Gomez, *op.cit.*, (1993). None of these authors however has focussed on the issue of precedents.
to particular antique architectural fragments nor to any of the precedent rule systems elaborated by Vitruvius and the modern Italian authorities.

The absence of common measures between precedent cases and systems of rules that were all considered to respond to the norm of beauty, invalidated, according to him, all the theories that tried to relate the rules of proportions to transcendent, natural or rational causes.

"Pour connaitre combien il y a de règles dans l'architecture pour les choses qui plaisent quoique contraires à la raison, il faut considérer que les raisons qui doivent avoir plus de lieux dans l'architecture pour en régler la beauté doivent être fondées ou sur l'imitation de la nature, telle qu'est la correspondance des parties d'une colonne avec son tout, de même qu'il y en a une entre le corps entier d'un homme et toutes ses parties; ou sur la ressemblance qu'un édifice peut avoir avec les premiers bâtiments que la nature a enseignez aux hommes, ou sur la ressemblance que les Echines, les Cymaises, les Astragales et les autres membres ont avec les choses dont les figures de ces membres sont prises, ou enfin sur l'imitation de ce qui se fait dans les autres Arts, comme celle des ouvrages de la charpenterie, sur lesquels les Frises. les Architraves, les Corniches et leurs différents membres sont formez tels que sont les modillions et les mutules. Cependant, ce n'est point de ces imitations et de ces ressemblances que dépendent la grâce et la beauté de toutes les choses, car si cela était, elles devraient avoir plus de beauté, plus ces imitations sont exactes. Or il ne se trouve point que la proportion et la figure que toutes ces choses doivent avoir pour plaire, et lesquelles ne sauroient être changées, sans choquer le bon goust soient prises exactement sur les proportions et la figure des choses qu'elles représentent et qu'elles imitent... L'imitation de la nature, ny la Raison, ny le bon sens ne sont donc point le fondement de ces beautez..." (Perrault 1683, p.ix–x)

Although Perrault contested the positive value of the design attributes of proportions in the orders of architecture, he was not ready to
reject the idea that some form of proportional control might be justifiable on positive aesthetic grounds in architecture. Thus inspired by the theory of Pierre Nicole and the philosophers of Port Royal, Perrault defined two kinds of proportional beauty: one arbitrary, the other positive. The proportions which depend on the relationships between the dimensions of parts such as those between the sizes of various elements, either with respect to one another or to the whole, were difficult to discern and therefore without positive value. These, he called "arbitrary". The proportions that are called symmetry, and which consist in the relationship that the parts have collectively as a result of the balanced correspondance of their size, numbers, disposition and order were more easily perceptible and had a "positive" value. According to Perrault, the proportions of the architectural orders belonged to the first kind, and therefore could not be considered a positive source of beauty. But if the proportions of the orders cannot be considered a positive source of beauty, one cannot deny that certain proportions seem to have been more appreciated than others. Therefore their must exist some other explanation for these preferences.

Perrault stressed the fact that the proportions considered beautiful by the Greeks were not the same as those approved by the Romans. Similarly, the proportions of the corinthian columns on the facade of the Louvre are not the same as those of the columns of the Pantheon. Yet, both are equally admirable to the modern eye. According to him, if such a large variety of building cases and rule systems continue to represent as many canons of

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3 In his Traité de la vraie et de la fausse beauté (manuscript 1659) which discusses grounds for selecting of rejecting ancient epigrams, Pierre Nicole underscores the importance of customs in the definition of beauty. Possible relations between Perrault and the philosophers of Port Royal have been evoked by Herrmann, (1973), Ryckwert, (1980), and Picon, (1988). This point has also been investigated by Michel Pelletier in Claude Perrault's Politics, Religious Belief and Philosophy and their Impacts on his Notion of Beauty: The Jansenist Hypothesis. M.Phil Dissertation, Cambridge Univ.,(1989).
beauty in the modern age, it is not because they constitute particular instances of a universal rule, but simply because people have become accustomed to their proportions.

According to Perrault, customs in architecture were created and perpetuated by repetition as well as by association. For instance, he explains that the first works of architecture executed by man were characterized by their richness of materials, their grandeur, opulence, precision of workmanship, symmetry, and other obvious causes of admiration. As result, these works seemed so beautiful, and were so revered and admired, that people decided they should serve as criteria for the others. In the same way that they believed it impossible to add or change anything in all these "positive beauties" without diminishing the beauty of the whole, they also found it unimaginable that the proportions of these works could be altered without ill effect; whereas, they could, in fact have been otherwise without effects to other beauties.  

Quite interestingly, Perrault, like some of our contemporary architectural theoreticians, compared the rules of proportions to the nature of legal conventions established in civil law, (loix civile) which, he says; "dépendent de la volonté du législateur et du consentement des peuples et que la lumière naturelle de l'esprit ne découvre point." (Perrault 1683, p.xiii) Those rules are the result of habits and consensus, but have no natural origins. Moreover, knowledge of and respect for the rules is not innate but demands some form of education.

Perrault, op.cit., (1683), 53.

In architecture for instance, pleasure can be naturally experienced from the appreciation of positive qualities such as the richness of material, the regularity and symmetry of the design and the quality of execution of a building. But in order to appreciate the proportions of a composition, one must be familiar with the rules established by customs.

"Pour recevoir du plaisir des proportions de l'architecture, il faut être instruit par une longue habitude des règles que le seul usage a établi et dont le bon sens ne saurait suggérer la connaissance." (Perrault 1683, p.xiii)

According to Perrault, what distinguished the ordinary observer from the expert was precisely the latter's knowledge of such conventions.

"...il est constant que la connaissance des beautez arbitraires est la plus propre à former ce qu'on appelle le goust et c'est elle seule qui distingue les vrais architectes de ceux qui ne le sont pas..." (Perrault 1683, p.xii)

Thus the domain of the rules of proportions of the orders belonged to the educated man and the expert, exactly like the mastery of the system of legal conventions. Laws might be based on customs but they also constituted a rationalized and institutionalized form of conventions established by experts who had the authority to shape and codify customs in prescriptive forms. Perrault had a rather realistic point of view about the actual source of authority in the academic system of the Ancien Regime. In the Preface of his critical translation of Vitruvius in 1673 he indicated that;

"...la beauté, n'ayant guère d'autre fondement que la fantaisie, qui fait que les choses plaisent selon qu'elles sont conformes à l'idée que chacun a de leur perfection, on a besoin de règles qui forment et rectifient cette idée: et il est certain que
Clearly for him, institutional rules should spread from a rationalization of conventions. Perrault rejected the idea that some rules of proportions able to satisfy the norm of beauty could be established on absolute positive ground, such as those principles regulating mechanics and military architecture. However he believed that a rational system of design directives for the orders could be defined on the basis of a critical evaluation and adaptation of the precedents sanctioned by custom. Those rules would be "probables et vraisemblables fondées sur des raisons positives, sans beaucoup s'éloigner des proportions reçues." (Perrault 1683, p.xiv) If the idea that the proportions could constitute an arbitrary and conventional form of beauty introduced a disturbing sense of relativity in the normative discourse on the orders, the epistemic norm of probability in Perrault's conceptual system allowed him to continue to justify a search for the definition of rules in spite of their relativity.

5.2 Instrumental Rationality and Precedents

Perrault thought that in order to design a systematic set of rules of proportions for the orders of architecture one should abandon the method used by previous authors, who had consistently failed at this task.
"Les modernes qui ont mis par écrit les cinq ordres d'architecture ont traité de cette matière de deux manières: les uns n'ont fait autre chose que de recueillir dans les ouvrages tant des Anciens que des Modernes, les exemples les plus illustres et les plus approuvez; et comme ces ouvrages contiennent des règles différentes, ils se sont contentez de les proposer toutes, et de les comparer ensemble sans guerre rien déterminer sur le choix que l'ont doit en faire. Les autres ont cru que dans cette diversité de sentimens ou sont les architectes sur les proportions qui doivent être suivies dans tous les membres de chaque ordre il étoit permis de donner son jugement sur les opinions qui ont toutes d'assez grands auteurs, pour ne pouvoir fonder un mauvais choix; et ils n'ont pas même fait difficulté de proposer comme une règle leur opinion particulière..." (Perrault 1683, p.xiv)

Perrault compared the architects who had used the first method to the painters and sculptors who believed that the composition of the human figure should always be based on the precise imitation of canonical figures.

"Leur attitude est comparable à celle des peintres et des sculpteurs qui pour prescrire les proportions d'un beau visage, donneraient exactement celle des visages d'Hélène, d'Andromaque de Lucrèce ou de Faustine..." dans lesquelles, par exemple, "le front, le nez et l'espace qu'il y a depuis le nez jusqu'au menton étaient égaux à quelques minutes près mais différents dans chacun de ces visages."(Perrault 1683, xiv)

According to Perrault, this method, which has prevented Fréart de Chambray and François Blondel from coming up with a definitive, rationalized solution to the problem of the orders, was inspired by a quasi-religious respect for some canonical precedents. Such respect derived from a general attitude, and a way of reasoning, which they had in common with theologians and exegetes.
"(cette attitude) leur est commune avec la plupart de ceux qui font profession des sciences humaines... Il prend sa source tout déraisonnable qu'il est, du véritable respect qui est du aux choses saintes... Habitue à raisonner en sciences humaines qu'à la manière de raisonner en théologie...les savants n'avaient pour but que la recherche des opinions des anciens...se faisant plus d'honneur d'avoir trouver le vrai sens du texte que d'avoir découvert la vérité de la chose..." (Perrault 1683, p.xix)

Furthermore he wrote;

"... comme l'architecture ainsi que la peinture et la sculpture a souvent été traitée par des gens de lettres, elle s'est aussi gouvernée par cet esprit plus que les autres arts; on y a voulu argumenter par autorité supposant que les auteurs de ces admirables ouvrages de l'Antiquité n'ont rien fait qui n'aient des raisons, quoique nous ne les connaissions pas".(Perrault 1683, p.xix)

Perrault argued that architects should be able to make the difference between the respect due to holy objects and the critical attitude needed for solving problems of design.

"Il faut...faire la distinction entre le respect du au choses saintes et celui que méritent celles qui ne le sont pas, lesquelles il nous est permis d'examiner, de critiquer et de censurer avec modestie..." (Perrault 1883, p.xix)

Perrault also criticized the method used by architects and theoreticians like Palladio and Scamozzi, who tried to define norms on the arbitrary basis of their individual preferences and authority.

"...pour donner les proportions d'un beau visage on disait qu'il doit avoir dix-neuf minutes et demie depuis la racine des cheveux jusqu'au commencement du nez, vingt minutes
et trois quarts depuis le commencement du nez jusqu'à son extrémité, et dix-neuf minutes et trois quarts depuis l'extrémité du nez jusqu'à celle du menton." (Perrault 1683, p.xv)

Those architects were, according to Perrault, unable (or perhaps simply unwilling) to create any rational and convincing system of directives.

"ils n'ont pas su trouver des règles qui eussent en elles mêmes des vérités évidentes ou du moins des probabilitez et des raisons capables de les faire préférer à toutes les autres" (Perrault 1683, p. xiv–xv)

Perrault tended to include himself among this group. He respected the attitude which allowed them to act freely and which created so many beautiful designs. Still, none of these precedents offered a definitive solution to the proportioning of the orders. Therefore one could legitimately approach the problem anew.

"on peut considérer les deux manières de traiter les proportions des cinq ordres pratiquées et reçues jusqu'à présent comme n'étant pas les seules qui peuvent être mises en usage et qu'il y a rien qui puisse empêcher d'en recevoir une troisième" (Perrault 1683, p.xv)

Perrault refused to accept the authority of the ancients as a legitimate basis for the rules of architecture. Instead of arguing "par autorité" he affirmed his intention to argue "par raison". He considered that all the variations that architects had introduced in the rules of proportion since Vitruvius, had been done without known reasons. For him, regularity in the proportional system of the orders had to be achieved. However, Perrault did not associate the norm of proportional regularity with any universal aesthetic
value. For him, proportional regularity was only a necessary condition and a framework for effective memorization and consistent application of design directives.

"les changements de proportions que les architectes postérieurs à Vitruve ont introduit, ont été faits, sans aucune raison connue.... celles que je propose se trouveront ici fondées sur des raisons claires et évidentes, telles que sont la facilité de faire des divisions et celle de les retenir..."(Perrault 1683, p.xxii)

Here Perrault's pragmatic and normative approach to the problem of the orders emerged clearly. His effort to demonstrate the arbitrary character of the beauty of proportions in architecture allowed him to justify the autonomy of the normative project in relation to the tradition, emphasizing mainly its cognitive and instrumental aspects. But even if Perrault attributed neither transcendental value, or any definitive authority to past architecture, he did not contest its utility regarding the definition of rules. Perrault did not prescribe a tabula rasa. On the contrary, for him the canonic examples of classical architecture and the different systems elaborated by the most acclaimed authors of the past demonstrated the persistence of conventions and aesthetic values which, in his view, could not be arbitrarily rejected.

This tension is reflected in the strategies used by Perrault in the elaboration and justification of his system of rules. On the one hand, he conceived a proportional grid as an abstract, taxonomic and methodical device. On the other hand, he used the grid as a frame for appropriating the most acclaimed elements inherited from the past.
5.3 The Grid and the Cases

The structure of Perrault's book reflects the two sides of his normative strategy. The first part of the book discusses the "choses communes à tous les ordres," the system of proportional subdivisions within which all the five orders are defined and controlled. The second part deals with the "choses propres à chaque ordre", the specific elements and parts of each individual order. Even though Perrault refused to attribute a transcendental value to proportions, he believed, nevertheless, with Vitruvius, that proportions constituted what distinguished the different species of the orders. In the book, a proportional system is presented as operating like a taxonomic device, clearly defining the particularities of each species of order. Since it is essentially a cognitive device, the system, insists Perrault, should be regular and simple in order to facilitate its use and memorization. It is not a framework embodying profound aesthetic and symbolical value, it is a device for methodical design. Consistent with this perspective, he refers especially to Vitruvius's prescription as the ultimate existing application of a regular proportioning method.

Perrault explained that since Vitruvius, architects had used two methods to determine the dimensions that establish the proportions of the elements making up a column and establishing the principal distinctions between the orders. The first method was to take a known dimension, which was either average or very small. The average dimension, which was usually the diameter or half diameter of the base of the shaft of the column, was called a module. It was used to determine the height of the column, for example, by taking eight or nine diameters. The small dimension – which was called a part or a minute, and which was usually one-sixtieth part of the module – was used when dimensions smaller than the module were
called for. For instance, when ten minutes were given to the plinth of the Attic base or seven and one half were given to the large torus.

In the second method, neither minutes nor any other fixed part of the module were used; rather Perrault proposed divisions of the module or some other dimension established, either by the module or by other means, in as many equal parts as were necessary. In this way the dimension of the Attic base, which was one half of a module, was divided either into three parts to obtain the height of the plinth, into four, to obtain that of the large torus, or into six, to obtain that of the small one.

Both methods had been applied as much by the Ancients as by the Moderns. But for Perrault the second one seemed preferable to the first. He explained however, that his preference was not so much justified by the fact that this proportional method always supposed the correlation of a whole to its part, for he did not believe that this correlation in itself resulted in anything that might be pleasing to the sight. Rather, what he found most commendable in this method of the Ancients was the facility it afforded memory for retaining dimensions. This was so, he argued, because it was a method founded on reason, which could produce recollection (reminiscence). According to him such a method was more reliable than the mnemonic capacity for simple factual recall (la simple appréhension de la mémoire).  

Perrault's intention was to provide proportions based only on dimensions that had simple and regular relationships to one another. He wished thereby, to facilitate memorization by eliminating complicated numbers and fractions in his measurements. Instead of using a unique module based on the diameter of the column as his basic unit of measure, he proposed to use three different units, respectively equal to one, one half and one third of the diameter of the column, adapted to the different scales.

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6 See Perrault, op.cit., (1683), 67.
of elements in an order as a way to determine, without fractions, the height of the parts in all the orders.

With this tool in hand, Perrault defined the general proportions of the five orders and built up the most regular system of proportions designed yet (see fig. 5.1). Each order were made up of three main parts; the pedestal, the column and the entablature. Furthermore, each of these parts was itself made up of three parts. The pedestal had its base, its dado and its cornice; the column had its base, its shaft and its capital; and the entablature was made up of the architrave, the frieze and the cornice. The overall height of each of these three main parts was determined by a fixed number of small modules. The entablatures of all the orders were made equal, each having six small modules, which corresponded to two large modules or diameters. As Perrault pointed out, it was this uniformity in the height of the entablature that gave rise to the differences in their relative proportions to the columns, and which was therefore, the key to a rigorous differentiation of their characters. The height of the pedestal, like that of the column, was different in each order, and increased proportionally as the orders became slighter and less massive. The increment was always by one module in the pedestal and by two in the column, so that the tuscan capital, which was equal to its entablature, measured six modules, the doric seven, the ionic eight, the corinthian nine, and the composite ten. Since the height of the columns with their base and capital increased by two modules, it followed that the tuscan had twenty two modules, the doric twenty four, the ionic twenty six, the corinthian twenty eight and the composite thirty. Finally, the proportions of the three parts that made up the pedestal were also the same in all the orders.\(^7\) The systematic character of the classification of the orders

\(^7\) See Perrault, \textit{op.cit.}, (1683), 70 ff.
in the *Ordonnance* arose from an autonomous intellectual project of parametric rationalization. However Perrault pretended that this very rational system was in fact generated from an extensive study and comparison of previous systems of rules, and that many proportions were derived from an effort to establish some average measures accounting for the diversity of proportions of the most universally acclaimed past cases and systems.

For instance, Perrault explained that there was nothing about which architects were less in agreement that the proportions of the height of entablature to the thickness of columns. No two works, ancient or modern, maintained the same proportions, and some entablatures were almost twice the size of others – as in the case of the facade of the Temple of Nero compared to that of the Temple of Vesta in Tivoli. Neither of these cases could be considered to offer a sound basis for the rules of architecture; nevertheless both were among the most admired of antiquity. Perrault refused to raise any particular case to the status of a norm. Instead, he thought that all the most acclaimed cases could contribute to the definition of rules. This in the end was what he proposed. Regarding the dimension of the entablature for instance, he wrote;

"je ne prétend me rendre arbitre d'un différent qui est entre de si grands personnages, et si je dis mon sentiment sur ce sujet et sur le reste des proportions qui s'y trouvent avoir été pratiquées, je ne veux point que mon jugement passe pour autre que pour celuy que des jurisconsultes appellent le jugement des rustiques, qui se donnait dans les causes ou les choses étaient tellement embrouillées que les juges les plus éclairés n'y pouvaient rien connaître. Ce jugement était de partager le différent par la moitié. Car je crois que n'y ayant rien qui nous puisse faire connaître quelle est la raison de cette grande diversité on ne peut faire autre chose pour établir une règle certaine avec quelque probabilité que de tenir le milieu en prenant une mesure qui ait quelque rapport"
avec celle de la colonne tel qu'est le double de son diamètre et qui soit également distante des extrémités qui se trouvent dans les ouvrages antiques." (Perrault 1683, p.9)

As Wolfgang Herrmann has pointed out, Perrault did not strictly apply this method for calculating proportions. But what is interesting is that he saw in this method, again borrowed from the legal discipline, a reasonable means of establishing conventions in situations where no particular precedents had authority, but without arbitrarily imposing a directive. Perrault's method was in effect a strategy of compromise between pure rationality and the authority of precedents.

The rational, proportional grid designed by Perrault represented an instrument of conciliation and - to use a term coined later by Gottfried Semper - of "conventionalization" with respect to the classical tradition.

"Si l'on m'objecte que la méthode que je propose n'est pas une chose fort difficile à trouver, que je ne change presque rien aux proportions et qu'il y en a guère qui ne se trouvent dans quelques uns des ouvrages antiques ou des Modernes, j'avouerai que je n'ai point inventer de nouvelles proportions, mais c'est de cela que je me loue parce que je n'ai point d'autre dessein dans cet ouvrage que de faire, que sans choquer l'idée que les architectes se font des proportions de chaque membre on les puissent réduire toutes à des mesures facilement commensurables que j'appelle vraisemblables..." (Perrault 1683, p.xxi)

Therefore, the proportional grid appeared as a product stemming from a rational compromise between the extremes of a universe of conventions. But the grid also served as an instrument for the selection, regularization and integration of elements from precedents.

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"Il faut... suivre les changements que les habiles ont introduit avec raison et approbation... il n'y a aucun de ceux qui ont écrit des ordres d'architecture qui n'ait ajouté ou corrigé quelque chose dans ce que l'on prétend que les Anciens avaient établi comme des règles et des lois inviolables... je ne propose rien qui n'ait des exemples et des auteurs illustres..." (Perrault 1683, p.xxvi)

For instance, Perrault's doric order was composed, among other elements, of Vitruvius's base and capital and part of the entablature of the Theatre of Marcellus.

Although most of the orders were in fact reframed versions of Vitruvian elements, the whole repertory of architectural elements taken from antique and modern sources constituted for Perrault a bank of precedents, understood in the modern sense as solutions to be applied and adapted as a function of their relevance in specific frameworks of design, and not as ready-made solutions to particular problems. They were used only to the extent that they conformed to a preestablished and intentional system of rules invented by the architect and not as something imposed by the tradition (see fig. 5.2).

5.4 Modern Design and the Rational Appropriation of the Past

Yet Perrault's relationship toward the authority of the Ancients and especially Vitruvius remained ambivalent. Indeed Perrault maintained, for instance, that his method was similar to that used by the Ancients.

"Cette méthode est celle que les Anciens ont suivie et dont Vitruve s'est servie dans l'explication des proportions qu'il a donnée, où il procède toujours par divisions méthodiques et aissées à retenir." (Perrault 1683, p.xvii)
5.2 Claude Perrault, *Ordonnance des cinq espèces de colonnes*, (Paris, 1683). Composition of the doric order. (plate 3)

Explanation of the third plate (translated form the Ordonnance)
A. The base Vitruvius calls Attic used for the doric order
B. Base of the doric order in the Colosseum
C. Base of the doric order in Vignola
D. Hollow fluting according to Vitruvius
D*. Flat fluting according to Vitruvius
E. Fluting according to Vignola
F. Capital according to Vitruvius
G. Capital of the doric order in the Colosseum
H. Capital according to Alberti
I. Entablature taken in part from the Theater of Marcellus
K. Soffit of entablature
L. Architrave of the doric order in the colosseum
M. Figure explaining the tracing of the cyma recta and the ogee
Furthermore Perrault described his critical reconfiguration of precedent knowledge as an effort toward the reconstruction of the original system of the Ancients.

"Si les ouvrages que nous avons de l'antique sont comme les livres où nous devons apprendre les proportions de l'architecture, ces ouvrages ne sont pas les originaux fait par les premiers et véritables auteurs, mais seulement des copies différentes entre elles, et dont les unes sont fidèles et correctes en une chose, les autres en une autre, en sorte que dans l'architecture, pour restituer le véritable sens du texte, s'il faut parler ainsi, il est nécessaire d'aller chercher dans ces différentes copies qui étant des ouvrages approuvez doivent contenir chacune quelque chose de correct et de fidèle dont le choix doit apparemment être fondé sur la régularité des divisions non rompues sans raison, mais faciles et commodes telles qu'elles sont dans Vitruve." Perrault 1683, p.xvii)

The regular system elaborated in the Ordonnance differed from the Vitruvian system. But Perrault considered that the two systems not only expressed the same urge for the satisfaction of the norm of regularity, but also reflected the same universal cartesian conviction about the autonomy of reason.

Like Fréart, Perrault dogmatically presented a definitive system of proportions for the orders. For him, once a system of rules was defined and accepted on the basis of positive reason, there would be no truly legitimate motives for changing it. But while, for the former author, the rules or proportions remained a transcendantal and inaccessible reality, the latter exposed them as a pure construction of the human mind. Perrault argued that the design of a regular system seemed impossible as long as a transcendant authority was conferred to the various proportions of the ancient monuments. Furthermore he explained that the reason why modern
architects gradually abandoned Vitruvius's system was because they believed that the rules prescribed by the Roman author were incompatible with the measures of ancient buildings.

"cette méthode a été abandonné... parce qu'ils n'ont pas trouvé qu'elle puisse s'accomoder aux mesures irrégulières qui sont dans les membres des beaux ouvrages de l'Antique qui se trouvent toujours différents de ce que Vitruve nous a laissé, de manière qu'ils les auraient fallu altérer en quelque chose pour les réduire aux proportions régulières que cette méthode demande... Mon but, n'est pas tant de corriger l'antique que de tâcher de le rétablir dans son Ancienne perfection". (Perrault 1683, p.xvii)

Ultimately Perrault considered himself to be the first modern architect able to resolve the tension arising from the confrontation of the authority of precedents and tradition with the problem of the rational definition of the rules of architecture.
Chapter 6

Precedent Rule Systems and Architectural Composition in Charles Augustin D'Aviler and Pierre Nativelle's Works

6.1 Charles Augustin d'Aviler and his Cours d'architecture

In his Cours d'architecture published in 1691, Charles Augustin d'Aviler followed the example of Claude Perrault and proposed one single definitive rule system for the proportions of the five orders of architecture. However, this system, like François Blondel's was borrowed from the classical tradition. Indeed the first part of the Cours reads as a translation and a commentary on Vignola's Regola della cinque ordini. In the Epistre dedicated to Louvois, the Contrôleur Général des Bastiments and successor to Colbert, d'Aviler explains;

"L'architecte dont je vous présente les ouvrages s'est acquis une réputation au-dessus de tous les autres par la facilité de ses règles, et le bon gout de ses profiles ... j'ai cru qu'il serait avantageux pour les ouvriers et pour tous ceux qui les emploient non seulement de le remettre au jour avec une nouvelle traduction mais encore d'y joindre des remarques qui en confirment les préceptes et en facilité l'usage..." (Aviler 1691, Epistre)

Like most theoreticians, d'Aviler admired the simplicity and the methodical character of Vignola's rule system for the orders. But the concrete indications for the application of the rules of the orders in Vignola's book remained, according to him, relatively laconic. D'Aviler considered that a clarification and specification of Vignola's prescriptions was needed in
order to make them more applicable (see fig. 6.1). D'Aviler was one of the first students to attend the lectures given at the Académie Royale d’Architecture by François Blondel, and had been the travelling companion of Antoine Desgodets in his voyage to Italy from 1674 to 1681.¹ On his return from Rome, he entered the office of Jules Hardouin Mansart, where he worked as draughtsman. He soon became interested in developing efficient tools for draughtsmen and workers. In 1685, he published a translation of Scamozzi’s sixth book on the orders in which he attempted a clarification of the complexities of the architectural proportions for modern builders.² In the meantime, he also began to work on his commentary on Vignola, the Préface of which he was invited to read to the Académie in 1683.

The Cours d’Architecture was intended as a manual for draughtsmen and workers. The Cours begins with a description of geometric procedures for the drawing of regular figures. This is summarized in a first plate which illustrates a series of generic lines, surfaces and volumes. It is followed by a discussion of their application to the tracing of the profiles of the different parts and mouldings of the architectural orders. Each moulding has its importance and is reduced to a precise geometric figure. D’Aviler explains that these profiles are like the letters of the alphabet and constitute the most basic elements of architectural composition. Like a sentence, which is composed of series of letters and words, a column is made of an assemblage of mouldings and elements. In a manner also comparable to a manual of Euclidian geometry, the Cours begins with the simplest elements and progresses toward more complex forms. But the linear progression stops with the presentation of Vignola’s five orders, first discussing the rules of

The five orders of architecture according to Vignola.
intercolumniation and then a detailed description of each order. The *Cours* ends with a collection of building elements and parts conceived by Vignola, including plans, sections and elevations of complete buildings, such as the Church of the Gesu in Rome, the castle et Caprarole and several others.

This section does not present a rigorous method of composition however. In fact for d'Aviler, composition was a discipline that should be learned through the imitation of precedents, in the manner of painters studying models and not through a deductive process.³

"Après avoir fait connaître l'excellence de ses ordres et de quelques parties tirées de ses ouvrages, comme cette étude n'est utile par comparaison à l'architecture que de même que le dessin des parties du corps humain l'est à la peinture, et qu'il est nécessaire pour parvenir à la perfection de cet art de juger de la composition entière des édifices je n'ai point fait de difficulté de donner représentation de quelques bâtiments entiers de Vignole." (Aviler 1691, p.259)

The entire book is in fact conceived primarily as a collection of received elements to be carefully studied and imitated. According to d'Aviler, those studies should proceed systematically.

"Quelque soins que l'on se donne, quelque temps qu'on s'emploie pour faire avec exactitude l'examen des ouvrages antiques et ceux des modernes on en retire peu de fruit si l'on observe pas un certain ordre dans la recherche. Il faut d'abord les considérer dans leur tout ensemble et s'assurer si en général les parties sont conformes à l'usage pour lequel le bâtiments a été fait, si elles ont relations à la masse de l'édifice, et si l'harmonie et la bienséance y sont observées. Il faut ensuite entrer dans le détail des parties et y voir si les ordres y sont traités avec régularité; on ne doit laisser

échapper aucunes moulures pas même les moindres ornements, sans leur avoir jeté quelques coups d'oeil."
(Aviler 1691, p.xxiii)

D'Aviler mentions that existing buildings could be studied through prints but that students should also measure buildings in situ. It is only after years of these of exercises that an architect should try himself on architectural composition. "Lorsque l'imagination est meublée de ces belles idées, on peut inventer quelque chose pour éprouver ses forces." (Aviler 1691, p.xxiii)

D'Aviler, like many of his colleagues, believed that the power of invention of an architect did not depend on his capacity to create new elements but primarily on his ability to compose received existing elements. In his Cours, d'Aviler presented some designs based on adjustment and adaptation of existing schemes such as; a corrected version of a window taken from the Palazzo Sachetti, and an altar based on an antique niche in the Pantheon (see fig. 6.2, and 6.3).

Of course this principle of design applied especially to the orders of architecture.

"Ce n'est point montrer de génie que d'imaginer des formes capricieuses ou de chercher de nouveaux ordres d'architecture: ce que nous avons reçu des anciens sur ce sujet et que l'usage a consacré est suffisant, il ne s'agit que d'en bien faire l'application. Le bon architecte ne va pas au delà, il se renferme dans l'étude de la distribution des plans et de la décoration des façades; la variété dont ils sont susceptibles lui fournissant assez de quoi exercer son génie quelque fécond qu'il soit à produire des choses singulières." (Aviler 1691, p.xxi)
Design for window based on a precedent from the Palazzo Sachetti.
Regarding the five orders, d'Aviler suggested that architects should limit their choice to the set of elements designed by Vignola. In the imitation of precedents, d'Aviler authorized corrections when it was possible to make the original more regular; on the whole, however, corrections should only consist in minor adjustments.

6.2 Vignola and the Reception of Antique Precedents.

D'Aviler was not the first architect in France to consider Vignola an authority on the rules of the five orders. Pierre Le Muet had already made a French translation of the *Regola* in 1631. However, d'Aviler was the first to propose Vignola's system as a normative basis for architecture, thus departing from Fréart de Chambray, Blondel and Perrault's preference for Vitruvius and Palladio.

The reason why D'Aviler attributed such authority to the *Regola* was not only for the simplicity and ease of Vignola's system of rules; for him, Vignola was the modern architect who had most consistently relied on antique precedents. D'aviler supported this affirmation through an extensive collection of footnotes listing examples of ancient buildings from which Vignola could have extracted his prescriptions. He wrote; "Je montrerai par les exemples antiques les plus universellement reçus que Vignole approche plus de l'Antique que tous les autres qui ont écrit de cette matière." (Aviler 1692, p.2) But d'Aviler did not consider Vignola a slavish imitator of the Ancients. On the contrary, Vignola's system of rules appeared to him as the product of a critical mind, and as a significant advancement in the progress of normative thinking since the Renaissance.

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4 The importance of Vignola in France, especially in the eighteenth century, has often been mentioned. Indeed, in 1804, Athanase Détournelle referred to fifty seven French editions of Vignola in *Journal des Arts*, no 352, 20 prairiral, an XIII, p.374 cit. in Szambien, *op.cit.*, (1986), 37.

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D'Aviler thought that there had been an evolution in attitudes towards the remains of antique architecture since the fifteenth century. According to him, architects in the early days of the Renaissance indiscriminately reused antique fragments as ready-made construction material. Then gradually, with the rediscovery of Vitruvius's text, architects developed a more dogmatic approach to antiquity, looking exclusively for examples of the application of the rules prescribed by the Roman author. Finally, a more critical approach was developed by modern architects such as Vignola who, having carried out extensive studies and comparisons of antique remains, were able to progress significantly toward the discovery of general rules for the orders.

Vignola basically followed the general Vitruvian principle according to which proportions calculated with whole numbers were more harmonious and easier to use than those expressed with complicated fractions. On this premise, Vignola designed a general system of proportions using and adjusting measures from precedents.

"Lorsque j'ai voulu par exemple réduire à ma règle l'ordre dorique, je me suis assujetti à l'ordre dorique du Théâtre de Marcellus, qui m'a paru être le plus approuvé, et j'ai determiné sur ce modèle les parties principales de cet ordre; mais lorsque quelque moulure ne s'est pas trouvée conforme à la proportion des nombres, comme il arrive le plus souvent par la faute des ouvriers, ou par d'autres accidens qui ne laissent pas d'être considérables sur de petites parties, alors je n'ai point fait de difficulté de les accomoder à ma règle sans m'éloigner beaucoup de leur mesures. En prenant cette licence, je me suis autorisé de l'exemple des autres doriques qui ont le plus de réputation, dont j'ai pris quelques petites parties que j'ai substituées à d'autres." (Aviler 1691, p.2)
Vignola described his method of composition as a synthesis of the most beautiful features found in the architectural tradition. He too referred to a story borrowed from classical rhetoric according to which the painter Zeuxis, because he could not find a model for his idea of a perfect human figure in nature, was forced to compose his painting using the best attributes of ten different women. But interestingly, Vignola insisted on the fact that his method was not merely an assemblage of the most beautiful parts of ancient precedents, but rather a rational choice oriented toward the creation of a simple, practical system of the orders.

Je n'ai pas fait comme Zeuxis à l'égard des filles de Crotonne, mais selon que mon raisonnement m'a pu conduire, j'ai fait simplement le choix de certains ordres antiques; ... n'apportant de ma part que la distribution des proportions fondées sur des nombres simples."(Aviler 1691, p.2)

Still, d'Aviler tended to minimize the significance of Vignola's intervention on the proportions of the precedents. The simplification of the proportional systems of the orders by Vignola was attributed to his profound knowledge of antique sources, and not so much to a process of rationalization.

Il a le plus imité l'antique dans ses profils n'y ayant mêlé que quelques mesures qui sont peu éloignées de celles des originaux, ce qu'il a fait afin de tirer des plus approuvez une règle certaine ou la beauté des proportions et la facilité de l'exécution se puisse rencontrer dans un pareil degré. (Aviler 1691, p.2)

To a certain extent, Vignola, in the Renaissance, anticipated the rationalization of the orders proposed by Perrault. D'Aviler certainly valued this effort to simplify the rules of the orders. For him, however, Vignola's
simplified system represented an acceptable authority mainly because it embodied a profound respect for antique precedents and the continuity of a tradition.

6.3 Rules, Innovations and Extraordinary Practices

In adopting and facilitating the use of Vignola's rules for the orders, d'Aviler also wanted to secure a stable presence for the classical tradition in the context of the rapid transformation of the decorative repertory. The proportional rules of the five orders were the stable dimension of architecture, that part that most deeply embodied the continuity of the tradition. The other elements of architecture were considered more susceptible to change. This distinction allowed d'Aviler to conceive of a renewal of architecture within the continuity of tradition.

"Pour conserver la bonne manière que nous avons reçue par les écrits des plus excellents auteurs, il faut les renouveler de temps en temps afin de retenir les esprits changeants dans les règles générales (du moins s'ils ne veulent pas s'assujettir aux particulières)...." (Aviler 1691, p.7)

It appears that d'Aviler believed that once the general rules of the proportions for the orders were established, the rest of architecture could grow and change almost indefinitely, without risk. Indeed, the Cours was also conceived as a dictionary of models. In addition to Vignola's work, d'Aviler's Cours d'architecture included many new plates presenting works

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5 Although d'Aviler refers to "extraordinary design cases", the concept of "extraordinary practice" is here borrowed from Thomas Kuhn's interpretation of scientific practice. See Kuhn op.cit., (1962). It is interesting to note that the emergence an interest in non standard practices in science is interpreted by Kuhn as a sign of a destabilization of the dominant conceptual framework.
by Michelangelo as well as modern French architects -- designs for buildings, gardens, metal works, construction details and decorative elements. These were grouped in species, each group including many different examples.

D'Aviler manifested an unusual interest in the diversity and variety of architectural elements. The plates often grouped between ten and twenty variations. In addition to the five regular orders for instance, d'Aviler illustrated a series of twenty columns. These he defined as "extraordinaires et symboliques" as opposed to "colonnes ordinaires" (see fig. 6.4). The plate dedicated to balusters -- balustre d'apui -- presents fifteen cases divided in three series (see fig. 6.5). The first five balusters are named according to the five orders; toscan, dorique, ionique, corinthien and composite. The following five balustres extraordinaires are piedouche, cannelée, à double poire, à ceinture and à pans. The last series of balustres en gaine de termes include balustre rustique, en urne, à rebour and en vase. In discussing these different kinds of elements, d'Aviler used a vocabulary which was in no way derogatory; it was meant rather to frame the diversity of architectural forms into an explicit classification system.

This classification system varied according to the nature and the function of the element. For instance, designs for cornices were divided into those for interior decoration and those for exterior decoration. Eventually all such categories were defined precisely in an encyclopedic dictionary which was added to the second edition of the Cours as a separate volume.

D'Aviler even reproduced various designs by Michelangelo such as the Porta Pia, the gate of the Laurentian library and the giant orders of the Capitol. These, Vignola had also originally included in the Regola delle cinque ordini. They offered probably the most authoritative cases of architectural exceptions that one could present at that time. In a sense,
6.4 Charles A. d'Aviler, *Cours d'architecture*, (Paris, 1691). Different species of "extraordinary and symbolic columns".
Michelangelo's works served to legitimize d'Aviler's collection of singularities. He wrote; "les irregularités sont permises à ceux qui ont du discernement". (Aviler 1691, p.286) Furthermore, referring explicitey to Michelangelo's Porta Pia he says, "il y a des compositions heureuses hors de la sévérité des règles... lorsqu'elles portent un grand fond de dessin." (Aviler 1691, p.293)

D'Aviler believed in the imposition of rules for the proportions of the orders of architecture, but he wished also to offer a flexible reference tool open to the variety of the architectural heritage of the past, and able to adapt to and integrate innovations. This certainly accounts for the Cours' success as witnessed by the many augmented and revised editions published subsequently. The second edition prepared by d'Aviler and Jean–Baptiste–Alexandre Le Blond appeared in 1710. It included new examples of Le Blond's designs for domestic architecture. In the early eighteenth century, Jean Mariette obtained the rights to the book. He added several plans of contemporary buildings and ornaments and had the original plates enlarged and re-engraved for the 1738. The text was revised and new illustrations of architectural details and garden designs were added in Jombert's edition of 1756. Beside these four major French editions, the Cours had thirteen French printings and a German edition with four printings.6

D'Aviler's original notion of combining a general framework of rules with an encyclopedic approach to design was very influential. His Cours was a key effort to establish a balance between the authority of precedents and the need to control the changing dynamic of architectural innovations in the late seventeenth and the first half of the eighteenth centuries in France

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6.4 The Continuing Authority of Vignola in the Eighteenth Century

Vignola's *Regola delle cinque ordini* remained the principal system of reference for the rules of the five orders of architecture until the end of the eighteenth century. In addition to many new printings of the original work, various proposals based on Vignola's rules were issued. In the *Académie*, the discussion on the rules of the orders in the first half of the century evolved around adjustments and improvements to the *Regola*. Desgodets' project for a *Traité des cinq ordres d'architecture* - of which several manuscripts written between 1711 and 1745 still exist - was essentially based on Vignola, and effectively summarized the official doctrine of the Académie in the first half of the century. Only slight adjustments were made to the proportions of the corinthian capital and the doric base in order that they might correspond respectively to the proportions of those same elements in the Pantheon and in the Temple of Vesta in Tivoli. In general Vignola's orders were discussed in parallel with antique examples or with Palladio's system of proportions.

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7 On the manuscripts of Desgodets's *Traité des cinq ordres d'architecture* see W. Hermann, *op.cit.*, (1959), 34. Copies of this treatise exist at the Bibliothèque Nationale in Paris, and in the Bibliothèque de l'Arsonal. Desgodets was professor of architecture at the Académie Royale d'Architecture. Manuscript copies of his *Cours d'architecture* have been preserved in the Cabinet des Estampes of the Bibliothèque Nationale in Paris and in the library of Royal Institute of British Architects in London. Philippe de la Hire, who also taught architecture at the Académie, left a manuscript of his lectures which is preserved at the RIBA in London.

8 It should be noted that Desgodets was one of the academician who was the most committed to the study of antique building cases as source of design directives. His book on the *Edifices antiques de Rome* published in 1682, which was a landmark in the evolution of precise archaeological survey, was also conceived as as a book of models. As Hermann pointed out, academicians like Blondel for instance, were reluctant to use Desgodets's book because it tended to undermine the authority of normative treatises. Desgodets's system of orders, which included elements borrowed both form antique sources and measures taken from Vignola, can be perceived as an effort to reintroduce precedent building cases in design thinking.
In his *Nouveau traité d'architecture* of 1729, Pierre Nativelle took up the systems of Vignola and Palladio, which he ventured, in some instances, to correct or sometimes even combine. Jacques-François Blondel's doctrine of the orders, first published in the context of his article on architecture in the *Encyclopédie* in 1762, and reissued in his *Cours d'architecture* between 1771 and 1777, also constituted an adjusted version of Vignola's rule system.

6.5. Pierre Nativelle and the Rules of *Ordonnance*

In the eighteenth century, discussions of the architectural orders were not confined to the problem of the definition of the rules of proportions. The five orders were no longer treated as an autonomous theoretical problem as Fréart de Chambray, François Blondel, or even Perrault had considered them. Of course treatises on the five orders of architecture dedicated exclusively to the definition and rationalization of systems of proportions continued to appear, such as those published by François Amédé Frézier (1739), Pierre Nicolas Potain (1767) and Charles Dupuis (1762) for instance. Gradually however, the orders began to be considered within the larger framework of the problems of architectural composition. The orders were considered more in terms of "ordonnance"; as a general framework controlling the distribution of the elements in a facade or in a complete architectural composition. Of course the distinction between the order of a column and the concept of *ordonnance* was made before in architectural treatises. But as Fréart de Chambray mentioned, the subject seemed to have remained a source of confusion until the middle of the seventeenth century. The distinction between the *ordonnance* of a building, and the elements entering into the whole composition, had existed since antiquity. Vitruvius,
for instance, had mentioned that architects could imitate the proportions of a building without copying its individual elements. This division had also been a well known standard aspect of architectural design methodology since the Renaissance. Still, when Perrault published his *Ordonnance des cinq espèces de colonnes* in 1683, the problem of architectural composition had not been discussed in French treatises since Philibert de L'Orme. Perrault's dramatic distinction between these two aspects of architectural composition was nevertheless enunciated in the context of the design of the individual columnar orders. It was taken up and generalized by Cordemoy, who included a chapter on *ordonnance* in his *Nouveau traité de toute l'architecture* in 1706. But the first concrete eighteenth century French example of a treatise dealing with the use of the architectural orders as a framework for composition was given by Pierre Nativelle in his *Nouveau traité d'architecture*, published in 1729. This role was implied in d'Aviler's *Cours d'architecture* but was never developed into a methodological device for design.

### 6.6 Redefining the Representation of the Five Orders

Nativelle's book is rarely mentioned and its significance has generally been overlooked. Nevertheless it represented an important step in the evolution of the formulation of design methods in architecture. Issued in two large folios, the book contained the rules of the five orders of architecture

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9. The term "method" is used to define a rationalized form of design process. On the history of the concept of method and its impact on architectural thinking, see M. Carpo, *op.cit.*, (1993). Carpo shows that the idea of "method" which emerged in the Renaissance in the writings of Giulio Camillo and culminated with Descartes in the seventeenth century, had a determinant impact on the organization of Serlio's treatises. It must be noted that the formalization of a complete compositional method was not really achieved before Durand's *Précis des leçons données à l'Ecole polytechnique* in 1802-04, although elements of a method gradually emerged in earlier treatises.
according Vignola, Palladio, Philibert de l'Orme and Scamozzi. The entire first volume was dedicated to Vignola, and Palladio occupied nearly two third of the second volume. Only some aspects of de l'Orme and Scamozzi's systems were briefly discussed. Nativelle's position regarding the orders was traditional.

"C'est à l'exacte observation des règles prescrites pour l'exécution des cinq ordres d'architecture, que nous devons les édifices les plus accomplis qui subsistent aujourd'hui." (Nativelle 1729, intro.)

Consequently, he wrote, the purpose of the book was to offer a method allowing one to apply the most acclaimed systems of proportions of the orders to architectural compositions;

"Le but principal de ce traité est de donner une exacte étude des cinq ordres d'architecture selon les meilleurs auteurs, et plus intelligemment disposé qu'ils ne l'ont été jusqu'à présent, pour faciliter à l'étudiant le développement de leurs parties, savoir du plan, de l'élevation et de l'assemblage de ces même parties, mélangées de manière à former quelques compositions qui puissent approcher de la perfection de bâtir ou l'on est à présent." (Nativelle 1729, p.64)

The originality of the book comes through in the way the orders were represented, and through the compositions designed by Nativelle on the basis of the rules given by Vignola and Palladio. In order to present the rules of the orders in a "more intelligible way" than his predecessors, he gave them all the same height (see fig. 6.6).
6.6 Pierre Nativelle, *Nouveau traité d'architecture*, (Paris 1729). The five orders of architecture
"La manière dont les cinq ordres sont ici dessinés selon Vignole, n'est que pour représenter à l'étudiant la facilité avec laquelle ont peut exécuter celui des cinq que l'on voudra dans une même hauteur." (Nativelle 1729, pl.1)

In fact, what he proposed was to generalize the method invented by Vignola for the application of the rules of proportion in concrete design situations. This method consisted in defining the basic module of the order and in subdividing its different parts only after having decided on the actual height of the element on a facade. This practical method was admired for its simplicity and efficiency by Blondel, Perrault and others but was not adopted in their representations of the five orders. The five orders of columns were traditionally represented with a common module and therefore with different heights. This kind of standard representation, which can be found in almost every treatise on architecture before the eighteenth century, and even in Vignola's Regola, emphasized aspects of the internal theoretical consistency of the system. Since the Renaissance, theoreticians had cherished the dream of generating a whole building from one unitary dimension corresponding to the module of the order. In a concrete situation however, the actual dimension of the module of the order could only be defined after the height of the element was decided and, ultimately, after the general dimensions of the whole building were established.

This shift from a theoretical, deductive, "bottom-up" mode of representation of the orders, to a more pragmatic inductive "top-down" mode of representation, appeared in Nativelle's illustration of the parallel of the five orders of architecture designed by Vignola. In this plate, all the five

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10 The term "top-down" and "bottom-up" have replaced the notions of deduction and induction in the recent literature on the logic and automation of design thinking, like for instance, in W.J. Mitchell The Logic of Architecture. (Cambridge Mass., 1990). Françoise Chaoy, op.cit., (1980) describes these two modes of reasoning in terms of structure "ascendante" and "descendante". Carpo also uses these terms.
orders were represented with the same constant height, while the modular unit was derived from the respective subdivisions of the elements prescribed by the rules of the orders. Thus the difference between the orders was expressed through the gradual diminution of the diameter of the column.

Traditionally, discussions on the five orders in architectural treatises were isolated from concrete problems of building design. Here, on the contrary, they were integrated within a top–down design logic. The effect of this shift was perceptible in the different exercises proposed by Nativelle. It appeared particularly in his design for a church, where the general dimensions and proportions of the building were established on the basis of French precedent cases while the ordonnance of the interior was based on Vignola's rules. In this building, Nativelle explains;

"...la nef est disposée sur les proportions de celle de l'Eglise d'Amien, et le choeur sur celui de l'Eglise de Beauvais, suivant l'opinion commune qu'une Eglise composée de ces deux parties réunies en un même lieu serait sans défauts. Dans la considérable largeur de ce portail on s'est modelé autant qu'il a été possible sur celui de Saint Gervais comme étant dans ce genre le plus parfait édifice que nous ayons."
(Nativelle 1729, p.60–62)

The baldachin was described for its part as a corrected version of Saint–Peter’s. Finally the ordonnance of the interior decoration was based on Vignola's rules for the orders. Both the system of rules inherited from the classical tradition and specific precedents were used as sources of proportioning frameworks and specific ornamental motifs, but quite independently one from another.
6.7 Precedent Systems of Rules as Compositional Framework

Nativelle's distinction between the notion of *ordonnance*, the proportional subdivision of the orders, and the ornamental elements inserted within this system of proportions, was exemplified in the composition exercises he included in the book. Following the presentation of Vignola's rules for the doric order, for instance, Nativelle gave a doorway designed on the basis of the proportions given by Vignola. The author also included other compositions such as; une *Porte d'hôtel composée sur les mêmes proportions et mesures que le précédent portique doriqne avec piedestal suivant Vignole,... une Porte d'hôtel sur l'ordre doriqne suivant Vignole avec des colonnes couplées, ... une porte sur l'ordre doriqne de même proportion que la précédente mutilée en pilastre de bossage* (Nativelle 1729, pl.14–15). Here both the authority of Vignola and the doric character of the order were preserved, even though the selection and combination of ornamental elements varied.

On some occasions Nativelle combined Vignola's and Palladio's rules in a single design, as in the case of his *Porte sur l'ordre doriqne avec colonnes couplées dont l'entablement est entre Palladio et Vignole* (Nativelle, 1729, pl.25) (see fig. 6.7). In other cases, the elements used in the composition of a design were adapted from an existing monument, such as in his *Porte du dessin de Nativelle composée sur l'ordre corinhien... suivant Vignole pour les principales parties, dont les colonnes sont couplées ou se touchent par le tailloir de leur chapitaux, et dont la corniche en ce dessin est étudiée sur celle du peristyle du Louvre* (Nativelle 1729, pl.38).

As we mentioned already, the distinction between the *ordonnance* and the ornamental treatment of the orders introduced here was not new. But
what Nativelle proposed was to use this principle to establish the discipline of architectural composition on the authority of precedents while, at the same time allowing the integration of innovative architectural motives. In a sense, the tension created by d'Aviler between the authority of precedent rules systems and the need to adapt to changing taste, was here resolved and instrumentalized. In this method of composition, precedent proportional systems and designs operated as discrete entities, allowing authorities of the past to be reinstatiated in new works.
Chapter 7

The Authority of Precedents and the Rationalization of Architectural Expression in Germain Boffrand's *Livre d'architecture* (1745)

The intervention of Claude Perrault in the debate on the rules of the orders in the last quarter of the seventeenth century provoked a real crisis in the foundations of design thinking. His contestation of the essentialist interpretation of proportions inherited from the Renaissance, and his attempt to demonstrate the conventional character of the norm of beauty in the proportions of the orders, undermined the authority of the classical tradition as a potential source of absolute rules and models. His approach however, was endorsed by only a few authors, such as Sebastien Le Clerc, Francois Amédee Frézier and Pierre Patte in the eighteenth century.¹ For most other architectural theoreticians, the problem was to come to terms with Perrault's conventionalist approach and at the same time to reestablish the authority of classical precedents on positive natural grounds.

7.1 Germain Boffrand and his *Livre d'architecture*

It is in this context that Germain Boffrand published his *Livre d'architecture* in 1745. Boffrand belonged to the genealogy of the great architects of French classicism. He studied sculpture and architecture with Francois Girardon and Jules Hardouin Mansart with whom he collaborated until 1708.

¹ Sébastien Le Clerc in his *Traité d'architecture* in 1714 was very explicit about that: "Si les ordres avaient des beautés positives reconnues, les architectes auraient été obligés de convenir entre eux de leurs règles et proportions: mais ces beautés n'étant qu'arbitraires, puisqu'elles n'ont aucune démonstration constante; ceux qui en ont traité nous en ont donné des règles différentes selon leur gout et leur génie." (intro.) On the reception of Claude Perrault's ideas in France, England and Germany see Herrmann, *op.cit.*, (1973), chap.V.
Boffrand was particularly active in Paris and Nancy. His built works included several chateaux in Nancy, Cramyel, Malgrange and Wurtzburg, works at the hotels d'Argenson, Montmorancy and Soubise, as well as bridges, city gates, and industrial buildings. Moreover, he was very much involved in the building administration of France especially as Inspecteur Général des Ponts et Chausées and as an active member of the Académie Royale d'Architecture.

Boffrand's Livre d'architecture begun in 1734 and published towards the end of his life in 1745, and was partly related to the deliberations of the Académie. The book was not a standard treatise on architecture. It was conceived as a collection of concrete examples by an experienced architect for students of architecture, and contained engravings of a selection of Boffrand's most important constructions. It also included a series of essays mainly addressing issues of taste and expression. Contrary to most major existing publications on architecture, Boffrand's book did not discuss in detail the rules of proportions for the architectural orders, but did propose a general rule for the improvement of the profiles of mouldings inherited from classical tradition.

Germain Boffrand, like most architectural theoreticians associated with the Académie Royale, remained profoundly attached to the authority of the ancients and to the continuity of the classical tradition. In his Livre d'architecture he firmly reiterates his respect for the rules and models inherited from the past but indicates as well that the expression of architectural character might still be improved by a better understanding of the psychological effect of forms on the observer. According to him, the architect should be able to express any kind of character by using a limited range of regular geometric lines in the composition of the profile of architectural elements. Thus, Boffrand proposed a simplification of the
architectural vocabulary on the basis of a belief in the natural expressive propriety of geometric lines; a belief that was grounded in the scientific theories of expression of his time. While his theory was intended as a way to free the architect from the servitude of mechanical imitation of precedent cases and rule systems, his approach ultimately aimed at a reconsolidation of the authority of Greek architecture on an experiential basis.

7.2 Rules of Taste: The Reconsolidation of the Tradition of Normative Thinking at the Académie Royale d'Architecture in the Eighteenth Century

As we mentioned before, the role of the Académie Royale since its foundation, was to define the rules of good taste in architecture. For François Blondel, these rules were constituted by a set of canonical precedent rules systems and building cases taken from the classical tradition. These defined the limits of correctness in architectural design, allowing for the evaluation of individual creation in relation to a general principle of continuity within a certain tradition established over time, and ultimately embodying some profound universal truth. Good taste was, for Blondel, essentially related to the knowledge of the rules and models sanctioned by the community of experts and the tradition.

At the end of discussions that were held during the two first meetings of the Académie in January and February 1672, Blondel concluded: "le bon goust est ce qui plait à ceux qui ont du goust". For Blondel "ceux qui ont du goust", "les intelligents" as he also called them, were the experts, those who knew the rules and were familiar with precedents.

In François Blondel's mind, the relation between individual taste and the authority of tradition in architecture was not problematical. Their relationship was even tautological to a certain extent. It was assumed that
the experience of beauty derived necessarily from the recognition of the
rules deposited in the works which, by definition, could be learned through
a careful study of selected precedent rule systems and cases.

At the beginning of the eighteenth century however, the relation
between taste as a natural faculty depending on both reason and the senses,
and good taste as an educated form of aesthetic judgement, began to emerge
as a problematical issue and became a privileged topic of philosophical
inquiries. These discussions, which developed mainly outside the profession
in the world of letters and philosophy, reinforced the distinction between the
subjective dimension of taste in the arts in general, and the learned and
intellectualized dimension of good taste. In the writings of father Bouhours
and Jean-Baptise Dubos for instance, taste primarily emerges as a faculty
of the senses related to individual pleasure as well as to creativity and
invention. In fact, various conflicting interpretations of the concept of taste
were put forward during this period. Some perceived taste as something
distinct from reason and connected solely with sentiment and the experience
of a je ne sais quoi. These were opposed by others who insisted on the
rational source of taste, or more precisely on considering taste as a faculty
of judgement. Taste was eventually redefined as a natural faculty of rational
and critical discrimination. This latter interpretation served the traditional

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2 The literature on the concept of taste is vast in the historiography on aesthetic ideas.
In addition to Cassirer and Ferry's works already referred to, see T.M. Mustoxidi, Histoire de
l'esthétique française 1700–1900. (New York, 1968) and W. Tatarkievicz, History of Aesthetics,
The Hague, 1974).

3 "On ne juge donc pas les oeuvres d'art par la voie du raisonnement mais par le

4 "Je goût nous fait d'abord estimer par sentiment ce que la raison aurait approuvée
après qu'elle se serait donnée le temps de l'examiner assez pour en juger sur de juste idées." Jean-
Pierre Crousaz in his Traité du beau, (Paris, 1715), 68. This position was adopted by many authors
including Charles Bateau in Les beaux arts reduits à un même principe, (Paris, 1746) and Germain
Soufflot in "De l'identité du goût et des règles dans l'art de l'architecture," a memoir presented at
conception of good taste associated with the knowledge of rules in architecture. In this framework, the rule systems and buildings that formed the essence of the classical tradition were eventually redefined as successive manifestations of subjective and rational judgements applied to precedents.

In 1734, in the context of these new philosophical developments in aesthetic discourse and in the midst of flourishing of Rococo fashion, the issue of taste was addressed again in a series of academic meetings. Several memoirs on good taste were prepared by different members. Couronne, Beausire, Tavenot, Gabriel and Boffrand were invited to communicate their reflections to the Académie, and a Précis including their texts and others written by Blondel, Le Vau, Desgodets and La Hire was prepared and officially deposited.⁵

Boffrand's Essai sur le bon goût, included in his Livre d'architecture of 1745 originated from these discussions. On the whole, it basically reinstates the traditional rule-based conception of taste defended by the Académie since its beginnings but this time in explicit reaction to the individualist and sentimental definition of taste. He wrote:

"On dit en général du goût que c'est un certain je-ne sais-quoi qui plaît; cette idée est bien vague et ne vient que de la difficulté qu'il y a de dire les raisons pourquoi une chose plaît ou ne plaît pas; ce n'est que dans les principes de chacuns des arts que l'on peut en trouver les raisons démonstratives."(Boffrand 1745, p.3–4)

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⁵ The authors of the series of memoirs presented at the Académie during this period include: Couronne (18 January 1734), F. Blondel and Gabriel (25th January 1734), Gabriel, Boffrand, as well as definitions by Le Vau, La Hire, and Desgodets (22nd February 1734) Perrault, Beausire, Couronne, Tavenot (1st March 1734), Precis by Camus (15th March, and 15 April 1734) Couronne (10th May 1734), Couronne and Boffrand (5th and 19th July 1734). See also Desgodets (29th January 1723), Gabriel (9th January 1736).
Like Blondel, Boffrand believed that the knowledge of the principles of architecture formed the basis of good taste. However Boffrand also explained that those principles which originated from nature had been gradually clarified and formulated through history. The rules of architecture were seen as the product of a long and difficult intellectual and historical process of construction and adjustment based on experience, and not on some blind respect for the authority of the past.

"La nature a formé le germe des arts; mais la réflexion et l'expérience les ont développés et nourris, les hommes les plus éclairés ont dépouillé la nature de ce qu'elle a de trop agreste, pour n'en réserver que ce qui leur a paru plus propre à être cultivé et orné par l'art. Chaque art a ses principes; les Grecs ont commencé à développer ceux de l'Architecture, c'est une grande opération de l'esprit humain que de réduire un art en principes; ils sont l'ouvrage de plusieurs siècles, le fruit d'une profonde réflexion sur ce qui a plu ou déplu aux hommes les plus éclairés, et l'effet d'une expérience souvent redressée." (Boffrand 1745, p.4)

For Boffrand, as for most of his predecessors, the essence of architecture was contained mainly in the rules for proportioning the orders. Thus, if nature had inspired man to invent the column, the Greeks were the first have been able to formulate rules for their proportions. As Boffrand explains, the general validity of these rules was confirmed through the experience of successive generations of architects.

"L'expérience a confirmé la beauté reconnue, les hommes les plus éclairés en sont convenus dans les siècles suivants: les proportions établies pour principes; ont été approuvées, en sorte qu'un édifice parrait excellent, bon, médiocre ou mauvais à mesure que l'on y conforme ou que l'on s'en écarter. (Boffrand 1745, p.6)
For Boffrand, taste consisted in this ability to distinguish between the excellent, the good, the mediocre and the bad in architecture with respect to the relative conformity of a design to norms approved by the tradition, but ultimately sanctioned by experience. He criticized the arbitrary innovations brought by fashion, "la mode ce tyran du goût." According to him, fashion constituted more than an obstacle to the perfection of the arts; it had generally contributed to the deterioration of architectural production in the seventeenth and eighteenth centuries, as the works of Borromini or the Church of the Théâtins in Paris obviously showed. Boffrand explained that innovations, in order to be acceptable, should originate from nature, or more precisely, should appear as consequences of a natural development of accepted norms and rules.

"... il faut que ces nouveautés pour être admises, paraissent des conséquences naturelles tirées des principes déjà établis sur ce qui a plu ou déplu aux hommes les plus éclairés, des nations les plus policées, auquelles cas elles deviennent elles mêmes agréées aux principes qui sont la règle du bon et de l'excellent." (Boffrand 1745, p.5)

The role of knowledgeable architects was to protect architecture against those deviations encouraged by fashion. The Académie was expected to assume a role as warrantor of the continuity of the classical tradition and of its natural development.

7.3 Convenance and Character

In the seventeenth century, discussions about the rules of architecture were dominated by the problem of defining design directives responding to the norm of beauty. The beauty of a composition depended on its unity, which
derived from its good proportions. In the eighteenth century, however, design directives began to be redefined, primarily in order to satisfy the norm of precision in character and the pursuit of the "right expression" in architecture. Boffrand wrote:

"Chaque parties relativement au tout doit avoir une forme convenable à son usage....c'est le goût inséparable du bon sens, de la convenance et la juste proportion nécessaire à cette partie pour son usage qui en fait le mérite et la perfection..." (Boffrand 1745, p.10)

Of course the principle of convenance, also referred to as bienseance, was not a new principle in architecture. It derived from the concept of decorum which, in Vitruvius, referred to the unity of a composition and the adequate character of a work relative to its function and status. But while for the likes of Fréart de Chambray and François Blondel, the issues of convenance and character held a second rank, in comparison to the issue of beauty, their importance gradually increased in the eighteenth century, first in the writings Michel Frémin (1702) and Cordemoy (1704), and later as a central issue in Boffrand's essay *Principes tirés de l'Art poétique de Horace*.

The principle of decorum was fundamental to Horace's literary theory. Decorum, fitness or literary propriety had been discussed by Aristotle and Cicero, but it constituted for Horace a guiding and dominating principle. In the *Ars Poetica*, Horace applied it especially to dramatic poetry. According to this principle, every part and every aspect should be appropriate to the work as a whole: the relation of the subject to the chosen

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genre, the characterization, form, expression, metre, style and tone. The poet should also avoid mixing genres, or creating characters who lack verisimilitude, and nothing revolting or unnatural should be enacted on the stage.\(^7\)

In *Principes tirés de l'Art poétique*, Boffrand paraphrased the Latin poet.

"L'architecture est susceptible de plusieurs genres, qui rendent ses parties pour ainsi dire animées par les différents caractères qu'elles font sentir. Un édifice par sa composition exprime comme sur un théâtre, que la scène est pastorale ou tragique, que c'est un temple ou un palais, un édifice publique destiné à certains usages ou une maison particulière. Ces différents édifices par leurs disposition, par leur structure, par la manière dont ils sont décorés, doivent annoncer au spectateur leur destination, et s'ils ne le font pas ils pèchent contre l'expression et ne sont pas ce qu'ils doivent être..." (Boffrand 1745, p.16)

Boffrand gave many examples of characters for different building types or rooms. For instance he wrote:

"Si l'on veut faire un cabinet de musique, un salon ou se rassemble la compagne, il faut faire qu'il soit riant par sa position, par la clarté et par la manière dont il est décoré. Si l'on veut faire un mausolé, il faut que l'édifice soit traité par la matière et par un genre d'architecture et de décoration qu'il soit sérieux ou triste; car la nature forme notre coeur susceptible de ces différentes impressions..." (Boffrand 1745, p.27)

Through Horace's words Boffrand also discovered a parallel between the notion of unity of character in architecture and in painting.

"Pourrait-on ne pas trouver ridicule un tableau qui représenterait une tête humaine posée sur le col d'un cheval, ou seroit entremêlées des plumes de différentes espèces et auquels on aurait ajouté des membres de divers animaux, en sorte qu'une belle femme fut terminée par la queue d'un horrible poisson. Rien ne ressemble plus cependant à ce tableau, qu'un édifice composé de plusieurs parties différentes, sans aucun rapport les unes avec les autres et de plusieurs corps de logis et de pavillons disposés sans symétrie et plantez sur des alignements irréguliers...." (Boffrand 1745, p. 17)

Boffrand saw, in a parallel with classical poetry and painting, an effective way to enhance the new orientation toward problems of expression in architecture.

"Il m'a paru qu'il y a tant de rapport (between the principles of poetry and architecture) que l'on pouvait les joindre, en faire une très utile application, à ceux qui nous ont été donnés pour l'architecture par les anciens et les modernes et qu'ils pourraient encore les enrichir d'un caractère plus sublime." (Boffrand 1745, p.11)

By borrowing from other arts – namely poetry and painting – elements showing the importance of the principle of convenance – Boffrand sought to discover, beyond the limited sphere of architecture, principles with some general if not universal validity. But this strategy also extracted the problem of expression and character in architecture from its conventional theoretical environment, to put it somewhere in a higher sphere of preoccupation demanding a more universal type of justification.
7.4 The Rationalization of Expression and the Sanction of Precedents

In architectural theory, the expression of character depended on many aspects of the architectural form. Traditionally however, it was the orders which provided the most effective means of control of the character of a building. Boffrand wrote:

"Les ordres d'architecture employées dans les ouvrages des Grecs et des Romains, sont pour les différents genres d'architecture, ce que les différents genres de poésies sont pour les différents sujets qu'elle veut traiter..., un homme qui ne connaît pas ces différents caractères ou qui ne les fait pas sentir dans ses ouvrages n'est pas architecte. (Boffrand 1745, p.26)

Like Fréart de Chambray, Boffrand considered that the three Greek orders embodied the essential characters of architecture.

"C'est dans les proportions de l'ordre dorique, qui est le plus matériel, de l'ordre corinthien qui est le plus léger à la vue et le plus susceptible d'ornement et de l'ordre ionique qui tient le milieu entre ces deux extrémités, qu'on peu trouver le caractère qui convient à chaque espèce d'édifice." (Boffrand 1745, p.26)

According to him it was not always necessary to use columns or pilasters in a composition in order to express and control the character of a building. A simple application of the proportions of an order in the ordonnance of a facade could sometimes be more suited to the expression of a certain character.
"Il n'est pas toujours nécessaire pour faire sentir ces différents caractères d'employer dans les édifices des colonnes, des pilastres avec leurs entablements. Les mêmes proportions peuvent être données aux édifices simples et dénués d'ornements." (Boffrand 1745, p.26)

Boffrand remarked however, that it was generally more difficult to characterize a building precisely when simplicity was demanded. In such design situations, the expression of the right character depended on subtle nuances in the compositions of mouldings. According to him, the problem was that architects did not really have sound principles at their disposal for dealing consistently with the composition of mouldings. According to him, this had been at the origin of many excesses in architecture. In his critique of some recent decorative trends, Boffrand addressed this problem, and discussed its consequences for architectural characterization:

"La mode a varié les formes et les contours de toutes les parties des édifices et y a employé un mélange confus de lignes courbes et de lignes droites sans distinction des endroits où elles doivent être employées à propos..." (Boffrand 1745, p.10)

Boffrand criticized the fact that in some churches and mausolea for instance, designers had used lines which would have been better suited to the architecture of theatres or ballrooms. In his view, such a lack of convenance should not only be attributed to a misuse of architectural conventions, but to a lack of actual knowledge about the psychological effect of lines on human sentiment.

"Les différentes lignes sont à l'architecture ce que dans la musique sont les tons qui sur différentes cordes expriment la joie, la douleur, l'amour, la haine, la grâce, la terreur...le problème vient du défaut de connaissance des propriétés de
ces différentes lignes et du peu d'attention aux effets qu'elles produisent à la vue..." (Boffrand 1745, p.10)

Boffrand explained that there existed a limited repertory of acceptable lines in architecture, which, when carefully combined, could easily produce different feelings.

"Il y a trois sortes de lignes qui forment tous les édifices, la ligne droite, la ligne concave et la ligne convexe; ces trois lignes forment ainsi toutes les moulures et entre ainsi dans les profils; il faut être fort réservé pour en faire de nouvelles et ne les employer qu'aux endroits ou elles peuvent être placées. (Boffrand 1745, p.11)

Boffrand went on to develop these ideas. He discussed how lines could be joined together to create an appropriate contour with a juste grandeur and a juste saillie. He also stressed the importance of alternating large and small mouldings in order that they effectively reveal each other, otherwise the succession of similar mouldings would create waves and undulation in "gothic taste."

Boffrand attributed to the profiles of the orders almost the same value that proportions enjoyed in the theory of Blondel, comparing them with the tones in music. The form of the building was considered as important, if not more so than its proportions in the definition of character. Taking up d'Aviler's comparison between the composition of architectural mouldings and words in sentences, he wrote "Les profils des moulures et des autres parties qui composent un bâtiment sont dans l'architecture ce que les mots sont dans un discours."(Boffrand 1745, p.22) This analogy took a particular significance in the context of the emerging theory of expression in architecture, and explains why Boffrand considered the design of the profile of a building as the most difficult aspect of architecture.
This new emphasis put on the role of mouldings and profiles in architectural expression cannot be explained only as a response to the norm of *convenance*. In fact it can be understood in part in the context of Claude Perrault's reevaluation of the positive sources of experience in architecture. Indeed Perrault's reevaluation of positive and arbitrary aspects of architectural forms had, as a long term consequence, the displacement of critical attention from the problem of beauty to the problem of character in architectural theory. A new emphasis was given to the role of the orders as instruments of characterization in architecture through Perrault's reduction of the rules of the five orders to a rational system of classification. Furthermore when he designed his system, Perrault stressed that changes in the individual character associated with the different elements of the orders would be more consequential for architecture than changes at the level of their proportions, because the form of these elements, unlike their proportions was more immediately perceptible through direct experience. For Perrault, the character of the orders constituted in fact their only positive aspects. Furthermore, the shift in emphasis from proportions to the form of individual elements, and from beauty to character as the locus of positive value in architecture, implied a turn toward experience as a positive foundation for architectural principles. This aspect of Claude Perrault's theory was overlooked in comparison with the polemic surrounding the beauty of proportions. But it reemerged more explicitly in Germain Boffrand's work. Still, Boffrand did not question the importance of proportions, but attributed an unprecedented role to the profiles of the architectural elements by making them the subject of his theory of the natural character of the order.
The idea that the expression of different characters in architecture depended on the profile of the building, and that profiles could be schematized through geometric linear patterns of expression, has been compared to similar research done in painting by a contemporary of Perrault, Charles Le Brun, in his *Conférence sur l'expression* published in 1698.\(^8\) Le Brun was concerned chiefly with history painting, with the ways human emotions might be represented with due decorum so that the event depicted might be convincing. Le Brun adapted the scientific aspect of his theory from Descartes' *Les Passions de l'âme* of 1649. Thus he was particularly interested in the expression of the human face, which he conceived as a direct reflection of the affectation of the soul. He identified four positions of the eyebrows as indicative of particular emotions, and sought to demonstrate that the mouth reflected the movement of the heart. These expressions were analyzed particularly through the modification of the profile of the human face. Le Brun aimed at a scientific analysis of the principle governing expression so that painters might work, not in imitation of nature, but creatively, according to its laws.

Similarly, Boffrand wished to isolate and codify the natural laws of expression in architecture through simple geometric means, in order to allow architects to be less dependant on imitation and more efficient and creative in design. However Boffrand did not promote pure expressive freedom in architecture. Even though he attributed a particular power of expression to geometric lines, it was clear in his mind that those lines, in order to have any validity in architecture, had to be materialized through architectural elements taken from the classical tradition, and even, ideally, from ancient Greek precedents. He wrote:

"il faut autant qu'il est possible que leurs contours et leurs
assemblages soient tirés des profils employés dans les
ouvrages Grecs ils auront du crédit et deviendrons en usage."
(Boffrand 1745, p.22)

Thus Boffrand's rational theory of expression aimed at the restoration
of the authority of classical precedents not so much as a source of models
and rules, but as objects able to adapt to changes in the foundations of
normative thinking and validate the most progressive trends of thought in
eighteenth century architecture.
Chapter 8

The Norm of Harmony and the Recasting of Precedents in Charles Estienne Briseux's *Traité du beau essentiel dans les arts* (1752)

In Germain Boffrand's *Livre d'architecture* (1745), the tension between an attempt to restore the continuity of the normative tradition, and the effort to create a rational theory of expression in architecture based on the natural power of expression of geometric lines is hardly resolved. Nowhere in Boffrand's work can one find real traces of the resolution of this tension through the formulation of a new precedent-based rule system. Although Boffrand is conscious that his ideas will only find some legitimate application through a recasting process of ancient precedents, we are not able to contemplate any possible concrete applications of this theory of character. Such a method for recasting precedents inherited from the classical tradition, within a critical framework pretending to some natural validity, was developed by Charles Estienne Briseux in his *Traité du beau essentiel dans les arts appliqué particulièrement à l'architecture et démontré phisiquement et par l'expérience*, of 1752.

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1 The proliferation of competing articulations of a theory, the manifestation of a will to transgress the traditional limit of a paradigm, the expression of explicit discontent and criticism in the discourse, and the recourse to philosophy and debates over fundamentals to regenerate a coherent conceptual framework of practice are, according to Kuhn, characteristic of periods of transition in the conceptual system of a discipline. See Kuhn, *op. cit.*, (1982).

8.1 Toward a Synthesis of Reason and Experience

The title of this work clearly announced a scientific demonstration of the essential character of beauty in the arts, and particularly in architecture. As such, the book was intended as a direct response to Claude Perrault's theory, and constituted a concrete attempt to reestablish the value of proportions in the definition of design directives in architecture, on a positive and experiential basis.

In the Avant-propos of this treatise the author presents a critical review of some of the main arguments put forward in Perrault's famous Préface to his Ordonnance des cinq espèces de colonnes. For Briseux, the diversity of proportions in architecture did not offer a sufficient reason to conclude that proportions were arbitrary. According to him, in architecture, as in music, infinite variations were possible in compositions within the general framework of harmonic proportions. The proportions of buildings depend on their size, their situation and their composition, factors that are different every time. But this did not imply for Briseux that proportions were not essential, or that they should not be submitted to some rules. On the contrary, as experience confirmed, proportions constituted, in his view, an essential condition of unity and order in a work; qualities inherent to the beauty of a composition. Well proportioned buildings were seen to incite a sensation of pleasure, whether or not their proportions were immediately perceptible to the observer. Naturally, an educated observer might possibly enjoy an artistic work more than an ignorant person, even the "ignorant" will experience a sensation of pleasure. This again, according to him, tended to prove the natural character of proportions. Finally, if proportions were universally acknowledged as a condition of harmony and pleasure in music, he argued that there was no reason not to accept that they also constituted
the essence of beauty in architecture since, according to him, the essence of beauty could not be different in the various arts. Ultimately however, because the rules of harmony were more positively defined in music than in the other arts, they should serve as a model for defining the rules of proportions and harmony in architecture.

On the whole Briseux, sided with Blondel in the debates that opposed the latter to Perrault. But Briseux's approach was much more radical. While Blondel saw music as an analogy which affirmed the existence of absolute though imprecisely defined rules of proportions in architecture, Briseux proposed to directly transpose the rules of musical harmony to architecture. Moreover, while Blondel perceived, in the variations of proportions adopted by different architects, the result of an adaptation of a particular set of rules that remained to be discovered, for Briseux, these differences simply reflected various types of harmonies adapted to different situations. Briseux, unlike Blondel, did not attribute a transcendental origin to proportions. He proposed instead to look at proportions from a scientific point of view and to consider them as a natural framework of beauty. Thus, contrary to Perrault, Briseux was able to present a definitive and consistent framework for the proportions of architecture while preserving an essential connection between the norm of beauty and the nature of proportions.

8.2 Rules Against Fantasy: the Renewal of the Doctrine of Proportions

The first half of the eighteenth century in France was a period of important development in domestic architecture during which the art of distribution reached an unprecedented sophistication, and interior decoration its most
exuberant Rococo expression. Briseux was an architect whose name was associated with the design of some aristocratic mansions, but he was better known as the author of a book on domestic architecture published in 1743, which offered a series of designs for country houses. *L'Art de bâtir des maisons de campagne* was conceived as a model book but also demonstrated Briseux's ability to systematically explore architectural variables in design. It contained a careful survey of planning problems associated with various programmatic constraints and site conditions, including design strategies for irregular and complex sites. The book also provided models of interior decoration for each design.

Briseux was not opposed to the imaginative repertory of forms of the Rococo. He praised the work of Vasé, and was filled with admiration for Pineau's *"génie supérieur".* In fact, he himself had contributed to the loosening of the ties imposed on composition by classical orthodoxy. Yet, like Boffrand, he opposed a tendency he had detected among modern architects to abandon rules in favour of a hegemony of individual taste. Briseux maintained that the teaching of the proportional rules of architecture had ceased in the first half of the century. Proportions, he claimed, were the only source of the beauty and elegance of the great masters' works. But more recently architecture had degenerated, its first principles overcome by falsity and arbitrariness.

"Par quel renversement l'architecture qui a mérité le glorieux titre de la reine de plusieurs arts, seraît-elle dépourvue de solides principes, tandis que ces mêmes arts qui lui sont subordonnés ont tous des règles fixes. " (Briseux 1752, p.99)

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3 Briseux, *op.cit.*, II, 6.

4 Here "taste" must not be understood in a normative sense but as personnal preference and individual fantasy.
According to Briseux, the necessity of rules in architecture had been acknowledged since the early days of architecture.

"Le génie et souvent le hazard fût la source des productions des premiers architectes. Mais quel beauté réelles pouvaient offrir aux yeux des ouvrages de pure fantaisie qui n'étoient point assujettis à aucun principe fixe. On chercha donc des règles pour mettre un frein à la bizarrie de la licence, que s'étoient permis les premiers architectes de l'Antiquité, et pour fixer à jamais la véritable idée du Beau, on trouva ces règles dans la nature même." (Briseux 1752, p.13)

Following this argument, rules were originally conceived as means to restrain fantasy in architecture. They were not inborn to the arts, but appeared as an external framework that needed to be discovered in nature in order to constrain the human mind's inborn tendency to fantasy, and control the production of architecture. They were discovered by geometers in the measure of the human body, and in music, and were considered as mathematical evidence of the order in nature. They were then transposed to architecture.

"L'Antiquité a donc bien conçu quelles étoient la nécessité et l'étendue des proportions, Elle en avait pris l'idée dans la nature, elle l'appliqua heureusement à l'art. Les géomètres en avaient déjà donné la théorie et les sages architectes qui s'en servirent, firent admirer dans leur production ce qu'on nomme élegance et beauté." (Briseux 1752, p.14)

According to Briseux, architecture was again in need of fundamental and permanent rules; "ces règles constantes sont les proportions, règles d'une vérité mathématiques, règles fondées sur la nature, le calcul et l'expérience..." (Briseux 1752, p.65)
8.3 Architectural Science and Musical Harmony

The architectural theory and principles of proportions formulated by Briseux were founded on an analogy with the principles of harmony in music. In his view, these principles had been active in architecture since antiquity:

"Qu'on examine le détail des mesures du Temple de Salomon rapportées dans l'Ecriture Sainte, on reconnaîtra que toutes les parties de ce temple étoient entre elles dans la proportion des nombres harmoniques, Qu'on examine encore la doctrine de Vitruve sur les mesures qui y sont prescrites pour l'ordonnance générale des édifices, tant publics que particuliers, et dans ses ordres d'architecture, on verra qu'il s'est réglé sur les mêmes principes." (Briseux 1752, p.14)

Briseux accepted the analogy made by Blondel and Ouvrard between the proportions of the Temple of Solomon, those prescribed by Vitruvius, and harmonic proportions in architectural treatises. He also took up ideas from Palladio and Barbaro's writings. "Daniel Barbaro dit que les proportions qui dans la voie flattent les oreilles, sont les mêmes qui appliquées aux corps d'architecture font le plaisir des yeux." (Briseux 1752, p.15) He also referred to Alberti and even to Vignola's simple system of proportions and concluded: "nous avons lieu sur une tel autorité... de conclure sans hésiter que les proportions forment l'essence du Beau dans toute les production de l'Art." (Briseux 1752, p.17) Thus for Briseux, a respect for the principles of harmonic proportion was the very basis of the continuity of the classical tradition.

However, in Renaissance architectural theory, the musical analogy served a metaphysical purpose. It connected architecture to the archaic norm of cosmic harmony. This neoplatonic idea was still very much alive in François Blondel's theory of proportions where order and proportions were
associated with the manifestation of some divine idea. Briseux was not satisfied with such metaphysical explanations, and proposed instead a scientific justification for his principles of proportion.

Briseux devoted a whole chapter of his treatise to the explanation of the principles of arithmetic, mathematical and harmonic proportions and progressions. Following the principle and method elaborated by Ouvrard in his *Architecture harmonique*, he used the subdivision of a string — "division de la corde sonore" — to show how the principles of musical harmony which were based on combinations of simple ratios, could be applied to architecture (see fig. 8.1). This harmonic scheme was transposed to architecture as a scale allowing one to measure, evaluate and control the design of the orders.

Briseux did not restrict his discussion of the rules of harmonic proportions to a repetition of Renaissance theory. For him, harmony was not a mysterious law of the universe that manifested itself through particular numerical relationships, but rather a physical phenomenon that could be studied scientifically and represented in a mathematical model. He referred for instance, to a memoir presented at the *Académie Royale des Sciences* in 1720 by Jean Philippe Rameau on the phenomenon of harmonic resonance in which the natural sympathy between certain proportions in music was physically explained.

"Par une expérience rapportée dans les mémoires de l'Académie des Sciences de 1720, et par celle que le célèbre Rameau a marqué dans son traité de la génération harmonique, il est prouvé que tout corps sonore étant frappé, il fait entendre outre le son principal, la quinte, la tierce de ce son, ou leur octaves, d'où résulte l'accord parfait... plusieurs autres expériences que cet habile musicien a
Division de la corde sonore

Figure 1.

Figures:
- Figure 1: Octave
- Figure 2: Quinte
- Figure 3: Quarte
- Figure 4: Tierce Majeur
- Figure 5: Tierce Mineur
- Figure 6: Sixte Majeur
- Figure 7: Sixte Mineur

rapportées, prouvent l'amitié des rapports harmoniques et qu'ils sont offerts par la nature." (Briseux 1752, p.43)

Briseux even mentionned Newton's observations and experiments on the colours of rainbows as proof that an analogy could be established between the rules of proportion in music and architecture.

"Mais dira-t-on quelle relation y a t-il entre l'union des sons et celles des corps? L'arc-en-ciel nous en offre un exemple bien sensible; tout y est distigué et cependant tout s'y réduit à un. Cet effet merveilleux provient selon les expériences du célèbre Newton, de ce que les sept couleurs qu'on y remarque occupent des espaces qui sont entre-eux dans la même proportion que les intervalles des sept sons de la musique: tableau naturel que le Créateur présente à nos yeux pour nous initier au système des arts." (Briseux 1752, p.36)

Briseux also used a cognitive argument to justify his belief in the universality and natural origins of the rules of proportions based on simple ratios. For him, human understanding could be defined as the ability to perceive and establish relationships between things and ideas. Simple relationships were naturally easier to perceive than complex ones; therefore, the simpler the ratio, the better the perception. Thus, Brisuex like Perrault, associated the simplicity of proportions to some ideal condition of human cognition. Unlike the latter, however, he established a direct connection between the principle of cognitive economy, and the norm and experience of pleasure and beauty.

Briseux also attributed a physiological cause to the positive human response to the effect of proportions. In order to prove that proportions were the ultimate causes of agreeable sensations both in music and in architecture, he described the two experiences in terms of a similar physiological and
neurological process of perception. He explained that all exterior stimuli experienced through the senses in a healthy body were channelled through the same physiological mechanism; along nerves and through liquors. Furthermore, according to him, the reason why certain proportions appeared to be universally more agreeable than others was that, in normal circumstances, an analogy existed between these sensible proportions and those of the fibres, organs and liquors distributed in the human body.

Although the cosmological dimension seems absent in Briseux's text, his ideas remain deeply rooted in the Renaissance principle of a discrete, essential analogy between all the spheres of the physical and intellectual universes, including nature, the human body, music and architecture. But this analogy appears as evidence of the existence of universal laws in nature, and not as a symbolic structure allowing one to detect, in architecture, the magical presence of a cosmic harmonic model.

8.4 "Preuve par l'expérience"

For Briseux, the essential character of the proportions, and the universality of the norm of simple harmonic ratios, could both be demonstrated through an analysis of the most admired monuments of history. Briseux gave a series of illustrations entitled "preuve par l'expérience," representing buildings that were presumably designed according to harmonic proportions. They included facades of villas and palaces designed by Palladio and Scamozzi and even François Blondel's Porte Saint-Denis (see fig. 8.2). In the margins of each figure, an abstract proportional scheme — apparently derived from surveys done during the reign of Louis XIV — was given as experimental proof of the essential character of harmonic proportions.
These abstract schemes were not precise transpositions of the buildings' measurements but rather, as Briseux himself admitted, reliable approximations in most cases. In fact, all examples had been regularized to fit the demonstration. Still, these proportional grids were not a purely idealized framework: they were given as a demonstration of the existence of a general principle of harmonic proportions. From a cognitive point of view, they were intended to be read as generalizations made after experimentations.

As we have seen, theoreticians like François Blondel and Desgodets considered the irregularity of proportions in canonic buildings to be the result of optical strategies of adjustment to the particular conditions of perception of the buildings. In contrast, Briseux regularized and reframed the monuments within his own system in order to demonstrate their validity. He actually refuted the theory of optical adjustments as an explanation for the differences in proportions of canonical buildings. According to him, in many cases the irregularities that had been noticed in the proportions of the most beautiful buildings could in part be attributed to the negligence of the builders, and did not invalidate the theory of harmonic proportions. Most important however, he believed that harmonies in architecture, as in music were necessarily variable. Harmony was a general norm, it did not provide a definitive and static canonical framework for the proportions, but rather related to a general and flexible set of principles for architectural composition.

8.5 The Harmonization of Precedents

The principles of harmonic proportions and progression in architecture developed by Briseux also constituted, for him, an instrument of design and
a framework for integrating and correcting precedent building cases and rule systems. For instance, even though Briseux opposed Perrault's theoretical position, he actually closely emulated Perrault's system of proportions. Indeed his proportional system for the five orders, presented in the first book of his treatise, was a corrected version of Perrault's Ordonnance. More precisely Briseux reframed Perrault's system within a completely different but still coherent proportional system based on harmonic ratios (see fig. 8.3). Its rigour and systematic character competed with Perrault's. Furthermore, like the latter, he did not use a universal modular unit of measure but followed a hierarchical principle of proportional scale.

"J'ai suivi dans mes leçons, la méthode des anciens architectes qui est la seule qui puisse conduire avec le plus de sûreté à un heureux succès. ... l'on ne doit point coter les desseins par la voye de l'échelle mais par la règle de trois..."  
(Briseux 1752, p. 46)

The system was both more inclusive less dogmatic than Perrault's, for it did not propose a definitive way to apply specific canonical proportions. Instead, it offered a general normative framework within which the architect could operate, refine, adjust and control the entire compositional scheme. Briseux was completely at ease with the classical tradition in general. Quite significantly, the second volume of the treatise contained the rules of proportions proposed by Vignola, Palladio, and even Sebastien Leclerc, a theoretician of the orders notoriously sympathetic to Perrault. In each case, Briseux included his revised, regularized, and harmonized version of their proportions. Still, for Briseux unlike Perrault, the meaning attributed to the proportions as we have already indicated, was not purely conventional: the proportions were interpreted as a natural
framework for both perception and design, and as condition of beauty and harmonious sensations.

François Blondel, who had also persisted in proposing corrections to the systems of the traditional authorities, had not actually proposed a definitive framework of proportions for the orders. But Briseux did not share Blondel's inhibitions with respect to the authority of precedents, and accepting them both as empirical fact, and instances of design to be engaged in an analytical and critical way through a rational but flexible framework for evaluation.

Indeed Briseux defended the role of proportions as an essential aspect of architecture because they allowed an almost infinite variety of possibilities within a methodical rule-based approach to design:

"On peut varier les proportions à l'infini dans l'Architecture ainsi que dans la musique, mais le résultat de leurs différentes modulations dépend du plus ou moins de goût et d'expérience de ceux qui la compose. De plus on doit encore avoir égard aux différentes situations et aux diverses longueurs et hauteurs des édifices, cette variété demandant du changement dans les proportions.(p.4) ... Il ne suffit pas de suivre les proportions, il faut que le goût perfectionné par l'expérience en fasse le choix." (Briseux 1752, p.9)

Seventeen designs for doorways and complete buildings invented by Briseux and presented as "leçons de l'auteur" were included in the treatise. Though substantially different in their ornamentation, they were all composed on the basis of proportional harmonies. Some included architectural columns and full blown decoration, while others were very simply designed without any columns. But they all obeyed a strict proportional rigour in the subdivisions of both their plans and elevations.
Briseux's system also allowed for the use of precedents in the definition of the *ordonnance* of a design. That option is particularly significant because it demonstrates how his proportional framework still depended upon a compatibility with previous canonical buildings and the rules already set by Vitruvius, Palladio and Vignola. Thus the first design given as a "leçon de l'auteur" was a "porte toscanne réglée par les proportions de celle de Vignole" which also appeared to fit within Briseux's own proportional system. These exercises remind the examples given by Nativelle in his treatise on architecture in 1729. However, in Briseux's case, the corrections made to authoritative ordering systems inherited from the tradition were not minor, local adjustments but a more profound, global, and systematic reframing.

The normative universe devised by Briseux was presented as the result of a meeting between a scientific theory of proportion and the empirical experience of precedent rule systems and buildings. But Briseux's demonstration of the validity of proportions in architecture through precedent cases artificially constrained within an *a-priori* system of regular representation, illustrates the limit of Briseux's discourse. As in the case of Perrault's normative system, precedents here constitute both an instrument of justification and primary material to be appropriated within a rational *a-priori* intention. For Briseux however, the musical analogy served as an effective means to connect the instrumental and aesthetic dimensions of proportions, as well as to preserve an essential connection with the tradition through the actualization of its underlying ideal of harmony.
Chapter 9

Rules, Precedents and Critical Reasoning in Jacques–François Blondel's Didactic Works

Germain Boffrand and Charles Estienne Briseux developed a critical attitude toward precedents on the basis of a rigorous application of the norm of regularity embodied in a general belief in a theory of either the natural expression of geometric lines and profiles, or the natural beauty of harmonic proportions. Both authors were able to propose guidelines for a systematic reframing of precedents. Selected precedent cases were also called upon as empirical justification for a strict application and generalization of the norm of regularity, but they did not attribute any critical value to precedent cases or rule systems. A new critical status for precedent cases was to emerged later from Jacques–François Blondel's writings.

Jacques–François Blondel has often been described as a rationalist. Indeed, Blondel was interested in developing a rigorous system of architectural composition mainly based on a refinement and reinterpretation of the tradition of normative thinking on the five orders of architecture. Like Boffrand, Blondel was mainly concerned with the issue of character, and conceived of architectural composition as a means to give to each particular building an expression suited to its function and status. For him, the ideals of clarity and regularity in architecture were fundamentally related to the perceptual and cognitive problem of the legibility of character in a building.

On the other hand, Blondel did not believe in the self–sufficiency of rules in architecture. On the contrary, he defended a critical approach based on a comparative study of architectural precedents which might validate the expression of a building on the basis of the principle of the continuity and development of the French classical tradition. Thus, contrary to d'Aviler,
who saw the rules of the five orders of architecture, and the heritage of the past, as two coexisting but almost autonomous aspects of architectural decoration, and to Nativelle, who implicitly promoted the complete submission of a traditional repertory of form to the discipline of the orders, Blondel established a critical dialogue between precedent rule systems and precedent cases in which both terms were intended to inform the definition of directives for architecture and the design reasoning process.

9.1 Jacques-François Blondel and his Didactic Works

The contribution of Jacques-François Blondel to the development of architectural knowledge in the eighteenth century was closely connected to his life and work as a pedagogue. In 1743 he created the École des Arts, and began to give public lectures on architecture. After a brief interruption, during which he reorganized his program, Blondel reopened the school in 1754, proposing a revolutionary curriculum in which he offered courses for three categories of students, including future professional architects, craftsmen and amateurs. Blondel also provided basic training in architecture for future engineers at the École des Ponts et Chaussées.1 In 1755, Blondel was admitted to the Académie Royale d'Architecture, where he eventually became professor in 1762. Until his death in 1774, he continued to teach in both schools, helped mainly by former students G.P.M. Dumont and Daubanton.

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During this period, Blondel also published several works, among which *Architecture Françoise* (1752–56) and the *Cours d'Architecture* (1771–77) (completed by Pierre Patte) were especially important from a didactic point of view, summarizing Blondel's teaching method at two significant moments in his career. *Architecture Françoise* condensed the first years of Blondel's teaching at the École des Arts. The work included a long theoretical introduction on the classical principles of decoration, and a large collection of engravings representing the most significant institutional and private buildings erected in the Parisian area since the seventeenth century. This collection of illustrations comprised material from Jean Mariette's *Architecture Françoise* of 1737 as well as numerous new plates and a text by Blondel, providing a theoretical introduction and critical descriptions of each project seen through the lens of the classical principles defined in the first chapter of the book. In Mariette's publication, the plates were grouped according to building types. In Blondel's version, they were reorganized according to their geographical location in different districts, probably so as to follow the direction of the architectural visits instituted by Blondel for his students. Indeed Blondel made a regular habit of taking his

2 J.F. Blondel also published *De la distribution des maisons de plaisance et de la décoration des édifices en général* (Paris, 1737–39), *Description des festes données par la ville de Paris à l'occasion du mariage de madame Louise Elizabeth de France et de Dom Philippe, infant et grand amiral d'Espagne...* (Paris, 1740), *L'homme du monde éclairé par les arts...* (Paris, 1774) as well as many memoirs that were eventually included in the *Cours d'architecture*. Blondel who was also an engraver had some collections of ornaments printed such as *Fragments d'architecture et dessins des croisées qui décorent les façades du Louvre...* (s.d.) In addition to this material, Blondel contributed to the *Encyclopédie* with 133 articles. On this see Harrington, *op. cit.* (Ann Arbor, Mich. 1981).

students on weekly tours of Paris, explaining the relative merits and defects of the various buildings they visited. *Architecture Françoise* offered the first reliable report of his method.4

The *Cours d'Architecture*, published at the very end of Blondel's career, embodied the lessons given by the author since 1750, both at the *École des Arts*5 and the *Académie Royale*. Compared to the lectures published by François Blondel and Charles Augustin d'Aviler in the seventeenth century, which focused almost exclusively on decoration, J.F. Blondel's book formed a much more comprehensive work. The two first parts of the *Cours*, based directly on Blondel's manuscript, provided a lengthy discussion of decoration and distribution, while the third part, completed posthumously by Pierre Patte, offered the first complete didactic book on building construction. Like *Architecture Françoise*, the *Cours* combined the study of rules and principles with a critical case presentation primarily of French buildings of the Grand Siècle. Although the *Cours* recollected a large amount of written and graphic material produced between 1750 and 1771, it may be generally seen as a developed version of *Architecture Françoise*'s method and content. I will therefore refer to both series of texts and images as pertaining to the same pedagogical and cognitive framework despite their different dates of publication.

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4 See P. Collins, *op.cit.*, (1971). It should be noted that Blondel not only visited monuments and discussed drawings with his students, but also used large scale models and provided a list of cabinets and private collections containing relevant material for architects. See *Discours sur la nécessité de l'étude de l'architecture*, (Paris, 1754). On the use of models at the Académie see M. Mosser, "Models of French Architecture in the Age of Enlightenment," *Daidalos*, no.2 (1980), 83–97. "Its (the Académie) collection of models was teaching material," (86), and on the presence of architectural models in private collections see C.R. Hill, "The Cabinet of Bonnier de la Moisson", in *Annals of Science*, 43 (1986), 147–174.

5 The *École de Arts* was founded by Blondel in 1743. Blondel developed a curriculum adapted to the formation of amateurs, professional architects and craftsmen.
9.2 Toward a Synthesis of Antique and Modern Architecture

"S'il s'agissait que de rapporter les préceptes des anciens concernant l'ordonnance des édifices, ou de traiter des principes qui regardent notre distribution moderne, tant d'auteurs de réputation nous ont laissé par écrit et donné les modèles les plus parfaits de l'antiquité qu'il parraitrait superflu d'en parler ici, d'ailleurs la quantité d'exemples des édifices François que nous offrons dans cet ouvrage semblerait suffire et être le moyen le plus propre à instruire de cette partie de l'architecture par les remarques que l'on peut faire sur chaque espèce de bâtiment. Mais notre objet étant de concilier les deux genres et d'enseigner la source de la beauté de l'un et de l'agrément de l'autre, on espère que l'étude que nous proposons aura lieu de plaire et d'être regardée comme le seul moyen d'atteindre à l'excellence de l'architecture." (J.F. Blondel 1752, p.21)

According to Blondel, antique architecture offered the best examples of architectural decoration, while modern buildings provided the best cases of interior distribution. At the same time he felt that many of the modern buildings erected in France since the reign of Louis XIV deserved to be admired both for their decoration and distribution. He thought that the architecture of Perrault, Le Vau and Mansard represented successful adaptations of the principles and rules of antique architecture, and could even be compared advantageously to the buildings of the Greeks and Romans. According to him, in these buildings, architects had achieved a perfect synthesis between antique and modern knowledge, and produced a truly French, classical architecture.

"...les Mansarts et les Perraults... avec la prudence et les lumières dont ils étoient pénétrés en suivant la route des anciens, n'en n'ont pas moins créé un genre d'architecture qui
nous appartiennent, qui est à nous,..." (J.F. Blondel 1752–56, t.II p.111)

As historians have often pointed out, the position adopted by J.F. Blondel was characterized by a certain nostalgia for the reign of Louis XIV, and indeed he clearly encouraged architects to imitate the works of this period to continue to develop French architecture.⁶ This was explicit in his teaching. But it was not only this genre of architecture that Blondel wished to perpetuate, but the very conciliatory and progressive attitude behind it, an attitude which rested both on the confirmation and consolidation of basic and universal principles, as well as on a positive recognition of the values of particular examples of adaptations.

Thus Blondel conceived his didactic work as a contribution to the study and advancement of both types of architectural knowledge. He wished to assemble the complete ensemble of rules and principles inherited from the tradition of normative thinking, as well as assist in the creation of new knowledge from the study and analysis of precedents, mainly taken from within the French building tradition. Ultimately, he wished to integrate both aspects of architectural knowledge within a global methodical and critical approach to design. The format of his two main theoretical works was based on this agenda.

9.3 The Norm of Convenance and the Classification of Building Genres.

J.F. Blondel's publications were characterized by an encyclopedic approach towards past knowledge with respect to both the normative and building tradition. He had a thorough knowledge of the architectural literature

published in the sixteenth, seventeenth and eighteenth centuries in Italy, England and France, and much of the material presented in his two treatises was taken from those sources. In fact, he actually based his chapters on architectural theory on a collection of quotes taken from the best authors. But Blondel not only assembled this material, he also tried to organize it according to specific questions. Most importantly, he wished to provide a framework for the integration of this material within a rational design method. To a certain extent, his work could be compared to François Blondel's achievement of the late seventeenth century, although it involved a more inclusive and rational criticism of pre-existing knowledge.

The whole theoretical work was intended to provided directives for the composition of buildings responding to the norm of fitness or convenance.

"La convenance doit être regardée comme la partie la plus essentielle du bâtiment; c'est par elle que l'architecte assortit la dignité et le caractère de l'édifice qu'il doit élever, elle enseigne le choix des emplacements et celui des matériaux propres à chaque partie de la construction; c'est elle qui selon l'objet du bâtiment, détermine à sacrifier plus ou moins de pièces principales ou de dégagements dans un plan, soit pour la commodité personelle du maître ou de ceux qui sont en relation avec lui, soit pour celle des domestiques, c'est enfin la convenance qui détermine l'ordonnance, la richesse ou la simplicité de la décoration extérieure et intérieure... Ce que nous entendons ici par convenance est nommé par Vitrue bienséance et c'est selon cet auteur l'aspect d'un édifice dont la décoration est approuvée et l'ordonnance

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7 "...le Cours de théorie sera accompagné de citations utiles et importantes dictées et démontrées..." in Discours sur la nécessité de l'étude de l'architecture, (Paris, 1754), 14.

fondée sur quelque autorité... Toutes les différentes espèces de productions qui dépendent de l'architecture devant porter l'empreinte de la destination particulière de chaque édifice, tous doivent avoir un caractère qui détermine leur forme générale et qui annonce le bâtiment pour ce qu'il est." (J.F. Blondel 1752–56, t.I p.22)

Indeed, Blondel sought to develop a framework for an exhaustive classification of means of the architectural expression and modes of composition. Architecture was to be globally transformed into a rational system of expression — or language — providing the means, through composition for a large variety of character. Many categories of civic buildings were discussed. While *Architecture Françoise* focussed primarily on institutional buildings and hotels, the *Cours d'architecture* was much more exhaustive, including most of the standard eighteenth century categories and sub-categories of buildings. The discussion encompassed the various rooms and parts entering into the composition of those buildings. The classification of building character was organized according to building types, and included various particular cases of expression. For instance, Blondel listed seven different types of palaces: *palais Électoral, Ducal, Pontifical, Cardinal, Épiscopal, Royal* and *Imperial*. He also indicated eighteen genres of temples and churches. The *Cours* also discussed *bâtiments de magnificence*, (arches, theatres, basilicas, etc...), *de commodité* (markets, libraries, museums etc...), and *de sureté* (prisons, arsenals, harbours etc...). In addition, Blondel reviewed the kind of rooms usually included in palaces and large *hotels particuliers*. Furthermore, these buildings and rooms were classified according to their rank in the general hierarchy of civic architecture.

Parallel to the definition of the various characters of building types, Blondel developed a more generic discourse on the definition of specific
qualities such as — noble, grand, sublime, terrible, noble, champêtre, mâle, féminin, mystérieux,....etc. For instance:

"Le genre sublime dont nous venons de parler devrait être par exemple le propre de l'architecture de nos temples; en effet tout doit y parroître tracé par une main divine; leur ordonnance doit avoir un caractère sacré qui rappelle l'homme à Dieu, à la religion, à lui même.... Certaines églises gothiques modernes portent cette empreinte; une grande hauteur de voûte, qui n'a rien de vulgaire, des nefs et des bas cotés spacieux, une lumière modérée et analogue aux mystères, des façades élevées et pyramidales, une symétrie intérieure dans les cotés respectifs, en des dimensions qui annoncent des préceptes suivis quoiqu'ils nous soient pour la plupart inconnus, sont autant de beautés que l'on remarque dans les ouvrages de ce genre..." (J.F. Blondel 1771–1777, t.I p.378)

The description of these characters contained some indication about the manner in which to achieve them in design; on the whole however, they remained rather general. Still, they introduced a new level of aesthetic sophistication in French architectural discourse, partly inspired by painting and poetry.

"...comparons l'Architecture aux autres Arts. Le peintre, par la variété qu'il fait répandre dans l'ordonnance de ses tableaux, ne retrace-il pas aux yeux du spectateur, l'image des passions fortes ou tempérées, de l'action ou du repos.... Pourquoi donc l'architecture plus étendue dans ses préceptes...n'offrirait elle pas aux architectes des ressources pour varier à l'infini leur productions." (J.F. Blondel 1771–77, t.1 p.231)

Like Boffrand, Blondel clearly believed in architectural forms'intrinsic power of expression. This idea was unrelated to an effort to
define the basis of a more autonomous architectural discipline. Traditionally, sculpture had played an important role in the characterization of buildings as indices of their status and function. As Blondel explained, he intended to find, within architecture's own rules of composition, more fundamental instruments of characterization.

"Il ne suffit pas que le caractère distinctif soit seulement désigné par les attributs de la Sculpture; ce secours, employé avec ménagement, peut, à la vérité, y ajouter un nouveau degré d'évidence et de perfection; mais si ce caractère n'est remarquable que par une telle indication, l'ordonnance sera nécessairement imparfaite; les attributs amenés dans l'architecture par le ministère de la Sculpture, ne pouvant constituer seuls le genre de l'édifice. C'est la belle disposition des masses générales, le choix des formes, un style soutenu, qui donne à chaque bâtiment une manière d'être qui ne convient qu'à lui seul ou à ceux de son espèce: l'Architecture seule a le droit de fixer les lois de la convenance..." (J.F. Blondel 1771–77, t.II p.230)

Although Blondel seemed to believe in the natural expressive potential of all architectural forms, he relied primarily on the traditional system of the five orders as a basis for characterisation. He devised a systematic framework for the control, in the composition of buildings, of the general ordonnance, as well as the disposition of particular details, as a function of their character.

9.4 The Orders and the Rationalization of Composition

The system of the five orders of columns described by Blondel in his Cours d'architecture was, like d'Aviler and Nativelle's, primarily based on Vignola. Blondel indicated that he preferred "Vignole a tous les autres théoriciens
pour la simplicité de ses règles." Blondel took up the general proportions of
the orders, which progressed from one sixth for the tuscan, to one tenth for
the corinthian and the composite, but he modified the proportions in the
smaller parts, in the subdivisions of the base, column and entablature, in
order to bring more regularity to the ensemble. For the individual elements
comprised within each order, Blondel also used various sources; the ionic
order for instance, was composed of the ionic capital of Scamozzi, the
volute designed by Goodmann, and parts of the entablature proposed by
Palladio. Jacques–François Blondel considered the various solutions to the
problem of the orders proposed by the different authors as resources for
architectural composition. He wrote;

"On ne doit pas regarder les différentes oppinions de ces
auteurs comme autant de contradictions, mais au contraire
comme autant de ressources pour féonder nos

On the whole Blondel's system of the five orders was the eloquent
embodiment of the Académie's cumulative and progressive conception of
architectural knowledge, aiming toward the ultimate synthesis and
integration of all the best of the classical tradition. It was within such
profound sense of continuity that Blondel developed his framework for
architectural expression. Nevertheless in his view the role of the five orders
in architectural composition was not so much to submit the expression of
building to any form of past authority, but rather to systematize architectural
composition and make it an efficient instrument for the critical integration
of precedents.

Blondel adopted the same method as Nativelle in the illustration of
the five orders; however their representation at a same scale and with a
similar height was not, for him just a way to simplify the comprehension and application of the rules. It was directly related to the codification and experience of the different expressions of the orders (see fig. 9.1). He wrote:

"Cette planche peut donner une idée générale des cinq ordres, réduit sous une hauteur commune ce qui fait connaître plus positivement la différence du diamètre de chacun d'eux, comme on le remarque par les plans qui sont au dessous de ces ordres qui indique d'un seul coup d'oeil leur diverses expressions." (J.F. Blondel 1771–77, t.I, p.220)

The expressive power of the architectural orders was attributed to their appearance of relative solidity, demonstrated visually through the experience of the variation of one single "positive" parameter of corporeality.

The proportions of the orders were also understood as a general framework for expression within which variations of character could be achieved. Blondel mentioned that the use of columns and other elements was not always needed for the expression of a specific character.

"Par le mot ordonnance nous n'entendons pas uniquement l'assemblage des piedestals de la colonne et de l'entablement mais aussi la forme et la richesse des portes, des croisées, des niches, balustrade, fronton etc... afin que par l'aspect des édifices dont les ordres sont supprimés ont puissent reconnaître son ordonnance rustique, solide, moyenne, délicate ou composite par la raison que l'on aura de puser ses proportions dans les ordres..." (J.F. Blondel 1752–56, t.I p.62)

This method was well illustrated in a plate in the Cours showing, in parallel, two facades of similar *ordonnance* but of different character, one with *l'ordre présent* and the other with *l'ordre absent*. Here, the difference of character was not to be attributed to the use of different *ordonnances*, but
to variations in the degree of simplicity or richness of the decoration (see fig. 9.2). He wrote:

"C'est par le secours de ces nuances imperceptibles qu'on parvient à mettre une distinction réelle dans les projets de deux batiments de même genre, mais qui néanmoins doivent s'annoncer différemment." (J.F. Blondel 1771–77, t.I p.373)

Blondel's system allowed for subtle variations in the expression of a building within the compositional framework of the five orders and ultimately offered an efficient framework for the integration of an extended repertory of classical forms.

If Blondel's work had only consisted in the further articulation of d'Aviler and Nativelle's design methods, his contribution to the emergence of a critical approach in design thinking would not have been significant. However further analysis of the respective roles of rules and precedents in Blondel's thinking reveals a different picture.

9.5 The Dialectic of Architectural Judgement: Rules and the Critique of Precedents – Precedents and the Critique of Rules

Although Blondel recognized the necessity of rules, he clearly favoured the study of precedents which, according to him, offered the most reliable method for the teaching of architectural judgement. In fact, he regarded the role of rule systems in architectural education with some scepticism: "les règles seules ne peuvent guère former que des hommes froids et médiocres." (J.F. Blondel 1771–77, t.I p.452) According to him, the knowledge of rules was necessary, but needed to be confronted with a direct practical knowledge and rigourous study of concrete cases.

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9.2 J.F. Blondel, *Cours d'architecture*, (Paris, 1771–1777). Three compositions for the facade of a pavilion based on ionic proportions, respectively showing free standing columns, engaged pilasters (*ordre présent*), and a rusticated wall (*ordre absent*).
"Le goût ne peut s'acquérir que par la comparaison des chef-d'œuvres des grands Maîtres. Ce n'est point à la seule théorie qu'il faut avoir recours pour faire éclore le génie. Il est vrai qu'elle lui prépare la voie, mais c'est l'enthousiasme qui en lui faisant franchir les obstacles, l'élève jusqu'au comble de la perfection. Les seuls préceptes n'ont jamais fait un homme de génie.... Pour acquérir ce goût, il faut supposer dans l'architecte la réunions du sentiment et de l'esprit. Le premier est exité par les objets sensibles et fait son rapport au second. Tous deux réunis forment dans l'artiste le jugement qui le conduit au goût de l'art." (J.F. Blondel, 1771–77, t.I p.451–452)

According to Blondel, the experience of precedent cases and the knowledge of rules represented two different but complementary dimensions of judgement, one natural, the other acquired.

"On peut diviser le goût en goût naturel et en goût acquis. Le premier n'est point une connaissance théorique mais un sentiment des règles mêmes que l'on ne connaît pas. C'est lui qui nous cause le plaisir que nous éprouvons à l'aspect d'un bon ouvrage de l'art sans autre recours que le sentiment; le second est celui qui procure à l'âme des sensations dont l'esprit peut se rendre compte. Cette dernière espèce de goût peut être changée, modifiée ou augmentée par le goût naturel: en sorte que l'on peut dire que le goût acquis pour se perfectionner a besoin du goût naturel. (J.F. Blondel 1771–77, t.I p.451)

In fact for Blondel, the study of concrete architectural cases compared to the study of nature and had the effect of re-creating the original conditions for the emergence of the rules; "l'effet que produit nécessairement le goût, c'est de nous ramener par la voie du sentiment aux premiers préceptes de l'art." (J.F. Blondel 1771–77, t.I p.466)

Most of Blondel's treatises concentrated on critical descriptions and analyses of precedents, including some antique, some Italian, but mostly
French buildings of the seventeenth and eighteenth centuries. Of course the study of precedents was not a new feature in architectural education. The study of antique and modern Italian architecture had been part of the academic curriculum since its inception. However, Blondel was the first to attribute a central role to the critical study of modern French architecture as opposed to antique sources. Parisian buildings certainly constituted the most immediate and accessible empirical material available, "... l'on a vue naître," wrote Blondel, "tant de beaux édifices, dont l'examen ne contribue pas moins à perfectionner les architectes de nos jours que les ouvrages des Grecs ont servi autrefois à instruire les Architectes d'Italie." (J.F. Blondel 1752–56, t.I p.16)

For Blondel and his students, these buildings also represented specimens of the French adaptation of the classical tradition. The buildings of the Mansarts and Perrault were particularly admired as examples of a truly French and modern adaptation of antique principles. Blondel wished to revitalize the architecture of the Grand Siècle. He rejected the works designed by Meissonnier, Oppenord and other Roccoco artists, but not merely for aesthetic reason; their architecture was seen as an arbitrary product of some deranged imagination with no link to the French tradition. Blondel's pedagogical and philosophical position was radically incompatible with the Roccoco. He could not conceive architectural design as a pure product of the mind. His empirical approach favoured the continuity of architectural knowledge and tradition through the study of precedents and their emulation.

Precedent building cases were in fact crucial to Blondel in his effort to established directives in architectural composition. Specific modes of combination of classical elements were discussed in relation to particular exemplary models. For instance, in Architecture Françoise, Blondel identified ten different manners of decoration for building facades. For each
of them a selection of Parisian precedents was described and illustrated. For one storey buildings, he referred primarily to the Palais Bourbon and Hotel de Lassy, for buildings with a ground floor, a regular storey and an attic, Blondel cited the Hotel de Clermont and the Hotel de Noir Montier. For a facade composed of a basement and a colossal order applied to two storeys, the models were the east facade of the Louvre, Place des Victoires and Place Vendôme.

Although modern French architects were accorded preeminence in J.F. Blondel's curriculum, they were not considered beyond reproach, as Blondel's criticism shows. Architecture was to be perfected through the reasoned examination and disciplined emulation of works in conformity with the principles established by the Greeks and recognized by both ancients and moderns. Thus precedents were examined in light of the rules. Often Blondel would propose corrections and adjustments to these precedents. Even the facade of the Louvre was submitted to this critical exercise. In the Cours, Blondel illustrated Perrault's design for the Louvre in parallel with his own corrected and regularized version, where, for instance, the interpenetration of elements was eliminated in order to clarify the outline of the general composition. Blondel also proposed to block the windows on the first floor in order to adapt the building to a gallery function with zenithal lighting. Finally Blondel designed a monumental staircase leading to the main entrance which was relocated to the first level or piano nobile, so as to offer a better and more powerful architectural experience of the colonnade (see fig. 9.3).

J.F. Blondel, like Perrault, did not believe that precedents should be blindly imitated. He did suggest however, that certain rules and principles could be inferred from the careful comparative analyses of existing cases. He opted for a comparative method of study in which precedents were
submitted to a critical evaluation in relation to a particular design problem.

"N'oublions pas que la meilleure manière de perfectionner notre goût, c'est de comparer ensemble les édifices de même genre, ensuite ceux de genre différent. Peut être ces divers moyens nous conduiront-ils à découvrir les vrais principes du goût." (J.F. Blondel 1771–77, t.1 p.457–58)

The comparative analysis of precedents was not used to confirm the validity of established rules. Rather it offered the means to generate rules in a still relatively unregulated field of knowledge. In certain cases, precedents could even justify licentious practices. Blondel reviewed in detail the "deviations" introduced to architecture by architects over the centuries. While he condemned abuses, he authorized a certain licence for their occurrence in successful French masterworks. For Blondel, precedents offered empirical justifications for design, and represented a dynamic agent in the progress of architecture.

9.6 Rules, Precedents and Design Method

According Anthony Vidler, Jacques–François Blondel's teaching and design methods were based on the tradition of rhetorical education elaborated in colleges and formalized in the writing of authors such as Charles Rollin. Rollin's approach was eclectic and encyclopedic. It extracted from each canonical literary work a kind of repertoire of quotations, or morceaux choisis, suitable for all occasions — an anthology of passages for memorization and stylistic exercise each with one illustrating a moral

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attribute or a heroic act. For Rollin, examples were the most powerful of lessons.

The purpose of the exercises proposed in colleges was the learning of the conventions of the literary genre; éloge, odes, satire etc... The standard technical exercises comprised: constructing periods and discourses including considerations of rhythm, balance, harmony and cadence, practicing transposition by applying a passage from a classical author to another contemporary subject, using the same figures while only changing words and ideas, memorizing every figure of speech and every trope listed in manuals with their classical citations, and learning the art of abbreviation and amplification.

However the material included in Blondel's Cours d'architecture was not only intended to be used in a mechanical way in the context of didactic exercises. It did not constitute mere sources of imitation, but was intended to be integrated within a critical design reasoning process. In the fourth volume of his Cours d'architecture, Blondel discussed the Manière de concevoir le projet d'un Bâtiment in which he clearly described the design process as a critical activity based on the use of precedents. To my knowledge, this text is the first of its kind.10

"Nous venons de remarquer que la convenance doit être regardée comme l'un des premiers principes de l'architecture: si cela est vrai, comme nous l'avancions, un architecte intelligent doit d'abord se former une idée générale de tout son bâtiment: il doit se le représenter dans son imagination, comme s'il étoit élevé, et même comme s'il se trouvait

10 Around 1740, Blondel wrote an Abrégé d'architecture concernant la distribution, la décoration et la construction des bâtiments civils (manuscript ms 3691, Bibliothèque Mazarine, Paris) which, according to Richard Etlin, allows us to follow an architect in the genesis of his design for a home. This text was never published in an integral form. See R.A. Etlin, "'Les Dedans" Jacques-François Blondel and the System of the Home," in Gazette des Beaux Arts VI, (April 1978), 137-147.
chargé d'en faire la critique. Pour parvenir à cette examen impartial: il faut qu'il en considère la distribution générale; ensuite qu'il apprécie toutes les parties les unes après les autres, en comparant ensemble la décoration extérieure avec l'usage des dedans, soit par rapport à leurs parties principales, soit relativement à leur détails.

Après avoir conçu l'idée entière de son édifice, il doit passer à l'esquisse des plans, des élévations et des coupes, et y placer même les principaux ornements. Il doit prévoir en même temps la hauteur qu'il doit donner à ses planchers, enfin il doit déterminer les enfilades essentielles, dans l'intention que les dehors et les dedans aient une parfaite correspondance entre eux: autrement il est à craindre qu'à la faveur de quelques parties, peut-être estimables, il n'en néglige d'autres plus importantes qui ne se peuvent réparer qu'en faisant un tout autre projet: ce qui devient d'autant plus difficile, qu'on peut rarement se soustraire aux sujétions et aux entraves qui lui ont d'abord été prescrites par les personnes qui le mettent en œuvre.

... le moyen le plus sur de parvenir à bien faire, est de se rendre compte des ouvrages de l'Art que nous avons laissés les plus habiles Maîtres à cet égard: ouvrages qui fournirons à l'élève de nouvelles idées, et qui le mettrons à portée de passer avec plus de facilité, à un autre projet qu'il comparera ensuite sans précipitation ni prévention avec sa première pensée. Après ce double travail il en devra conférer avec les personnes intelligentes, pour profiter de leur avis et se regarder alors comme un juge équitable de sa première opinion avec celle des autres.

... il est à propos lorsque son projet est de quelque importance, de le laisser reposer pour quelques temps, afin de l'examiner de nouveau, comme s'il lui était étranger, et, qu'après en avoir fait une nouvelle critique, il en tente un troisième qui puisse réunir les avantages des précédents sans en avoir les défauts. Qu'on y prenne bien garde, toutes ces précautions sont indispensables, surtout lorsqu'il s'agit du projet d'un bâtiment qu'on doit planter en place neuve...." (J.F. Blondel 1771–77, t.IV p.110–112)
Blondel described the design activity as a "top down" reasoning process beginning with an idea of the general distribution of the building and ending with the refinement of the different parts of the decoration. In this process, distribution, or planning, comes first. It is the most determinant level in the logical hierarchy of the design process. The planning of a building implies the organization and coordination of spaces and different storeys according to a hierarchical system of enfilades. Once the general layout of the plan is established, then comes the composition of facades and decorative details which must reflect the interior organization of space and the character of the building.

But this analytical method based on the application of the norm of convenance and the knowledge of conventions does not provide a complete picture of the design process. In fact, according to Blondel, architects should rely consistently on the use of precedents all through the design process.

Indeed, Blondel conceived of precedents as being the principal source of ideas and having a direct critical incidence on the development of the project. The student was to compare his original idea, which might already have been informed by some precedents, to other precedents, in order to be able to criticize his project and evaluate its qualities and defects. In a second phase, a new projet integrating the corrections suggested by this critical exercise would be composed. Blondel even suggests a third phase in which this process of comparisons with precedents and previous iterations could be carried out once again, eventually ending up with a final proposal embodying all the best of the process. Precedents were seen, therefore, as catalysts in the succession of phases involving iteration, analysis, comparison, criticism and synthetic reiteration.

The conceptual process was not seen as dependant on a rigid application of rules or on the imitation of canonical models. It was described
instead as a critical appropriation of the past in the form of knowledge extracted from precedents and adapted to particular projects. Blondel wrote... "nous sommes persuadés qu'il est une imitation qui n'a rien de servile et qui nous rend propres les richesses que nous empruntons à autrui..." (J.F. Blondel 1771–77, t.1 p.xiv). Moreover, this process of appropriation, although carried out in a very regulated environment of conventions, was seen as fundamentally subjective and dependant on personal experience. Blondel wrote, "(l'architecte) doit savoir se replier sur lui même, et d'après ses sensations particulières, ses observations et beaucoup de tentatives, faire passer les chef- d'œuvres de la nature et de l'art dans les ouvrages importants, confiés à ses soins." (J.F. Blondel 1771–77, t.1, p.455)

9.7 Bernard Forest de Bélidor and the Systematization of Precedent-Based Knowledge in Hydraulic Engineering.

While J.F. Blondel critical and precedent based approach to architectural design was unique in the teaching of civil architecture, a similar and in fact more systematic approach was adopted by Bernard Forest de Bélidor in his *Architecture hydraulique*, published between 1737 and 1753.\(^\text{11}\) The two first tomes of the treatise, published in 1737 and 1739, deal with problems of mathematics and mechanics applied to hydraulic architecture. The third and fourth books, which appeared respectively in 1750 and 1753, discuss the use of precedents in design.

Taking a stance comparable to Blondel, Bélidor considered that the knowledge of *a–priori* rules, especially the rules of mechanics in engineering, was not sufficient in design. The engineer should study

\(^\text{11}\) On Bélidor, see A. Picon, *op.cit.*, (1988) and (1993).
precedents in order to be able to select the best cases and adapt them to
particular design situations. Béldor proposed an approach based on a
method of prototype refinement and adaptation which he distinguished from
the purely empirical attitude based on personal practical experience. For
him, the sum of experiences realized in the recent and distant past
constituted a source of theoretical knowledge, not just a collection of
individual achievements. In this respect he compared his approach to the
studies realized in civil architecture.

"Ainsi nous avons rassemblé de toutes parts les richesses
inestimables que l'on ne trouve que dans les sources ou nous
les avons puisées... On sait que ceux qui ont écrit avec le
plus de décisions sur l'architecture, ont tiré leurs principes
des plus beaux monuments antiques qu'ils donnent pour
exemple, nous avons de même établi nos règles sur les plus
magnifiques écluses qui ont été exécuté à Dunkerque,
Mardick, Calis, Ostende, Bouingeure, Cherbourg, Muyden
etc..." (Béldor 1753, t.III p.VI)

Béldor considered design as a process of refinement and adaptation
of prototypical cases. His *Cours* was conceived as an encyclopedia of cases
organized to be efficiently used by designers. This concern for the
instrumental efficiency of his book emerged in the evolution in the modes
of organisation and communication of knowledge between the third and
fourth books of his treatise. In Volume III, the cases were presented
according to their geographic location and included all the different types of
structures built in each particular project. In the Volume IV, the structures
were grouped according to type and compared with each other. According
to Béldor, this method allowed easier memorization of the material.\(^\text{12}\)

\(^\text{12}\) "Cette méthode de diviser la matière est propre à soulager la mémoire," (Béldor 1753,
T.IV p.X).
Furthermore, this mode of typological organization facilitated case comparisons, and the confrontation of different solutions to particular design problems. It also permitted the subdivision of the decision-making process into smaller units. On the whole the purpose of the instrument was to systematize the process that led to the choice of the better parti or solution to a given problem or to multiple interrelated problems. Indeed the reservoir of precedents was clearly seen as a source of partis.

"l'on y fait mention de ceux qui ont été exécuté ou simplement projeté chez toutes les nations tant de la part des anciens que des modernes et de ce qu'on doit observer pour former les projets en conséquence afin de prendre le parti le plus avantageux. (Bélidor 1750 t.III p.XI)

Bélidor provided all the information needed to reproduce and adapt these partis.

"Les plans, les profiles et élévations que l'on en rapporte expriment si nettement ce qui mérite d'être distingué que l'on peut à l'aide des instructions qui les accompagnent en exécuter dans le même goût, et faire mieux encore à certains égard montrant ce qui a été bien ou mal entendu et en termes de précision auquels la pratique peut atteindre. (Bélidor 1750, t.III p.XI)

In addition to the multiples cases presented in this book, the author included several inventions and reconstructions of buildings. Some of them were designed "in the manner of" or "in the taste of" another cases, with the example of the shipyard for the construction of galley dans le goût de celle de Marseille (see fig. 9.4). This design method, which consisted in the appropriation of a given precedent, recalled Nativelle's attitude toward the rules of the orders given by Palladio and Vignola more than it did Blondel's
Design for a shipyard based on a precedent in Marseille.
critical reasoning process. Indeed, Bélidor even intended to transposed to hydraulic architecture the method of proportional control elaborated in the domain of the architectural order. However, he believed that this modular system could be applied to the codification and classification of prototypical precedents and eventually, to the rationalization of the design process. Although he did not fully develop this system, he gave an example of this method applied to the design of locks (see fig. 9.5).

"Comme jusqu'ici, la grandeur de leur membres a été arbitraire, nous les avons assujetti à des règles générales dans le goït de celles qui sont établies pour les ordres d'architecture, c'est à dire qu'à l'imitation des architectes qui divisent le demi diamètre inférieur de la colonne en un certain nombre de parties égales afin de déterminer les membres d'un ordre nous avons divisé la largeur des écluses en douze modules pour fixer les leurs, et en partant de cette base fondamentale, réglé les dimensions de leur charpenties, la force de leurs serrure et celle des pièces de bronze qui entre dans leur exécution qui est rendu par là extrêmement commod. (Bélidor 1750, t.III p.V)

Finally, Belidor proposed a classification of the locks in categories corresponding to the diameter of the lock, itself regulated by the depth of water needed for different categories of ships in the manner of the different orders of columns.

It is interesting to realize that contrary to the general opinion shared by most historians today, architecture was not at the time, a retardataire discipline compared to engineering. Belidor's treatises show for instance, that the modular control of ordonnance elaborated within the conceptual framework of classical architecture was seen by engineers as a potential instrument for the rationalization of precedent–based design. But one must also appreciate the fact that Bélidor was probably the first author to propose
Method for the definition of the proportions of locks.
the general use of a modular ordering system for the global control of engineering design based on the use of prototypes.

Bélidor taught at the École Militaire, and was a close colleague of J.F. Blondel, who was responsible for initiating future engineers to architecture. Blondel acknowledged the value of Bélidor's treatise in his Cours, therefore the influence of Bélidor's work on J.F. Blondel in particular should not be underestimated. Significantly, the four volumes of Architecture Françoise, and the two last tomes of L'Architecture hydraulique appeared almost simultaneously, illustrating the increasing importance of critical studies of precedents in design thinking in the middle of the eighteenth century and their close connection to the consolidation and increased autonomy of the different disciplines in relation to the production of built environment.
Chapter 10

The Experience of Precedents and the Principles of Architecture in Nicolas Le Camus de Mézière's *Le génie de l'architecture ou l'analogie de cet art avec nos sensations* (1780)

For Le Camus de Mézière, the canonic examples of antiquity had no authority whatsoever. They represented neither models to imitate nor examples from which to extract some rules or design principles. This antique universe of conventions belonged to the past. Taste had evolved since antiquity and the sensitivity of French modern people demanded in Le Camus de Mézière's eyes, a more sophisticated understanding of the effects and sensations provoked by architectural forms. Nonetheless, according to him, modern architects must continue to use the forms of classical architecture and especially the five orders, which constituted the basic framework for the control of expression in building design.

However, the profile and proportions of the orders were not seen as the only source of sensation and emotion in architecture. According to Le Camus de Mézière, the experience of architecture was largely conditioned by the changing appearance of forms under different conditions of perception, most notably affected by lighting conditions. It was imperative that the architect develop a knowledge of those visual effects and their impact on sensation in order to use them effectively in the characterization of buildings. This knowledge was not given. It was to be inferred by analogy from the empirical observation of buildings, nature and other forms of artistic expression, most notably painting, scenography and garden design.

On the whole, Le Camus de Mézière attempted to set the basis for a new science and art of expression in architecture founded on an empirical understanding of the effect of architectural forms on human sensations and
emotions. Most important however, this direct empirical and subjective engagement with multiple sources of sensation becomes a platform for a criticism of the notion of authority as a ground for the definition of norms and directives in design.

10.1 Antique Architecture and Modern Sensitivity

_Le Génie de l'architecture ou l'analogie de cet art avec nos sensations_, published in 1780¹, was mainly dedicated to the study of the principles of distribution and decoration in domestic architecture, illustrated by the case of a typical large country house. Le Camus de Mézière systematically described the character of each part and room in the building as well as the particular composition of elements and effects that should be used, in order to stimulate particular sensations in the viewers' mind and soul. His purpose was to provide directives for the design of a modern domestic environment adapted to modern French sensitivity. According to Le Camus, the architecture of modern country houses had reached a very high level of sophistication compared to the antique villas of the Romans, such as the one described by Pliny for instance. This was why, he thought, such illustrious cases could be of little help for contemporary designers, especially regarding interior distribution and decoration.

"... parcourons d'un oeil rapide les édifices des anciens Romains, ces vainqueurs de la terre: ils donnaient tout à la décoration extérieure, ainsi que les Grecs, et les dedans

n'étoient nullement commodes, il n'y avait aucune relation entre chaque pièce, le décor du dehors fixoient leru étendue. ... Que l'on voit la description que Pline nous a faite de ses maisons de campagne....(Le Camus 1780, p.81)

"Nous pourrions aussi cité les maisons de Ciceron, suivant le rapport de Salustre, celles de Pompée, la magnificence des édifices de Lucius Lucullus, de Sylla et tant d'autres Romains. Mais ces descriptions ne seroient pas d'une grande utilité pour l'objet qui nous traitons; elles ne nous offriraient que la manière dont les anciens se logaient, qui est fort différente pour la distribution que celle que nous employons en France. Nos moeurs ne sont pas les mêmes non plus que nos usages: nous nous contentons donc de nous renfermer dans ce qui nous est relatif, et nous dirons que le français seul, entraîné par la volupté a rafiné sur les aissances..." (Le Camus 1780, p.85)

Indeed in the first half of the eighteenth century, the art and theory of distribution in France had developed greatly. Many of the most significant treatises written during this period addressed problems of domestic planning, such as *De la distribution et de la décoration des maisons de plaisance* (1737–38) by J.F. Blondel, *L'art de construire des maisons de campagne* (1743) by Briseux, and even Boffrand's *Livre d'architecture* (1745). Like J.F. Blondel, Le Camus was convinced that the art of distribution was the most important French contribution to modern architecture. But he also considered that the evolution of the art of planning had not been followed by a parallel transformation in the decorative aspect of architecture. He intended to remedy to this situation by providing the means to shape the decor of domestic architecture in a way analogous to the constitution of the modern homme sensible.

"Ingénieux Français notre siècle voit briller avec étonnement l'étendu de vos talents. L'homme sensible admire les
heureuses distributions que vous avez inventées. Tels sont les progrès que vous avez fait faire à l'architecture: encore un pas et bientôt il sentira son âme se développer et prendre un essor sublime...". (Le Camus, 1780, p.86)

According to Le Camus, a standard apartment was usually composed of at least five rooms, including: antichambre, salon, chambre à coucher, cabinet and garderobe. However, French refinement had engendered new needs and many other rooms often had to be added to this standard sequence. The typical case described at length by Le Camus was a developed version of a standard country house, reflecting the sophisticated way of life of late eighteenth century French society. According to the author, the level of sophistication demonstrated by this case was not exceptional. It had become the norm in French society, not only among members of the royalty and aristocracy but even in bourgeois society.

"Qu'on ne croit pas que ce soit un palais de roi dont nous faisons la description. Un particulier porté au faste par la richesse, exige cette profusion de logements. Une actrice, une petite maîtresse vont souvent plus loin." (Le Camus 1780, p.90)

The mutation of French eighteenth century society was seen by Le Camus as a pretext for the development of a new aesthetic discourse for the renewal of directives associated with the expression of character in architecture. The planning and decoration of a house had become a complex and subtle task demanding an unprecedented awareness of the conventions and nuances of character suited to each category of building and even to each type of room within one single building. In the case of a country house he wrote:
"il faut un rapport entre elle dans la superficie, dans la hauteur des planchers enfin dans la décoration: la marche de cette dernière partie est prescrite, mais elle est fine et délicate, elle exige beaucoup de goût et de prudence. On doit passer de la simplicité à la richesse. Le vestibule alors est moins orné que les antichambres, les antichambres moins que les salons et les cabinets etc... Chaque pièce doit avoir son caractère particulier. L'analogie, le rapport des proportions décide de nos sensations; une pièce fait désirer l'autre, cette agitation occupe et tient en suspens les esprits, c'est un genre de jouissance qui satisfait..." (Le Camus 1780, p.44)

Ultimately the development of new knowledge about the relation between architecture and sensation appeared as a response to the changes in society and as an effort to adapt classical architecture to modern taste.

"il faut ... rendre nos demeures analogues à nos goûts, à nos désirs et aux différents besoins que le luxe enfante chaque jour, tant pour notre satisfaction personelle que par rapport aux usages et aux moeurs de la société dont nous faisons partie. " (Le Camus 1780, p.79)

10.2 Effects Produced by Precedents and the Definition of Architectural Principles

Although Le Camus de Mézière concentrated on the study of domestic architecture, his book raised questions that had global effect on the traditional definition of architectural knowledge, and opened the way to a transformation of design thinking. In his mind, the five orders of architecture remained the most important instrument of characterization in architecture, both as a source of sensations and as a framework for the control and unification of the composition of buildings. However, according to him, if
the orders were to continue to play this essential role, architects should definitely abandon the imitation of antique models, a practice which, in his opinion, had become mechanical.

"Jusqu'ici on a travaillé d'après les proportions des cinq ordres d'architecture employés dans les anciens édifices de la Grèce et de l'Italie: c'est un modèle précieux; on ne pouvait mieux faire. Mais combien d'artistes n'ont employé ces ordres que machinalement, sans saisir les avantages d'une combinaison qui pût faire un tout caractérisé, capable de produire certaines sensations, ils n'ont pas conçu plus heureusement l'analogie et le rapport des ces proportions avec les affections de l'âme." (Le Camus 1780, p.2)

Following the path established by Boffrand, Briseux and Blondel before him, Le Camus de Mézière believed that objects had a natural power to raise sensations analogous to their intrinsic character.

"Dans les objets innamés, la forme nous rend les uns flatteurs, les autres défavorables... Pourquoi les productions de l'art dont je traite n'auraient elles pas le même avantage. Une construction fixe nos regards par sa masse; son ensemble nous attire ou nous repousse. En examinant un monument nous éprouvons différentes sensations opposées les unes aux autres; là c'est la gaitée, ici la mélancolie...Quelles sont les causes de ces différents effets. Démêlons les s'il est possible. L'existence n'en n'est pas douteuse..." (Le Camus 1780, p.4)

For Le Camus, existing buildings represented an empirical reality from which principles should be inferred through observation. Like a scientist who discovers the cause of natural phenomena through his observation of reality, the architect should observe architecture in order to indentify the causes of certain sensations, and from these observations, extract specific means of composition. Still, the objects of observation
should be taken from the most acclaimed French buildings, beginning with the architectural realizations of the *Grand Siècle*.

"Il existe...d'heureuses productions de ces vastes génies, vraies phénomènes de leur siècle: prenons les pour modèles: discutons les avec une attention raisonnées, démêlons les causes qui les font agir sur notre âme et par cette voie formons nous des principes. Notre objet est de développer ces causes par nos observations sur les Édifices les plus remarquables, sur ceux qui nous auront frappés, et d'après les sensations que nous aurons nous même éprouvées." (Le Camus 1780, p.2–3)

"C'est dans l'ensemble des édifices connus qui excitent en nous différentes sensations, c'est dans les détails, dans la descriptions du lieu et des masses que nous puiserons des principes, sur lesquels ceux qui ont traité jusqu'ici de l'architecture ont passé trop légèrement." (Le Camus 1780, p.22)

Le Camus discussed the sensations one might experience during the visit of the most acclaimed monuments of the reign of Louis XIV. He described the feelings provoked by the colonnade of the Louvre, Val de Grace, the Sorbonne, the Collège des Quatres Nations, and Versailles, as well as more recent edifices such the Mint and the Opéra. The composition of these buildings appeared as an inexhaustible source of various sensations.

"Arrêtons nous par exemple à l'intérieur du Dôme des Invalides: quelle sensations n'éprouvons nous pas. Nous sommes remplis d'étonnement et d'admiration, notre âme est élevée. Saisis d'une espèce d'extase, il semble que nous participions à la grandeur du Dieu qu'on y adore. Si nous considérons le dehors du Dome, sa forme piramidale et la base sur laquelle elle s'élève majestueusement, nous somme aussitôt pénétrés d'un sentiment de grandeur et de magnificence." (Le Camus 1780, p.18)
"Ce sont donc les dispositions des formes, leurs caractères, leurs ensembles qui deviennent le fond inépuisable des illusions. C'est de ce principe qu'il faut partir lorsqu'on prétend dans l'architecture produire des affections, lorsqu'on veut parler à l'esprit, émouvoir l'âme et ne pas se contenter en bâtissant de placer pierres sur pierres, et d'imiter au hasard des dispositions, des ornements convenus ou empruntés sans méditation." (Le Camus 1780, p.7)

Le Camus did not admit that classical architecture might be conventional. For him, conventional – or "bad" – architecture was based on the mechanical repetition of pre-existing motives. For him, the rules of architecture could not be derived from precedents on the basis of their authority, but should be inferred from the direct experience of built cases. Such empirical experience opened the way to the discovery of architectural rules analogous to the natural laws that govern human sensations.

10.3 The Source of Sensation within the Conceptual Framework of Classical Architecture

For Le Camus, the causes of sensations were various, but in many respects, they could be described in standard classical terms. First, they depended on the form of objects. Referring back to the theory of human expression developed by Le Brun and taken up by Boffrand, he wrote:

"Plus j'ai examiné, plus j'ai reconnu que chaque objet possède un caractère qui lui est propre, et que souvent une seule ligne, un simple contour suffisent pour l'exprimer. La face du lycon, celle du tygre et du lèopard, sont composées d'un assemblage de traits qui les rendent terribles, et portent l'épouvante dans les âmes les plus fermes. On appercoit dans la tête du chat le caractère de la trahison: la douceur et la bonté sont peintes sur celle de l'agneau; le masque du renard
annonce la finesse et l'astuce; un seul trait les caractérise."
(Le Camus 1780, p.3)

However, the proportions still constituted the most important intrinsic factor conditioning the expression of architecture. In this respect, Le Camus completely endorsed the traditional Vitruvian position on the character of the orders.

"Les proportions générales de l'architecture ont avec celle du corps humain, une analogie frappante et semblent prises d'après les principaux caractères que nous y remarquons. Il y en a de forts et robustes; il y en a de délicats et d élégants. C'est sous cet aspect que nous considérerons les cinq ordres d'architecture, savoir: le toscan, le dorique, l'ionique, le corinthien et le composite." (Le Camus 1780, p.22)

As for J.F. Blondel, the orders of architecture constituted an ordering framework allowing some control on the character and unity of the entire composition. Le Camus considered that rules for the proportions of the orders were necessary in order to impose some limit on the imagination of designers which, he believed (like Briseux), tended to be naturally licentious.²

These general rules, he thought should be set in order to offer the simplest and most effective instruments for design. They could not be arbitrary but had to be based on sound natural principles of harmony. "A l'aspect d'un beau monument, les yeux jouissent d'un plaisir aussi flatteur que les oreilles dans l'art sublime des sons." he wrote. (Le Camus 1780, p.11). Like Briseux, he referred back to the precedent work of Ouvrard, the measures of the temple of Solomon given by Villapando, and ultimately to Pythagorus himself to justify this principles.

² It is interesting to note that Le Camus's interpretation of Perrault's position in this respect is biased and distorted when he writes: "En vain s'est on récrié contre les systèmes. Mal à propos M. Perrault a-t-il écrit qu'il ne devoit point y avoir de proportions fixes, que le goût seul devoit décider; qu'il étot nécessaire que le génie ait des écarts, que les règles strictes et trop multipliées le rétrécissoient, semblotroient le circonscrire et le rendoient pour ainsi dire stérile." (p.13).
"Nos principes sur l'analogie des proportions de l'architecture avec nos sensations sont calqués sur ceux de la plus grande partie des philosophes. On erre point suivant la nature; sa marche est une, Pithagore nous le dit." (Le Camus 1780, p.9)

Le Camus showed a particular interest in Père Castel's attempt to apply the principles of musical harmony to the visual field of colours. He was impressed by Castel's idea for a Clavecin des couleurs, a real sensationalist machine, designed to create a concert of sensations and emotions through a harmonious, analogous combination of sounds and colours. According to the inventor, each sound would have been associated with a colour so that when a musical composition was performed, a simultaneous concert of colours would be made visible.

For Le Camus, the norm of proportional harmony emerged as an essential aspect of compositional unity, but more importantly, it constituted a fundamental condition of expression through precise sensations and feelings.

"L'harmonie est le premier mobile des plus grands effets; elle a sur nos sensations le droit le plus naturel; les arts dont elle est la base portent dans notre âme une émotion plus ou moins délicieuse." (Le Camus 1780, p.10)

General rules were given for the proportions of each order – seven, eight, nine, ten, and eleven diameters for the height of the respective orders, a third of the height of the column for the order's pedestals and a fourth the entablatures. For the details, Le Camus referred the reader to Nicolas Potain's Traité des ordres d'architecture of 1767 as a possible source of directives. Potain's systems combined the characteristics of some of the most widely accepted prescriptions formulated by authors on architecture.

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3 Le Camus, op.cit., (1780), 25.
The proportions of the columns were based on Vignola's *Regola dell' cinque ordini di architettura* and on Desgodets' unpublished *Traité des cinq ordres d'architecture* which was taught for a long time at the *Académie*;\(^4\) while the proportions of entablatures were taken from Perrault's *Ordonnance*.\(^5\) However Le Camus did not find it important to mention those indirect sources. Instead he attached particular importance to the regular geometric definition of the mass and projection of every element.\(^6\) The general system was simple, harmonic, regular, and to some extent flexible in the details. But it had no significant connection with any antique, Renaissance or even modern French authorities.

10.4 Other Sources of Effects: Scenography, Painting and Garden Design

Le Camus believed in the intrinsic expressive power of geometric forms and harmonic proportions. In this sense he aligned himself with an already well established tradition of normative thinking. However, he was also convinced that the actual expression of a building depended on its appearance, which tended to change under different conditions of perception. Thus according to him, architects should not only possess rules for the proportions, but should also be aware of the causes affecting the appearance of buildings, and more specifically, they should understand the effects of light, shadow and massing on sensation and emotion and on the perception of architecture.

\(^4\) Desgodets received the official approbation for the printing of his *Traité des ordres d'architecture* on January 13, 1712 but the book was never published. (Arch. Nat. o 1 1087, fol.64) Manuscripts copy written by students can be find until 1745. On Desgodets' treatises see Herrmann, *op.cit.*, (1959), 34–35.


\(^6\) "Pour former la masse de la saillie de la base..." and, "Voulez-vous la masse des entablements....," Le Camus, *op.cit.*, (1780), 28.
Clearly, Le Camus conceived architecture as an art of effects comparable to scenography and painting. Indeed for him scenography was the paradigmatic example of an art form dedicated to the creation and control of visual effects for the communication of sensations and emotions.

"Jetons les yeux sur les décorations de nos théâtres, ou la simple imitation des ouvrages enfantés par l'architecture détermine nos affections. Ici c'est le Palais enchanté d'Armide; tout y est à la fois magnifique et voluptueux, on devine qu'il fut élevé par les ordres de l'amour. La toile change, c'est le séjour de Pluton qui porte l'horreur et l'effroi dans nos âmes. Voyons nous le temple du Soleil, il produit l'admiration. L'aspect d'une prison fait naître la tristesse...." (Le Camus 1780, p.5)

Le Camus told of his admiration for the artistry of the great eighteenth century master of scenographic illusions, Servandoni.

"Le fameux Servandoni dont le génie fécond et la connaissance des secrets de son art nous ont surpris et charmés sur la scène a su dans un spectacle muet, faire éprouver l'effet de l'ardeur brulante du soleil. On y voyait le camp de Godefroid en proie aux feux de la canicule; presqu'aucune ombre, un ciel rougeatre, une terre aride, un effet de lumière qui rappelait celui d'un air enflammé, tout y produisait une illusion dont aucun spectateur n'étaient à l'abris... " (Le Camus 1780, p.6)

Le Camus de Mézière, who used to organize similar "silent spectacles" in a small theatre located on his own estate, was fully aware of the means offered by scenography and their potential for architecture. For

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8 See Vidler, *op.cit.*, (1990), 52.
him the forms, masses, and the play of light and shadow constituted the basic material for the creation of architectural illusions.⁹

"On ne saurait être trop attentif aux masses d'un édifice, à l'effet qu'elles peuvent produire dans leur élévation au plus ou moins de lumière qui peut en résulter; les ombres doivent tempérer les jours, et la lumière doit tempérer les ombres. C'est dans ce principe que réside la réussite; dans lui seul on peut trouver le vrai beau..." (Le Camus 1780, p.62)

The discourse on painting also offered a good conceptual framework to describe and qualify the work of the architect.

"Il faut que comme un habile peintre, il (the architect) sache profiter des ombres et des lumières, qu'il ménage ses teintes, ses dégradations, ses nuances, qu'il mette dans le tout un véritable accord, que le ton général soit propre et convenable; il doit en avoir prévu les effets et aussi circonspect sur toute les parties que s'il en avait un tableau à produire." (Le Camus, 1780, p.62-63)

Le Camus not only conceived architecture in scenographic and 246 pictorial terms, but also saw, in the study of theatrical decoration, painting, and engravings, an important source of knowledge for architectural composition.

"l'artiste doit développer ses talents et faire connaitre l'étendue de son Art. Qu'il donne essors à son imagination, mais surtout qu'il l'égaie. Il peut échauffer ses idées par l'étude des tableaux et des estampes, par celle de nos décoration de théâtre" (Le Camus 1780, p.142)

⁹ On the scenographic conception of architecture in late eighteenth century domestic interior decoration see also Vidler, op.cit., (1990), 52-55.
Finally recent developments in the discourse on picturesque garden design disclosed a whole area of application of pictorial principles to design, offering examples of the control of visual effects of mass, light and shadow which were more specific and relevant to architecture. Le Camus was particularly influenced by François Morel and Claude Henri Watelet, the latter whom he considered a "vrai philosophe" and to whom his book was dedicated. Watelet's *Essai sur les jardins* of 1774, and Morel's *La théorie des jardins* of 1776, contained the fundamental premises and norms of picturesque aesthetics. On the whole, the gardener was expected to act like a painter, distributing masses, shadows and light sources to create characteristic landscapes. These works were a direct source of inspiration for Le Camus.

"Depuis que nous avons différents traités sur les jardins qui font honneur à ceux qui les ont donnés, nous en avons saisi plusieurs idées... tel a été l'objet de notre étude...c'est dans ces sources que nous avons puisé..." (Le Camus 1780, p.15)

"Que de scènes agréables et quels tableaux n'offrent pas les jardins de cette espèce... L'ensemble, les masses, les proportions, les ombres, les lumières ont servi de base à nos combinaisons. Nous avons tâché d'en concevoir les accords, de les analyser, de déduire des principes, d'établir des règles." (Le Camus 1780, p.15–16)

10.5 The Pictorial Paradigm: Architecture as Tableau

In general Le Camus subscribed to the traditional principle of *convenance*. According to him:

"le style et le ton doit se rapporter au caractère de l'ensemble, et l'ensemble doit être pris dans la nature, dans l'espèce et la destination de l'édifice qu'on veut élever.... L'appartement
d'un homme riche peut comporter la prodigalité et la somptuosité des ornements et des dorures. C'est le palais de Plutus, la magnificence fait son caractère... L'appartement d'un grand doit être traité avec noblesse et majesté; les belles masses préviennent les sensations, les profils l'exitent, les ornements la décident..." (Le Camus 1780, p.45)

But Le Camus was not content to discuss the character of buildings, apartments and rooms: he wished to provide the means to translate them effectively in architecture. For him, the traditional normative discourse based on conventional and numerical prescriptions was not sufficient. His normative discourse was formulated in categories of "tableaux".

"Il est bon d'avoir parlé du caractère relatif au genre de personnes pour lesquelles on peut batir, mais ce n'est pas assez; comme il est des loix générales et des moyens particuliers pour les exprimer, passons les en revue, ce sont des tableaux que nous avons à considérer." (Le Camus 1780, p.156)

His description of individual rooms stressed the effect of points of view, frames and sequences of spaces and depicted the atmosphere created by shadow and light. Le Camus also insisted on the importance of the building's situation in the landscape, its orientation, the position of openings, the tones of colours and the quality of material.

Le Camus began his description of an ideal maison de plaisance with the way different characters could be achieved through the composition of the masses of the building and their relation to the landscape. For instance, to create a composition dans le genre terrible he explained;

"Le genre terrible est l'effet de grandeur combiner avec la force... il s'agit de developper les objets dont la grandeur est le caractère, et de donner plus de vigueur à ceux qui se
distinguient par la force: on marquera avec soins ceux qui impriment la terreur en jetant ça et là quelques teintes obscures et propres à inspirer la tristesse, les avant corps saillants sont un des moyens dont on peut se servir, quelques percées qui se terminent sur un endroit sombre et obscure, ou la vue puisse à peine pénétrer à travers les ténèbres, seront une vraie ressource... d'un autre côté on laissera apercevoir si l'occasion le permet, de ces lointains vagues et non déterminés, ou il ne se présente aucun objet sur lequel la vue puisse se reposer. Rien de plus terrible, l'âme est étonnée, elle frémit. Les masses fières et hardies sur lesquelles les yeux ont été fixés tout d'abord l'on préparé à cette sensation." (Le Camus 1780, p.60)

Le Camus spent most of the book discussing interior design in similar pictorial and scenographic terms. Describing the seconde antichambre of a suite he wrote:

"c'est dans cette pièce qu'on doit commencer à ressentir le genre de sensation qu'on aura à éprouver dans les pièces qui suivent: c'est pour ainsi dire une avant-scène à laquelle on ne peut apporter trop de soin pour annoncer le caractère des Acteurs. (Le Camus 1780, p. 101)

Each room for Le Camus should have a particular character suited to its function, the function being that certain way the room was used. But what the architect should be concerned about, was not so much the creation of facilities, as the conception of a decor embodying the spirit, character and atmosphere of the place. This was well illustrated in a description of the chambre a coucher which appeared as a pure decor revealing the illusory and fictional character of architecture.

"La chambre à coucher... ne sert souvent que de parade. Elle est trop vaste. On aime mieux occuper un endroit dont le plancher soit peu élevé ou l'on soit bien clos, et ou on puisse
être à soi même. Quoiqu'il en soit par bienséance et par usage, il faut une chambre à coucher qui réponde au reste de l'appartement, elle ne sera que de parade si l'on veut, c'est une raison de plus pour lui donner un caractère qui inspire le repos et la tranquillité... C'est le palais du sommeil, tout y doit être simple et uniforme, le jour y sera faible et adouci tel qu'on le peint au réveil de Venus lorsque les grâces l'avertissent du levé de l'aurore...(Le Camus 1780, p.111)

The orders of architecture continued to play an iconographic and ordering role in the design of interior decorations. First the character of each major room was devised according to the proportions of the orders – such as a doric library, a corinthian boudoir and so on. But the classical elements also had a pictorial function, as with cornices which operated as a framing device.

"Les corniches donnent l'ensemble dans les lieux où elles sont employées; elles décident la réussite; celle qui sont intérieures surtout, font l'ornement essentiel des pièces où elles sont placées, elles en forment le caractère. C'est leurs proportions, la combinaison de leurs moulures, leur beau profil, leur agréable contour et leur accord qui nous captivent et nous séduisent par l'harmonie....Qu'on y fasse donc l'attention la plus sérieuse, c'est la partie que l'on doit le moins négliger, elle fait l'encadrement du tout... " (Le Camus 1780, p.49–50)

Le Camus considered the proportions of the orders as a compositional framework using the proportional grid as a guide for the distribution of architectural elements and parts, and as an instrument for the control and combination of visual effects created by masses, light and shadow.

On the whole the elements and compositional devices of classical architecture remained the principal tools of characterization both for the
interior and exterior of buildings. But they were prescribed mainly for the effect they could create or enhance. Colonnades in particular constituted effective devices for the creation of effects and character.

"...l'exposition des croisées doit être au Levant; de cet aspect favorable pour la composition on tirerait les plus grands effets, et la partie de la colonnade en face des croisées tournées en conséquence du côté de l'Ouest serait éclairée pittoresquement au moyens des rayons que le soleil couchant darderait sur cette partie. Il produirait l'aspect d'une scène de théâtre par le contraste des ombres et de lumière....c'est sur de pareil effets que la peinture puise les règles savantes de perspective et d'optique qui contribue à la magie de son art..." (Le Camus 1780, p.269)

However, Le Camus stressed that one device, such as a colonnade, could be responsible for different characters, depending on the particular condition under which it was used. The control of ephemeral and vanishing qualities such as shadow effects, was a crucial aspect of an approach to design based on the composition of appearances. "Un morceau souvent superbe en lui-même souvent devient froid; quel en est la cause... c'est l'exposition, c'est le défaut de contraste et de lumière." (Le Camus 1780, p.270) Comparing the colonnade of the Louvre designed by Perrault with the colonnade designed by Antoine for new Mint, Le Camus explains:

"Ce morceau heureusement conçu, bien composé, de la plus grande harmonie, paroit monotone: la réussite ne répond pas à ce qu'on pouvoit espérer. Qu'on y fasse attention, l'exposition au nord en est la seule cause; en effet point de jeux pour les ombres des corps saillants, tout y est du même ton. Jettons les yeux sur la colonnade du Louvre exposée au Levant, elle fait la preuve de ce que nous avançons. L'effet des jours et des ombres lui donne un relief, dont la grande façade de l'Hôtel des Monnoïe est malheureusement privée. " (Le Camus 1780, p.270-271)
Thus the recognition of the capacity of external phenomena to stir sensations did not imply, for Le Camus, that the same sensations or emotions would be aroused on all occasions by a particular object. From this point of view, sensations could no longer be considered intrinsic to the objects, a conclusion which in fact contradicted Le Camus' belief in the essential character of forms and proportions.

As some historians noticed, *Le génie de l'architecture* clearly expresses a tension between an essentialist and sensationalist philosophy inspired by Condillac. The impact of Abbé Etienne Bonnot de Condillac's, *Essai sur l'origine des connaissances humaines*, P. Mortier, (Amsterdam, 1746) on Le Camus de Mézières' theory has been acknowledged by most historians including Suisselin, *op.cit.*, (1975), Middleton, *op.cit.*, (1992), Vidler, *op.cit.*, (1990). On the aesthetic theory of E.B. de Condillac, see especially Isabel Knight, *The Geometric Spirit: The Abbé de Condillac and the French Enlightenement*, (New Haven, 1968). Knight discusses the role of Condillac's empiricist aesthetic in the disintegration of the classical paradigm at the end of the eighteenth century. More significant, however, with respect to the transformation of architectural reasoning, was his call for a direct, empirical, and subjective engagement with pre-existing built sources


of sensations as a basis for the criticism of the notion of authority, and as a ground for the definition of modern norms and design directives.
Chapter 11

Precedents, History and the Transformation of Normative Thinking in Julien David Le Roy's *Les ruines des plus beaux monuments de la Grèce* (1758, 1770)

During the eighteenth century in France, the notion of authority, which had formed the basis for the justification of the rules of proportions in architecture, was gradually undermined. The idea that certain buildings or texts could be accepted as canonical precedents in architecture on the basis of their antiquity or the authority of their authors was replaced by a tendency to appreciate them from an empirical and critical point of view. This approach evolved in part within the framework of an emerging aesthetic theory of sensations developed in the writings of Boffrand, Briseux, J.F. Blondel and Le Camus de Mézère.

Another important aspect of the process which led to the erosion of the notion of authority in design reasoning, and to the eventual dissolution of the paradigm of the five orders of architecture was the empirical discovery of multiple differences in antique and modern architectural production, and the growth of a concomitant awareness of the cultural specificity, and historical relativity, of the norms of architecture. Claude Perrault was the first to clearly affirm the conventional character of classical architecture, and to suggest its dependence on customs and manners. Important steps toward the recognition of the cultural specificity of the varied forms of classical architecture were also made by other authors already discussed. The definitive relativization of the architectural norms and directives associated to the five orders of architecture however, was finally
achieved through Julien David Le Roy's aesthetic and historicist interpretation of Greek architecture.

11.1 Julien David Le Roy and his Archaeological Works

Julien David Le Roy was a prolific author. He wrote essays on the history and theory of architecture, and published works on archaeological topics and even on naval architecture. His most important book however, was *Les ruines des plus beaux monuments de la Grèce*, first issued in 1757, and eventually revised in 1770. *Les ruines* consisted in a large folio containing, in a first section, an account of Le Roy's travels in Greece, with historical descriptions of monuments and views of ruins. The second section, which contained the architectural part of the work, included descriptions and measured drawings of the antique remains, and theoretical reconstructions of their original state. In the second edition of 1770, the archaeological material was reorganized in two separate parts, each dedicated to successive historical periods corresponding to distinct political regimes. The first part discussed buildings erected during the reign of Pericles, and the second, those built after the conquests of Alexander, and during the Roman domination. Each volume discussed the historical context of the monuments' production and focused on the particularities of the architectural production associated with the different historical time periods.

Le Roy's books followed the publications of other works on Greek architecture, mainly by Englishmen, such as Richard Pococke's *Description of the East and Some Other Countries*, of 1745, and James Dawkins and Robert Wood's *The Ruins of Palmyra*, of 1753, and *The Ruins of Baalbek*, of 1757. Le Roy's writing of *Les Ruines* was also contemporary with James
Stuart and Nicolas Revett's research in Athens, which began to appear in 1762.¹ Le Roy's historical approach to monuments was, however, more inspired by recent developments in antiquarian studies. Indeed, the Comte de Caylus, in his Recueil d'antiquités égyptiennes, étrusques, grecques et romaines, issued between 1753 and 1767, had already proposed to use ancient buildings as the principal source of knowledge about antiquity, as opposed to the textual sources used in traditional historical studies.² Similarly, in the introduction to Les ruines des plus beaux monuments de la Grèce,³ Le Roy explained;

"Les écrits des Anciens, leurs médaillés, leurs statues, leurs pierres gravées, leurs inscriptions, ces trésors que nous ont dérobés les barbares ne sont pas les seuls monuments qui peuvent nous fournir des connaissances sur la Puissance, le Génie et le Goût des Nations les plus renommées de l'Antiquité et sur les communications qu'elles ont eu entre-elles. Les édifices d'un petit nombre de villes célèbres, nous ont donné de nouvelles lumières sur cette partie intéressante de l'histoire..." (Le Roy 1758, p.IV)

Unlike Caylus, however, Le Roy was not an antiquarian. He was an architect concerned with the principles of his art. Because he emphasized the

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² In the introduction to his Recueil d'antiquités égyptiennes, étrusques, grecques et romaines, vol.1, (Paris, 1752), 7, Caylus explains that his method consists "in studying faithfully the mind and hand of the artist, penetrating his views, following him in their execution, and in a word looking at monuments as the proof and expression of the taste that reign in a century and in a country." cit. in Antony Vidler, "The aesthetics of History. Winckelmann and the Greek Ideal," in op.cit., (1987), 125.

historicity of Greek and Roman architecture, Le Roy could not regard them any more as a source of rules and models of absolute value. According to him, the beauty of classical architecture could not be considered universal, since other peoples in other times had preferred other kinds of architecture. Furthermore, the comparison of classical buildings produced by the Greeks, the Romans and even the moderns showed, according to him, that classical architecture was different in various countries and that it had changed over time.

But although Le Roy acknowledged the conventional aspects of architecture, he was not ready to accept a purely relativistic and contextual interpretation. According to him, although the design of buildings was determined by historical conditions, some common denominator between all the particular architectural manifestations of history must exist, from which at least some general principles could be established.

Les ruines contained two important and autonomous essays on the history and theory of architecture. In these texts Le Roy tried to deal with the difficult problem of the definition of architectural principles, despite his historical awareness and a growing sense of the relative value of ancient buildings. Together with the main body of texts and illustrations included in Les Ruines, these essays formed the basis of a course on the history and theory of architecture that Le Roy began to teach at the Académie Royale d'Architecture after the death of Jacques-François Blondel in 1774.

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4 Julien David Le Roy taught architecture and history at the Académie Royale d'Architecture from 1774 till the closing of the institution in 1793. He then taught at the École des Beaux-Arts, which opened the same year, and remained there until his death in 1803.
11.2 The Principles of Architecture and the Revision of the Problem of the Orders.

In his introductory discourse on the principles of architecture in 1758, Le Roy explained that one should first be able to distinguish between principles that are constant and principles that change.

"Les principes en général sont un petit nombre d'idées essentielles et fécondes, qui représentent en abrégé la substance des sciences et des arts dont ils ont été tirés et dans lesquels ils nous servent de guide. Ils sont plus ou moins certains selon l'objet de la science ou de l'art auxquels ils appartiennent, ils ont même différents degrés de certitudes dans une même science ou un même art. Cette dernière vérité ne m'apparaît pas avoir été senti assez fortement par les auteurs qui ont écrits sur l'architecture; quelques uns frappés de l'évidence de certains principes les ont regardés tous comme des vérités incontestables, d'autres envisageant ceux qui sont établis le moins solidement, les ont cru tous arbitraires. L'objet de ce discours est de démêlé autant qu'il sera possible de quelle nature sont les différents principes de cet art, de faire reconnaître ceux qui sont constants, et auxquels tous les artistes qui se proposent d'élever des édifices qui méritent l'approbation du public doivent s'assujettir; et ceux dont on peut s'écarter quelques fois. Une juste appréciation de ces principes nous ferait éviter deux inconvénients très dangereux dans l'architecture, celui de n'admettre aucune règles, et de ne prendre pour guide dans la composition des monuments que le caprice, et celui d'en admettre un trop grand nombre; de gêner par là l'imagination des architectes et de faire de cet art sublime une espèce de métier ou chacun ne feraient que copier sans choix, ce qui a été fait par quelques architectes anciens."

(Le Roy 1758, p.1)

This distinction between principles that embody permanent values and those that can vary is at the heart of the tensions that characterized the
discussion on the relations between rules and freedom, imitation and invention, technical work and artistic genius in the eighteenth century. Traditionally, the orders of architecture formed the normative framework of design thinking, while invention was perceived as an ability to compose architectural elements within the constraining framework of the proportions of the orders. Proportions were generally regarded, even by someone like J.F. Blondel, as a "positive" source of beauty and expression in architecture, and their rules constituted the most determinant system of constraints in design. Le Roy proposed a complete reevaluation of this tradition. Like Perrault, Le Roy considered the variation of proportions in the orders as a demonstration of the conventionality of their rules. Unlike Perrault, however, he did not try to design a definitive rational system of proportions. On the contrary, he accepted the variable character of proportions as evidence that, in order to establish profound and stable rules in architecture, other dimensions than the proportions should be considered.

Le Roy systematically restructured the whole cognitive framework of design thinking. First, he divided the principles of architecture into three distinct categories according to their degree of universality or conventionality.

"Les principes de l'architecture peuvent se diviser en trois classes; les uns que tous les peuples de la terre admettent et que l'on peut regarder comme des axiomes; d'autres qui ne sont fondés que sur une convention générale des peuples qui ont été ou qui sont les plus éclairés de la terre; et enfin une troisième espèce, qui moins généraux ne sont adoptés que par quelques peuples et qui tiennent aux climats qu'ils habitent, aux matériaux qu'ils possèdent, à leurs puissance, à leurs moeurs, et quelques fois à leurs caprices..." (Le Roy 1758, p.1)
"Axioms" were universal principles such as those derived from mechanics, essential to the solidity of buildings. "Conventions" included both the principles of the second and third classes. They derived from the the evolving norm of beauty in architecture and are mainly related to decoration and disposition. For Le Roy, the definition of those directives constituted the most interesting part of architecture precisely because they appeared to be the most representative aspect of the specificity of the architecture of the civilizations.

The system of principles proposed in *Les Ruines* involved a radical reframing of the conceptual system of architecture. Indeed among the third, or most relative class of principles, Le Roy included the proportions of the orders of architecture. Even Perrault had not gone so far in affirming the relative importance of proportions, having spent a whole book elaborating a system of proportions for the orders, as a modern emulation of Vitruvius.

For Le Roy, customs and fantasy were at the origin of the great diversity of proportions in architecture. The proportions were the most culturally specific aspect of architecture. For this reason they also represented an interesting source of knowledge about different civilizations. Le Roy's book included several surveys of monuments. He provided measured drawings of many of the buildings he visited. He was also conscious of the necessity of understanding the particular measurement system used by the Greeks themselves in order to size the specificity of the proportional systems embodied in their architecture. He wrote a long essay in which he attempted to define the length of the Greek foot on the basis of archaeological and historical evidence, which had led him to derive the measure of the Greek yardstick from the dimensions of the temple of Minerva in Athens, also called Hecatonpedon, which he understood as
meaning "one hundred feet". Thus, all the measures he provided for different buildings in Les Ruines were actually given in the Greek system.

Le Roy also carried out a rather systematic comparative study of the Greek originals and the models given in Perrault's Vitruvius, an operation which had significant implications in his discussion about the third class of principles. Indeed, the main text of Les Ruines contains constant references and critical comments on Vitruvius's descriptions of the Greek temples, especially as interpreted and illustrated by Claude Perrault. In fact, Le Roy also proposed multiple corrections to Perrault's Vitruvius on the basis of his discoveries in Greece. From the point of view of the definition of design directives, this exercise served above all to legitimize an open and liberal attitude in design and to criticize the tradition of normative thinking.

"Si l'on examine les écrits de Vitrue, si l'on considèrent les temples qui restent encore dans la Grèce et dans différentes parties de l'Asie, on reconnaîtra que chaque espèce de temple, sans passer dans une autre classe, pouvait offrir des masses très différentes. Car la proportions des façades de ces édifices pouvaient différer selon le nombre des colonnes qui les ornoient, selon le genre de ces colonnes, selon la proportion que l'architecte leur donnait, selon les espacements qu'il ménageait entr'elles, enfin selon la disposition des marches qui servaient en quelque sorte de soubassement à l'édifice.

Vitrue détermine à la vérité, le nombre de colonnes que chaque espèce de temple doit avoir à sa façade, mais on trouve encore dans la Grèce un grand nombre d'exemples qui prouvent que les architectes de cette nation ne s'y astreignaient pas servilement. Le Temple de Minerve à Athènes par exemple est Péryptère et il a cependant huit colonnes de face quoique Vitrue n'en donne que six à cet espèce de temple.... Non seulement les Grecs ne s'astreignaient pas...à ne donner que le même nombre de colonnes aux façades de chaque espèce de temple, mais ils les décoraient souvent d'ordres différents comme ils ne
donnaient que six diamètres de hauteur à leur colonnes doriques et qu'ils en donnaient quelque fois plus de dix aux corinthiennes, cette différence prodigieuse de proportion devait aussi produire des variétés très frappantes dans les masses et dans le caractère des façades des temples de même espèce, selon l'ordre qui y était employé." (Le Roy 1770, p.III) (see fig. 11.1)

According to Le Roy, the Romans, and especially Vitruvius, had been responsible for restraining the latitude given to designers. Furthermore, he thought that theoreticians who had been obsessed by the discovery or definition of permanent rules for the proportions, had fundamentally misinterpreted the real significance of the variety of classical buildings. In the spirit of ancient Greek architects, Le Roy wished to promote freedom in design, at least with respect to the use of proportions.

Thus, even though Le Roy relegated the proportions of the orders to a third class of directives, he did not denigrate the value of proportional frameworks in architecture. In fact he acknowledged the utility of such devices for designers, and mentioned that it might eventually be useful to continue to work on the definition of directives for the proportions of the orders in modern architecture, especially since new information concerning the Greek orders was available as a result of his research. Le Roy remarked that if one considered the proportions prescribed by Vitruvius, and those embodied in the buildings of Greece, Asia, ancient Rome and modern Italy as well as all the systems proposed by modern authors, one must undeniably admit that the proportions of the orders had been a constant source of renewal in design, and that there must certainly still be some place for new research and innovation in this domain. Although Les Ruines was completely dedicated to Greek architecture, it did not reflect a dogmatic
11.1 Julien David Le Roy, *Les ruines*. (Paris 1770). Various buildings described by Vitruvius and existing in Italie and Greece showing the diversity of types and proportions in classical architecture.
attitude: Le Roy did not try to imposed the use of certain Greek proportions for instance. Rather he proposed "la voie de la conciliation" (Le Roy, 1758, p.IV) suggesting a critical reception of design precedents as a natural mean of progress in architecture.

11.3 The Peristyle and the Fundamental Principles of Architecture

Against the historical diversity of proportions in architecture, Le Roy emphasized the contrasting persistence of the use of columns and especially colonnades, in the architecture of diverse civilizations. Even though the use of the colonnade could not be said to be an axiomatic directive — that is, a direct consequence of the transposition of the law of nature in architecture — the recurrence of this practice in the architecture of the greatest civilizations of history indicated, according to Le Roy, that it must at least be derived from some natural human preference for the effects and sensation created by colonnades.

"Le premier usage qu'on a fait des colonnes dans l'architecture a été comme on le fait, de les employer à soutenir les plâtre—bandes et les plafonds, mais on a pas tardé longtemps à reconnaitre combien elles avaient d'agrément aux édifices ou elles étaient si nécessaires. Si dès le temps de la plus haute antiquité on n'avait pas reconnu toute la beauté qu'elles y produisaient, pourquoi les Egyptiens auraient ils fait les plus grandes et les plus belles divisions de leurs temples avec des colonnes. Pourquoi les auraient ils prodiguées. Qui auraient porté ensuite les Grecs et les Romains à en orner les dehors, les dedans, les enceintes de ceux qu'ils construisaient ainsi que les places, leur théatres et leurs autres bâtiments. Enfin pourquoi toutes les nations éclairées de l'Europe regardent elles les ordres
comme la sources des plus grandes beautés de l'architecture, et les Péristyles et les colonnades, comme les espèces de décorations ou ces ordres sont employés le plus conformément à leur origine et avec le plus de succès.

Si des raisons de solidité, la nécessité de mettre leur galeries plus à couvert, l'économie ou d'autres causes ont portées quelques fois les peuples qui se sont distingués dans l'architecture à faire des portiques; il n'en est pas moins constant, il n'en est pas moins prouvé par les faits, qu'ils ont toujours préférés les Péristyles à ces portiques et que ce sont de toutes les décorations celles qui font éprouver les sensations les plus agréables." (Le Roy 1770, p.V)

For Le Roy, the empirical observation of the architectural production of the past offered a methodological framework for the justification of new architectural preoccupations. However, the significance of his interest in the design properties of colonnades must be understood in the context of the transformation of the general conceptual framework of architecture, and the effort to formulate new experiential grounds for the definition of design directives. It was in the conceptual universe of empirical aesthetics that Le Roy found an explanation for the recurrence of the peristyle in architectural history. Although traces of this approach can be clearly detected in the works of Boffrand, Briseux and J.F.Blondel, Le Roy was the first to develop it in depth, consistently borrowing ideas from philosophical sources. Le Roy not only evoked the expressive power of simple forms and proportions in classical architecture, but articulated a framework establishing a direct connection between a theory of knowledge, direct observation of historical facts, and the formulation of aesthetic norms and design directives.

Empirical aesthetics derived directly from the transformations in the theory of psychology and cognition that occurred in the seventeenth and eighteenth centuries in England and France, especially through the writing
of John Locke and Étienne Bonnot de Condillac.⁵ According to the empiricist point of view, sensations provoked by the direct experience of the exterior world are the source of all knowledge. Sensations become perceptions, and eventually ideas, which are combined to create organized knowledge. According to this theory, human language is structured the same way. The first sounds pronounced by man were direct responses to sensations provoked by exterior objects. These sounds were gradually codified to form conventional languages. In order to communicate, humans used language to combine ideas stored in memory, and provoke sensations. This theory emphasizes the natural origins of conventional language. In the framework of eighteenth century speculations on the origins of languages, poetry and the arts in general were usually considered primitive forms of language. Furthermore, most philosophical discussions on the relation between sensations, art, language and knowledge were dominated by a classical conception of art. Condillac, for instance, clearly considered classicism as embodying the ideal conditions of perception based on a clear articulation of ideas and sensations. In his Traité des systèmes, Condillac argued:

"The fine arts... seem to precede observation and they must have develop to some extent in order to be reducible to a system. The fact is that they are less our work than nature's. Nature imitates them when she shapes us, and nature has already perfected them when we think of explaining them. All the art are really only the development of our faculties. Our faculties are determined by our needs, and our needs are

the consequence of our organization. Nature, therefore by organizing us has begun everything."\(^6\)

In the arts, this was rapidly interpreted as a philosophical demonstration of the validity of classical premises, and served as a starting point for a re-naturalization of classical arts and architecture in the context of the erosion of the tradition.

As we have already seen, sensations moved to the centre of aesthetic theories in the early eighteenth century through the writings of Dubos, André and other philosophers. The issue of the sensations produced by buildings entered architectural theory mainly through discussions on taste. Thus, it is not surprising that the only significant theoretical source mentioned by Le Roy in his essay on architectural principles was the *Essai sur le goût* written by Montesquieu, and published in the *Encyclopédie* in 1762.\(^7\) Le Roy proposed an interpretation of the peristyle in empiricist terms, using many of the aesthetic categories mentioned by Montesquieu.

In a systematic effort to demonstrate that the obsessive use of peristyles in architecture throughout history was grounded in the very nature of human cognition, Le Roy transferred notions and principles of empiricist aesthetics to the conceptual system of classical architecture. Le Roy regarded peristyles as condense of sensations:

"Quelle est la cause des sensations que l'architecture nous fait éprouver en général? On peut s'assurer que c'est de la nature, de la force, ou du nombre de ces sensations que résulte le jugement que nous portons sur les divers édifices qui s'offrent à nos regards; souvent l'heureux rapport des

\(^6\) Cit. in Isabel, F. Knight, *op.cit.*, (1968), 185.

\(^7\) Montesquieu’s *Essai sur le goût* was read at the *Académie Royale d'Architecture* on June 5th, 1780 (the same day than Le Camus de Mézière’s *Le génie de l'architecture* was read), and on July 31st, 1780, and June 18th, 1781. See Procès Verbaux, vol. 9.
proportions d'un bâtiment y attache notre vue, nous en parcourons l'étendue entière, nous en observons toute les parties avec cet espèce de charme qui égale presque celui que les plus beaux spectacles de la nature nous font ressentir. Quelque fois aussi la manière grande dont l'extérieur ou l'intérieur d'un édifice sont divisés, le relief de ses parties, l'espace considérable qu'il occupe et son élévation prodigieuse produisent sur notre âme une impression très forte, enfin une grande quantité de petits objets différents offerts à nos yeux tous à la fois nous donnent encore une grande multiplicité de sensations agréables ou fortes que nous ressentons à l'aspect des plus belles décorations.

Ces trois qualités, l'agrément, la force ou la variété de sensations que l'architecture nous fait éprouver rarement réunies dans un même édifice étant donc les causes qui y produisent le beau nous allons voir comment elles se rencontrent particulièrement dans les péristyles et comment certains péristyles réunissent un plus grand nombre de ces qualités que d'autres." (Le Roy 1770, p.IV)

The experience of sensations was for Le Roy, the basis of aesthetic judgement. The sensations of pleasure, force and variety – the conditions of beauty – could be experienced through natural spectacles. These aesthetic categories were synonymous with the natural categories of beauty. In architecture, peristyles were the motives which brought those conditions of beauty together most effectively. Thus they appeared closest to a species of natural phenomena.

Such presumably natural categories of experience pervade Le Roy's discourse on the principles of architectural composition, for instance, in his justification of traditional strategies of formal amplification by the juxtaposition and division of simple masses or contrasts.
"Tous les grands spectacles en imposent aux hommes, l'immensité du ciel, la vaste étendue de la terre ou de la mer... semblent élever l'âme et agrandir nos idées. Les plus grand de nos ouvrages font aussi sur nous des impressions de mêmes nature; nous ressentons à leurs aspect ces sensations fortes bien supérieures à celles qui ne sont qu'agréables... La force de ces impressions que nous recevons à l'aspect des bâtiments, n'est pas toujours proportionnelle à leur grandeur. Elles dépendent souvent autant de la manière de diviser leur masses ou leurs surfaces que des dimensions de ces masses ou surfaces mêmes... Les Périistyles produisent presque toujours infaiblement dans les édifices la grandeur qui a seule le droit de nous affecter fortement et sans laquelle l'architecture la plus pure n'attire que peu notre attention." (Le Roy 1770, p.V)

According to Le Roy, the facade and interior of the Pantheon in Rome for instance, communicated a sensation of grandeur more effectively than the facade and interior of Saint-Peter because of the simplicity of the masses and their subdivisions. This was especially notable in the colossal corinthian colonnade of the portico, which like, a painting created strong and deep effects of light and shadow. According to Le Roy this constituted a typical pictorial strategy to attract attention.

"C'est par ce principe que les peintres aiment mieux composer les tableaux d'un petit nombre de figures qui nous affectent fortement que de les multiplier et de partager notre attention en un trop grand nombre d'objets...". (Le Roy 1770, p.V)

Indeed, this principle of composition had already been identified as a natural condition of clear and powerful perceptions in the discourse on painting at the end of the seventeenth century. It was mentioned by Roger de Piles in his Cours de peinture par principes and in Sebastien Leclerc's
treatise on optics. It was generally accepted as a principle of composition by eighteenth century painters, and Le Roy made explicit use of this principle in the composition of his views for Les ruines. Their point of view intentionally emphasized the presence of the main monuments while restricting the number of other elements within the frame.

This economy of means for maximum effect also applied to the sequential discovery of spaces and masses in an architectural composition. It could be compared to similar techniques in poetry and music.

"...l'architecte comme le musicien, le poète, le peintre, ne doit pas présenter trop de sensations à la fois... son art consiste à augmenter, ainsi que le poète dans ses ouvrages, le nombre de ces sensations en les rendant successivement, et en ne les restreignant pas comme le peintre à celles qui peuvent être produites par un tableau en un seul instant. Une pièce en vers, dit M. de Marmontel dans sa poétique, qui présente à notre imagination une suite de tableaux variés, nous intéresse plus qu'un tableau qui nous montre qu'un seul moment pris dans la nature. C'est peut être de cet espèce de mouvement, dans lequel la poésie entretient notre âme, qui fait que nous la préférons à la peinture." (Le Roy 1770, p.VI)

Movement, according to Le Roy, was not just a way to discover a succession of tableaux; it was a source of constant change and variety in architecture, best exemplified in the experience of movement in peristyles.

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8 On the definition of the ideal condition of visual attention see Sebastien Le Clerc, Système de la vision fondé sur de nouveaux principes, (Paris, 1719), 117-118. "Encore qu'on aperçoivent d'un premier coup d'oeil quelque objet considérable, un Palais par exemple et qu'il s'en peigne une image dans nos yeux qui nous en fait aussitôt avoir une bonne ou une méchante idée, c'est néanmoins toujours sans distinction de parties, parce que l'âme n'y fait d'abord aucune application particulière. Mais voulant savoir de quel ordre en est l'architecture, et si elle est du bon ou du méchant goût, alors elle en parcourt de l'oeil, ou pour mieux dire de son axe, toute les parties les unes après les autres, pour avoir une connaissance exacte de chacune en particulier." cit. in Michael Baxandall, Patterns of Intention: On the Historical Explanation of Pictures. (London, 1985), 144.
"Considerons par exemple deux façades; l'une composée de colonnes qui touchent un mur, l'autre formée par des colonnes qui en sont éloignées pour qu'elles fassent péristyle; et supposons encore que les entrecolonnnes dans l'un et dans l'autre cas soient égaux et décorés de même; on observera dans la dernière façade une beauté réelle, dont l'autre sera privée, et qui résultera uniquement des différents aspects ou des tableaux variés et frappant que ces colonnes présenterons aux spectateurs en se projetant sur le fond du Péristyle qu'elles forment. Cette propriété de multiplier sans les affaiblir les sensations que nous éprouvons à l'aspect d'unédifice, est encore un avantage très considérable qui se fait sentir bien plus fortement dans les péristyles que dans aucune autre espèce de décoration." (Le Roy 1770, VII)

Le Roy observed that both a colonnade and a row of trees in a garden provoke the same effect on the observer. The parallax effect due the movement of the observer constituted in his eyes, the most powerful source of sensations in nature and architecture. The colonnade of the Louvre, which Le Roy described as "le plus beau morceau d'architecture de toute l'Europe", represented for him the ultimate example of the dynamic effect of the peristyle in modern architecture. (Le Roy 1770, p.VII)

"... parcourrons des yeux toute l'étendu du Péristyle du Louvre, en marchant le long des maisons qui lui font face, éloignons nous pour en saisir l'ensemble; rapprochons nous en d'assez près pour découvrir les richesses de son plafond, de ses niches, de ses médaillons, saisisons le moment ou le soleil y produit encore les effets les plus piquants en faisant briller quelques parties du plus grand éclat, tandis que d'autre couverte d'ombre, les font ressortir; combien la magnificence du fond de ce péristyle combiné de mille façons différentes, avec le contour agréable des colonnes qui sont devant et avec la manière dont il est éclairé ne nous offrent ils pas de tableaux enchanteurs... Le spectateur n'épuisera pas en quelques heures les tableaux que le Péristyle du Louvre pourra lui offrir, même les différents
momments de la journée lui en offrirons de nouveaux..." (Le Roy 1770, p.VIII)

The impact of distance on perception was not a new preoccupation in architecture. Architects since Vitruvius had noticed the effect of distance on the perception of proportions. At the beginning of the eighteenth century, Philippe de La Hire (who had succeeded François Blondel as Professor of architecture at the Académie Royale) read a memoir to the members of the Académie on the ideal distance one should stand in order to appreciate the relation between the parts and whole of a building. In general, the point of view of the observer was difficult to integrate into the normative system of architecture. It was, potentially, a source of distortion with respect to the idea, tending to reveal the fragile position of the rules of proportion and composition. Theoreticians had problems reconciling criteria of objective beauty with subjective experience. But here again, Le Roy redefined the parameters of the question in empiricist terms, discovering new means to create a variety of sensations.

"Quand nous voulons jouir de l'ensemble d'un Péristyle, nous somme obligé de nous en éloigné à une certaine distance afin d'en embrasser toute la masse, alors les divers mouvements que nous faisons font changer la situation apparente des corps isolés qui le forment. Lorsque nous nous en approchons, un spectacle différent nous affecte; l'ensemble de sa masse nous échappe, mais la proximité ou nous somme des colonnes nous en dédommage, et les

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9 "In 1703, La Hire took a leading part in a series of meetings at the Academy of Architecture in Paris during which he worked out the distance from which, given the limit of distinct vision, discriminating perception of buildings was henceforth to take place. It was decided that the distance should be one and a quarter–times the breadth or two and half–times the height of the building whichever was the greater; this assumed a 45 degree arc or rather cone of vision effective enough for some global sense of the whole, taking in the building itself plus 10% of framing space each side, and also allowed the beholder to be close enough for good attentive scanning of particulars." cit. in Baxandall, op.cit., (1985), 99.
changement que le spectateur observe dans les tableaux qu'il est maître de se créer en changeant de lieu, sont plus frappants plus rapides et plus variés. Mais si le spectateur entre sous le Péristile même, un spectacle tout nouveau s'offre à ses regards, à chaque pas qu'il fait, la situation des colonnes par rapport aux objets qu'il découvre en dehors du péristyle, varie et se diversifie, soit que ce qu'il découvre soit un paysage, ou la disposition pittoresque des maisons d'une ville ou la magnificence d'un intérieur." (Le Roy 1770, p.VIII)

Le Roy discussed many other optical phenomena on which the architect could rely to control the appearance of buildings and the sensations they must provoke, such as proportions, colours and light. Special references are made to the optical effect of colonnades in the interior of modern churches such as Sainte-Geneviève and La Madeleine, which contribute to the heightened impressiveness of these spaces in creating a contrast between the columns in the foreground and other elements visible in the background. Perceptual issues are at the forefront of his architectural theory, providing an arsenal of empirical justifications and almost scientific explanations for the use of the colonnade.

Le Roy was eager to find even more universal justifications for the principles of classical architecture.

"Si le goût qui nous guide dans nos ouvrages et nos jugements, est le fruit de l'impression que nous recevons des objets qui nous environnent, pour que tous les hommes aient le même goût, ou des idées du goût qui leurs soient communes, il faut qu'ils aient été à porté de recevoir les impressions propres à produire ce goût ou ces idées, il faut que les objets propres à produire ces impressions soient si généralement répandues dans la nature que tous les peuples de la terre en aient été souvent et fortement affectés." (Le Roy 1770, p.XIII)
Le Roy identified two such objects; "l'idée de la symétrie, de la régularité parfaite relativement à nos organes, et celle de la disparité frappante". Le Roy also used the terms "objet symétrique" and "objet pittoresque". Although they originated in architectural theory, these two ideas were taken as the most basic cognitive categories of the human mind and therefore as natural objects.

"Le nombre infini d'astres répandus sans ordre dans l'immensité du ciel, les montagnes, les arbres, les plantes, le cour irrégulier des fleuves, les couleurs infiniment variées des fleurs qui émaillent les plaines nous donnent constamment le dernier spectacle. La structure des animaux au contraire nous offre le premier celui de la symétrie, et comme les hommes sont frappés de ces deux spectacles opposés, pendant tout le cour de leur vie, l'habitude doit nécessairement les leur faire aimer. Ils doivent donc aimer tous la régularité parfaite et la disparité frappante." (Le Roy 1770, p.XIV)

In reinterpreting symmetry and variety – two fundamental aesthetic categories of classical architecture – in empiricist and cognitive terms, Le Roy resumed his efforts to recover some natural validity for the classical tradition.

The description of the elements, and different factors entering into the shaping of the dynamic visual experience of peristyles, had an impact on the documentation and illustration of architectural fragments and parts in Les Ruines. Of course columns and colonnades were carefully illustrated and rendered, but the drawings also included pristine architectural details such as exquisitely chiselled cannelures, which appear particularly sensitive to changes in lighting conditions. The plates also contain an unprecedented amount of fully developed representations of ceilings, reconstructed from fragments discovered on the sites. Indeed ceilings contemplated from below
were regarded as offering a particularly rich potential for dramatic visual experience. Thus Le Roy's angular and rendered views of ruins of peristyles should not only be appreciated for their picturesque quality, but should also be read as embodying a new type of normative discourse dealing with modes of approach and compositional schemes designed to enhance sensational effects (see fig. 11.2).

Even though Le Roy seemed preoccupied with finding some new natural justification for the principles of classical architecture, and more precisely, for the use of colonnade in composition, one must remember that according to him, any principle concerning the questions of beauty or expressions was ultimately conventional. In other words for Le Roy – as for Condillac and the many philosophers of language in the eighteenth century – the human mind and senses were not naturally predisposed for a particular kind of architecture. Preferences were thought to be built up as a result of an historical process – beginning with a first impression and developing into a more sophisticated universe of convention. In this framework the principles of architecture were understood as a distilled form of accumulated architectural experiences and sensations. This idea was already accepted in part by Germain Boffrand and Jacques-François Blondel. Le Roy, however, was more radical and proposed an explicit framework for the historical interpretation of the dynamics of architectural continuity and change.

11.4 The Concept of "primitive idea" and the Historicization of Design Thinking

Le Roy considered the proportions of the orders of columns as the most variable aspect of architecture. Although their great historical diversity
offered an interesting way of accessing the specificity of the architectural production of different civilizations, it also ultimately defied any systematic historical interpretation. Of course, proportions were not among Le Roy's main concerns. In the second edition of *Les Ruines*, he responded to criticism made by his competitors, Stuart and Revett. In their own publication on the ruins of Athens, they had accused Le Roy of lacking accuracy in his measurements and drawings. Le Roy explained that he was not primarily interested in giving the exact measurements of the buildings or in finding out the proportional relationships between their different parts. What he wished to understand, he insisted, was the relation between the different buildings erected by the Greeks in order to compare them with those described by Vitruvius on the one hand, and on the other with those erected before and after them by other peoples. He was mainly interested in the study of, what we would call today, typological differences and variations between classical buildings. This typological approach offered both the possibility of a systematic historical interpretation of the evolution of architecture, and the grounds, for the definition of general design directives based on principles for the adaptation and combination of generic precedent cases.

The essay on the history of architecture included in *Les Ruines* was one of the first to attempt to produce a systematic representation of the evolution of architecture through time. As we have already mentioned, this piece must also be understood in the framework of Le Roy's search for a definition of principles in architecture. Indeed, while the text on the theory of architecture focused on the elaboration of an empiricist basis for the rationalization of architectural design, Le Roy's comparative historical discourse not only provided an empirical demonstration of those principles, but also proposed a framework for the understanding of similarities and
differences in forms, and the appreciation of the dynamic of continuity and change in history, and in design thinking.

Le Roy distinguished three main genres or styles of architecture in history; the architecture conceived by the Egyptians, the Hebrews and the Phoenicians formed one category, the architecture of the Greeks and Romans constituted another, and the architecture of the Christians, a the third. According to him, the architecture of these different peoples had progressed through history, but that evolution was always based on the reinterpretation of an original "primitive idea" through which the fundamental identity of the genre, and the continuity of the tradition were preserved.

Those primitive ideas were organically related to the first impressions experienced by peoples in different cultures, and were dependent on their ethnic origins, as well as their social and geographic environment.

"Les premières impressions, les impressions souvent répétées, influent tellement sur les jugements que nous portons, que le Nègre décidera hardiment que la plus belle taille est celle du Nègre, et que le visage le plus agréable est celui dont la couleur est noire, dont le nez est écrasé et les lèvres épaissent. Il trouvera les arbres, les plantes les animaux des contrés qu'il habite, les plus beaux qu'on puisse voir. Le Lapon n'aura pas moins de prévention sur la taille, le visage de l'homme de la Laponie et sur tous les êtres que la nature y produit, et le jugement du Lapon et du Nègre sera, un petit nombre excepté, l'image de celui du lettré de la Chine ou de l'habitant éclairé de l'Europe. Enfin ils aimerons tous le plus les choses qui leur rappellent les idées primitives, [emphasis added] ou souvent répétées qu'ils ont recues des divers objets qui se sont offert à leurs regards." (Le Roy 1770, p. XIII)
Le Roy's interpretation of the origins and development of architectural forms resembled, in many respects, the explanation given by philosophers for the formation and development of language. However, Le Roy focussed less on the formation of primitive architecture than on the genealogy and evolution of particular primitive forms or ideas. Le Roy believed in a progressive conception of the history of architecture in which ideas were not just repeated, but reinterpreted, and adapted to evolving historical situations, forming real "chains of ideas".

"Le spectacle que nous offre l'histoire des arts, bien digne de piquer la curiosité de ceux qui aiment à en suivre les progrès est de voir combien les idées primitives [emphasis added] originales de quelque génies créateurs ont influées sur les divers ouvrages que les hommes ont fait par la suite. Leurs essais en architecture en offrent des exemples frappants. La pierre élevées par les Phéniciens sur le tombeau d'un homme célèbre, imitée dans d'autres monuments du même genre, et rendue plus grande, plus colossale, a été l'origine des obélisques. La même pierre représentée au contraire par des masses de pierres entassées, larges à leur base, pointues à leur sommet a donné l'idée des piramides. Les origines nous paraissent d'autant plus vraisemblables, qu'on fait que les piramides étaient des tombeaux et que les obélisques étaient souvent consacrées à immortaliser la mémoire des héros ou des bienfaiteurs de l'humanité. Nous découvrons aussi dans la forme des cabanes des différents peuples, dont l'antiquité nous a laissé quelques traces, le modèle des temples les plus anciens que nous connaissions." (Le Roy 1770, p.VII)

In a famous illustration included for the first time in the 1770 edition of Les Ruines – in fact a substantially redesigned and expanded version of a plate included in Histoire de la disposition et des formes différentes que les Chrétiens ont donné des temples of 1764 – Le Roy presented three
columns of plans and sections of key buildings drawn to the same scale representing the main steps in the different progressive "chains of ideas"\textsuperscript{10} which formed the history of architecture (see fig. 11.3)\textsuperscript{11}.

All the buildings selected are temples, because, Le Roy believed, they constituted the most significant kind of construction in any culture. The first chain, including Egyptian, Hebrew and Phoenician buildings, begins with an archaic hut defined by a wall forming one single square room open on one side, protected by a portico decorated with a single column in the middle. Gradually, the system of walls and columns expands to form the basic architectural systems comprising different types of temples such as those of Luxor, Babastis and eventually the Temple of Solomon itself. The evolution of the spatial structure of these buildings, Le Roy explains, is closely connected to the transformation of religious and political rites.

The evolution of the typology of temples belonging to the Greco-Roman chain of ideas is also explained in part in relation to the history of religious and political habits. But the evolution of the architectural constructive system seems to follow a more autonomous line. The first building, or the primitive idea, at the top of the chain, is a small temple conceived as a simple rectangular room with a portico. This time however, the whole space of the building is divided in the middle by a row of

\textsuperscript{10} For instance Le Roy indicates that the Church of Saint- Augustin in Rome is small, but constitutes a significant element in the historical chain of Christian architecture; "elle tient une place importante dans la chaine des idées..." \textit{op.cit.}, (1770), XX.

\textsuperscript{11} For a fuller discussion on the genre of comparative history and Le Roy's plate, see Werner Szambien, \textit{J.N.L. Durand, 1760–1834} (Paris, 1984), 27–30. See also Antony Vildé, "The Decline and Fall of Architecture. Style and Epoch in Gibbon and Seroux d'Agincourt," in \textit{op.cit.}, (1987), 175–187. Quasi-systematic historical comparisons were illustrated in Fisher von Erlach's \textit{Entwurf einer historischen Architektur} in 1721. J. A. Meissonnier engraved a comparative plate of the "most considerable" buildings in history from Egypt to the present, which was included in Dumont's collection of survey drawings of St-Peter, \textit{op.cit.}, (1763). It should also be noted that Montesquieu and Buffon (to whom Le Roy probably owed his concept of "chaîne d'idées") provided in their respective works on political and natural history a systematic and comparative structure for the otherwise seamless chronology of events.
columns presumably designed to support the top of a sloped roof.

What is actually represented here is the Greek invention of the colonnade as an architectural motive. The discovery of the three temples of Paestum in the eighteenth century had contributed to the revision of the traditional interpretation of the origins of Greek temples. These temples were considered the most ancient Greek buildings known and they rapidly gained a privileged position in the history of architecture. The Temple of Hera I (Portique) in particular, which was considered the most ancient of the group, was characterized by a row of columns located along the central axis of the building. Le Roy referred to this temple as concrete proof of the antiquity of this archaic type. The other temples of the series were selected to represent the evolution of the use of the colonnade, peristyle and porticoes in a typology of Greek and Roman temples of increasing complexity.

The historical typology of the Christian temples, which extends to French eighteenth century cases, such as the Church of the Madeleine and the Church of Sainte-Geneviève in Paris, is much more dynamic than the Egyptian and Greco-Roman lines of development. The process of evolution and successive inventions involves more dramatic structural changes. Catacombs constitute the primitive idea of Christian architecture; a prototype of vaulted architecture fundamentally linked to the persecutions associated with the origins of the religion. With the christianization of the Roman Empire, the secular model of the Roman basilica was adopted. Then, in the building of Saint Sophia in Constantinople, the Greek Cross plan, and the

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12 Not until 1750, when J.G. Soufflot and his pupil G.P.M. Dumont measured the doric temples of Paestum, were French architects to begin to make any serious inspection of the ruins of Greek antiquity. Not until 1764 was Dumont to publish the result of their field work in *Suite de plans... de trois temples... de Paestum*. On the rediscovery of Paestum and its impact on architectural theory and design, see especially; *Paestum and the Doric Order*, Exh. Cat., National Academy of Design, (New York, 1980).
dome on pendentive were invented. The little Church of Saint-Augustin in Rome offered, according to Le Roy, the first example of combination between the construction technique of the vault and the use of columns. This mode of construction was refined in the church of Saint-Marc in Venice, Santa Maria del Fiore in Florence and, Saint-Peter in Rome, until a synthesis of French gothic vaulting techniques with the columns and entablature system of the Greeks began to emerge in Mansart's Chapel in Versailles, culminating with Contant d'Ivry's Madeleine and Soufflot's Sainte-Geneviève in the eighteenth century.

The Greco-Roman chain of ideas logically is presented in between the Egyptian and Christian chains. Le Roy saw Egyptian architecture as the ancestor of Greek architecture. According to him, the Greeks inherited the use of columns from the Egyptians, but were responsible for perfecting them. But Greek architecture, and more precisely the primitive idea of the colonnade, was also at the core of the improvement and evolution of Christian architecture, forming a classicizing force within the evolution of vaulted construction systems. Thus Le Roy not only saw an evolutionary pattern within each individual chain of ideas, but also perceived a development from one typology to another, from the Egyptians to the Christians, from antiquity to modern times via the Greeks and Romans.

Le Roy's position in architectural theory has often been associated with the primitivism and rationalism of Laugier. Indeed, his conception of the history of architecture as a succession of reinterpretations of a primitive idea is, to a certain extent, similar to Laugier's call for a recovery of the original principle of Greek architecture embedded in the structure of the primitive hut. For Laugier, however, the primitive hut was a natural
prototype to be imitated, not an historical construction to be reinterpreted.\textsuperscript{13} Furthermore, the structural synthesis of Greek and Gothic systems of construction discussed since Perrault, was for Cordemoy and Laugier, a vehicle for the creation of a modern architecture, embodying both the classical ideal and the French gothic tradition of construction. Le Roy understood this synthesis as a result of a long historical process punctuated by technical inventions and combinations associated with different moments in the history of the Christian religion and its architecture. In fact, Cordemoy and Laugier's primitivism corresponded to an effort to reduce architecture to the representation of basic principles of construction, and to minimize the importance of actual precedent cases in design. Le Roy on the other hand founded his theory of design on the study of concrete historical artifacts.

Thus the importance of the scheme developed by Le Roy was not limited to the context of eighteenth century French architectural historiography. For Le Roy, the history of architecture certainly served to demonstrate the differences and singularities of buildings within a given architectural genre, and as such, was crucial for the demonstration of the relativity of proportions. But history was also a method used to validate a generic theory of design.

The historical dynamics illustrated by Le Roy was partially modeled on the classical conception of design as an activity based on successive imitations and reinterpretations of an idea as well as on combinations and syntheses of existing ideas. In this sense, the reading of architectural history was classicized. But at the same time, the conception of the design process

\textsuperscript{13} It should be noted that however, that even Laugier referred to a concrete antique precedent in order to exemplify and support his ideas on the origins of classical architecture. "Il nous reste en France un très beau monument des Anciens: c'est ce qu'on appelle à Nîmes la Maison-Quarrée. Connoisseurs ou non connoisseurs, tout le monde admet la beauté de cet édifice. Pourquoi? parce que tout y est selon les vrais principes de l'architecture." \textit{Essai sur l'architecture}, Duchesne, (Paris, 2nd ed. 1755), 11.
was historicized. Selected concrete cases served as generic forms, and new
designs appeared as historically rooted cases of adaptations of primitive
ideas. Primitive ideas were exemplified in antique building forms. Those
precedents represented neither authoritative models nor unique source of
rules, but appeared as legitimate bearers of principles.

Paradoxically, while the authority of classical buildings and systems
of rules for the proportions of architecture may be seen to fade away toward
the end of the eighteenth century, the principles of classical architecture, as
examplified in concrete precedents were becoming all the more inclusive
and powerful. While for Fréart de Chambray and François Blondel, the
remains of classical architecture, and the texts of Vitruvius, Palladio,
Vignola and others, continued to define an autonomous universe of rules
excluding all deviances and other forms of architecture, classicism for Le
Roy offered itself almost as a paradigm; a model for the experience and
eventually the use, of the whole history of architecture.

Thus historicism and "aestheticism" might be considered as two
distinct and complementary modes of reasoning at the end of the eighteenth
century. In fact the recognition of the cultural specificity of architecture, and
the consolidation of subjectivity as a foundation of architectural principles,
were both related to the relativization of architectural norms. Through these
two modes of reasoning, classicism also tended to consolidate its power over
French architectural theory. As classicism mutated in the eighteenth century,
into an increasingly general and flexible normative discourse, it also became
more pervasive, and ultimately more modern.
Chapter 12

Conclusion

Between the middle of the seventeenth and the end of the eighteenth century, the role and status of precedents in design thinking were given their modern definition. Fréart de Chambray considered precedents as canonical models imbued with transcendental value, and as objects of respectful imitation. Gradually, through the writings of Claude Perrault, Jacques-François Blondel, Le Camus de Mézière and David Le Roy in particular, precedents were defined as historical forms of experience, instances to be used by analogy for judgement and critical reasoning in design thinking. These changes occurred as a response to problems emerging from a search for norms and design guidelines in a general context of relativization of architectural knowledge and values. During this period, precedents played a central role in the negotiations between antagonistic forces – including norms and invention, reason and experience, subjectivity and community, individuality and solidarity – at play in the belief and conceptual systems of the society.

12.1 Between Norm and Invention: The Changing Form of Precedent Knowledge – Canonical Model, Compositional Framework, and Generic Idea

The role of precedents in the definition of design directives and norms of beauty for architectural composition in Fréart de Chambray's treatise was extremely limited. Fréart proposed specific, definitive models for the five orders of architecture that were directly taken from particular antique cases.
If Fréart's system imposed a very constraining framework on the design of the orders of columns, it nonetheless exercised very little control on the general composition of buildings, offering little more than beautiful details for architectural compositions.

François Blondel provided a larger set of directives for the architectural orders. These were borrowed from precedent systems, although some adjustments and corrections were conceivable. The set of rules taken from precedents was more complete, and dealt with problems of composition of elements such as intercolumnation and the superposition of orders. However, the connection between these rules and the architectural composition of whole buildings was not made. The rules of the orders, and of their modes of assembly, remained an autonomous universe of disembodied design directives. In fact, François Blondel, like Fréart de Chambray, conceived of the orders of architecture as a particularly well regulated universe of forms in the general framework of a rather unregulated practice of composition consisting in assembling beautiful objects inherited and adapted from antiquity. Architects in the seventeenth century possessed a design method, but this method was not explicitly formalized into a global, coherent, and practically applicable system.

Although Claude Perrault did not approach the particular problem of complete building composition either, his attitude toward the composition of the columnar members of the orders was more systematic. For him, precedent cases and rules constituted primary material for a rational appropriation within a preestablished regular and unified compositional framework. The treatment of the composition outside the limited domain of the orders was left open to freer manipulation, leading possibly to the invention of such motives as the doubling of columns. Still, the explicitly formulated top-down design approach in the Ordonnance des cinq espèces
des colonnes, opened the way to a more global, rational, and critical approach to precedents in design thinking.

Charles Augustin d'Aviler proposed to use Vignola's five orders of columns as an authoritative precedent system of rules. He considered that Vignola's system could also be applied as a regulating framework for many other architectural elements such as balusters, windows, and doorways. On some occasions he gave examples of the application of Vignola's system of proportion in small compositions, such as in his design for an altarpiece adapted from the niches of the Pantheon. But here again generalization and unity of rules are absent. In fact, the majority of elements in the profusion of models given in his somehow encyclopedic collection of precedents did not submit to the classical discipline of the five orders.

As this study has shown, the idea of using authoritative precedent systems of orders as a general framework for composition began to emerge more clearly in Pierre Nativelle's treatise. Here, in addition to providing motives for compositions, the orders were used as a general proportional framework for the composition of entire buildings and complex assemblages. Thus Vignola, Palladio and other authorities were discreetly reincarnated in modern works, through an application of their ordering systems as guidelines for the assembly and proportioning of elements, whether newly invented or taken from other precedents. Moreover, Nativelle allowed for the combination of multiple proportional systems acting differently in plan, elevation and section, creating an architectural confluence of authoritative ordering systems in space.

Briseux developed a more direct and critical engagement with specific precedent systems of orders. Although he allowed himself to use different sources, including Vignola, Palladio and even Perrault, each system had to be reframed to obey the general norm of harmonic proportions. This
aesthetic reappropriation of precedents was also present in his representation of plans and elevations of Palladian buildings, and in some of his own compositions for entire building schemes.

Jacques-François Blondel adopted a more global and encyclopedic attitude toward composition. Once the general dimensions and the distribution of the rooms were fixed, the orders provided a regulating framework able to integrate an infinite diversity of existing motives, and to adapt to any situation and program. Blondel was ready to accept many different ordering systems, but on the whole, the one he favoured, was made of compound elements reorganized within a general system of proportions largely based on Vignola. Still, the confrontation between what we might call, the "top–down" general ordering system of a building, and the relatively autonomous system of proportions of the orders of architecture was perceived as a potential source of conflict calling for reasonable compromise.

Although Blondel conceived architectural composition primarily as a "top–down", regulated, assembly of parts, his approach was not purely deductive. It involved a critical and reflexive process of evaluation and reiteration of ideas, based on successive comparisons with precedents, and the evaluation of previous solutions. Precedents appeared as an aid for design thinking and decision making.

From Le Camus de Mézière's point of view, the orders of architecture constituted a harmonic ordering system which served as a basis for the composition of architectural effects. Le Camus suggested the use of Nicolas Potain's system which represented a distilled form of multiple experiences, including Desgodets's, Vignola's and Perrault's, reorganized within a personal ordering framework. Precedents, according to Le Camus, should be looked at as sources of knowledge about architectural effects and
affects, from which principles of expression could be derived. The list of precedents was broadened by Le Camus. Rules about effects were extracted from architectural precedents as well as from other fields of experience including painting, scenography and garden design. Ultimately precedent objects and forms could be reduced to an infinity of atoms of sensations to be recomposed for greater effect.

With the writings of Julien David Le Roy, we witness a definitive rupture in the tradition of normative thinking about the orders. For Le Roy, the proportions of the orders appeared as a merely contingent response to various situations and historical conditions. The multiplicity of precedents were not a source of principles but a demonstration of the non–existence of solid, definitive rules for proportions outside the particularity of cases, even though some of these cases might appear better and more systematically proportioned than others. In fact, the proportions of the orders constituted a bottom level class of consideration. Columns were a source of architectural and picturesque effects and their role was to be understood in the framework of the design of colonnades. Ultimately, variations in these motives depended on a higher level of determination in the design of building types, refering to generic, historical precedent cases or "primitive ideas." According to Le Roy, a design for a new building must be considered as a critical reinterpretation of one or multiple generic ideas. This was how history, or precedents, should be taken, and this was how design should be conceived. This approach indicated a shift toward a more synthetic and open ended conceptual framework for precedent based design practice.
12.2 The Changing Status of Precedents: From Transcendence to History

During the period covered by this study, the limits of the conceptual framework that constrained the practice of architectural composition evolved drastically to become more and more encompassing, while at the same time allowing greater flexibility in the control of architectural design. One of the reason for this change lay in the transformation of the status of precedents within the belief system of the period. This may be grasp more clearly in comparing the meaning of the concept of "idea" in the writings of Fréart de Chambray and David Le Roy. As has already been underscored in our analysis of Fréart's discourse on the orders, the canonical fragments selected among antique precedents represented, according to him, the best forms of the instantiation of an original Greek idea holding transcendental value. The sublime fragments were material manifestations of some revealed knowledge and deserved due respect and admiration.

The concept of "primitive idea" in Le Roy's discourse on the other hand, referred to specific historical examples. In his case the idea appeared as a human invention and an historical construction which had gained some authority through its adaptation and reinterpretation by subsequent generations. Primitive ideas were believed to have cultural and historical origins. Because these transcendental ideas had established themselves in an
earthly, human, historical world, attitudes toward precedent were subjected to change. Given this changing nature of the authority of antique cases during the period of our study, the nature of design thinking itself evolved toward a more rational and controlled form of definition.

12.3 The Changing Form of Analogical Thinking: Imitation, Adaptation, Appropriation and Reinterpretation

The gradual historicization of architectural knowledge began in the seventeenth century with the intervention of Claude Perrault in the debate on the rules of the orders of architecture in the last quarter of the seventeenth century. Perrault's essay on the architectural orders provoked a real crisis in the foundation of architectural thinking. By contesting the essentialist interpretation of the proportions of architecture inherited from the Renaissance and Antiquity, and still very much alive in Fréart de Chambray and François Blondel's discourses, and by affirming the conventional and relative character of proportions in architecture, Claude Perrault's undermined the authority of the classical precedents as eventual sources of absolute rules and models. Perrault conventionalist approach however, was accepted by only a few theoreticians in the eighteenth century, such as Frézier and Patte. Many of the works on the rules of architecture written during this period responded defensively to Perrault's attack on the foundation of architectural thinking. For most eighteenth century theoreticians, the problem was to come to terms with Perrault's relativistic and instrumental approach, and to reestablish the authority of precedents inherited from the classical tradition on positive and experiential grounds.
Gradually the subjective experience of precedents emerged as a new foundation for the rules of architecture.

In this context, the modes of appropriation of precedents in design thinking were gradually redefined, and the classical concept of imitation — *mimesis*\(^1\) — based on a belief in the eternal recurrence of the same essence, evolved into a more instrumental, analogical process of appropriation.

With Perrault, precedents began to derive their value from their relative relevance in rational design practice: they were used only to the extent that they offered solutions to design problems. Particular forms could be used by analogy in the context of intentional and unified design processes. Precedents could also be dismantled and used in parts, while parts of precedents could be discarded if they contradicted or conflicted with the main design intentions.

Precedents became sources of experience that needed to be rationalized in order to be of any use. This applied to systems of proportions and the geometric control of forms, as well as to incommensurable qualities. Le Camus de Mézière suggested for instance, that the experience of precedents could be a source of qualitative knowledge about forms and their effects on human sensations. Such experience-based knowledge could come from built precedents as well as from other sources of experience such as scenography, painting or landscape. These precedents provided generic knowledge or principles which allowed for the creation of an analogical bridge between sensation and architecture, experience and design.

For Le Roy, the imitation of a "primitive idea" involved a similarly rarefied form of analogical thinking, extracting form historical cases.

\(^1\) On the concept of *mimesis* see Erich Auerbach's classic study, *Mimesis: The Representation of Reality in Western Literature*, (Princeton, 1953), and more recently Gunter Gebauer and Christoph Wulf, *Mimesis: Culture, Art and Society*, (Berkeley, 1995).
 fundamental qualities in order to transpose, adapt and transform them in new designs. Here again, the notion of "primitive idea" did not exclude the use of a multiplicity of precedents. On the contrary, Le Roy's description of historical chains of development of architectural ideas suggested that architecture evolved through the combination and synthesis of ideas. By the end of the eighteenth century, this approach would become the key to architectural invention. However unlike the unregulated assemblage of quotations devised by Fréart de Chambray and François Blondel for instance, this mode of creative work was controlled within a rigorous framework of aesthetic and historical reasoning based on precedent experience.

12.4 From Authoritative Justification to Critical Reasoning

Studies of precedents in the early discourse of the Académie tended to seek sources for modern directives and norms in past examples. This was certainly the case in the discourse of Fréart de Chambray and François Blondel, and to a certain extent, this attitude continued to pervade the architectural discourse until the last quarter of the eighteenth century. With Perrault, and certainly with Boffrand and Briseux, precedents served more as justifications than as real design models. Boffrand for instance, referred in general terms to antique Greek precedents only as a way to justify his efforts to rationalize and simplify the repertory of mouldings, and the design of the profiles of architectural elements. Similarly, when Briseux presented an elevation of the Porte Saint Denis in Paris framed within a scheme of harmonic proportions — even though, as J.F. Blondel showed, the Porte Saint-Denis was not designed according to harmonic proportions — it was
in order to prove through experience ("preuve par l'expérience") the validity
of his principles of harmonic control of composition.

In the middle of the eighteenth century however, a more critical and
constructive mode of reasoning with precedents emerged in design discourse
especially in Jacques François Blondel's pedagogical writings and methods.
As Peter Collins has pointed out, and as our analysis has also made clear,
J.F. Blondel introduced, for the first time, a critical method of case-studies
in architectural education. A systematic comparative approach to precedent
cases and rules pervaded his entire work, not only as a critical method for
the definition of directives but as a framework for the progressive adaptation
of norms to changing design conditions and architectural experiences.

From the point of view of the analysis of the discourse, it can be
said that the relation between norms and precedents in the early modern
period became an increasing source of conceptual tension. While Freart de
Chambray established a direct, non conflictual relationship between antique
cases and modern rules, a century later Jacques-François Blondel was able
to set a creative and dynamic tension between these two poles.

Furthermore, J.F. Blondel introduced this critical design method
based on comparisons with precedents. According to him, architectural
design involved a critical and reflexive of evaluation and reiteration of ideas,
based on successive comparisons with precedents and evaluations of
previous solutions. As such, Jacques-François Blondel was probably the first
to formulate in architectural literature, the modern notion of a project as a
critical, reflexive process of conception. He anticipated to a certain extent,
the development of the paradigm of "reflection in action" more recently
developed By Donald Schön,² in which design reasoning with precedents –

² Donald Schön, The Reflective Practitioner, (New York, 1983), Educating the
Reflective Practitioner: Toward a New Design for Teaching and Learning in the Professions, (San
Francisco, 1987) and "Designing: Rules, types and worlds," Design Studies, vol. 9 No.3 (July
1988).
referring mainly to series of iterations related to a specific project – holds a crucial place precisely as a framework for the dialogue between points of view in the conceptualization of a project.

12.5 The Value and Meaning of Precedents in an Age of Relativization

This study has been concerned mainly with the evolution of the discourse on the orders of architecture and their role in design thinking. The choice of this topic was in larger measure justified by the central cognitive and philosophical significance of the debates generated by theses issues during the period under study.

However, other architectural topics and fields of practice could also be investigated in order to deepen our understanding of the role and value of precedents in the intellectual dynamic of the period. Important changes occurred in the conceptual systems of military architecture, civil engineering and urban planning, for instance. Precedents also played an important role in the consolidation of those other autonomous disciplines of design. In fact, when one considers the fundamental importance attributed to precedents by Bernard Forest de Bélidor, in his effort to create a specific body of knowledge for hydraulic engineering design — in addition to the abstract analytical knowledge represented by mathematics and mechanics — one is forced to consider the central, epistemological function of precedents in design thinking, and in the creation of the modern socio–professional organization of production of the built environment.

In fact, this leads directly in the core of the problem of the definition of a specific corpus of knowledge in professional education and practice in modern times. Indeed, while it is generally admitted that some common
ground should exist between the different disciplines related to the conception and production of the built environment, it has become increasingly difficult to define such universal grounds. In the absence of any universal truth, or shared principles, precedents at least offer a basis for dialogue, debate, and the formation of individual critical judgement within and between individual disciplines. No doubt, attempts to circumscribe general fundamental aspects of design thinking continue to be needed, and we certainly believe that a better understanding of the cognitive structure of design thinking will open new perspectives in this direction. However, it is also clear that such knowledge will, in turn, need to be learned through specific cases and examples of application and manifestation.

This study could also be extended to include the nineteenth and twentieth centuries as well as discourses from other cultures, as a way of providing a more global perspective on the structural role of precedents during the numerous crises that affected the development of professional knowledge in the modern times. Indeed as early as the Renaissance, the rediscovery of an antique body of precedents was both a cause of and response to, the crisis that affected the social and professional corporate structure of the Middle Ages, and constituted a key to a renewal of architectural design thinking. Although the Avant-Garde of the 1920's explicitly rejected the heritage of the past, precedents continued to occupy a discrete but fundamental place in the design thinking process. Indeed, even Le Corbusier referred explicitly to experimentation with iron structure by nineteenth century French architects such as Viollet Le Duc, Labrouste and Boileau as sources of building principles, and applied these principles in the
conception of the metal structure of the Swiss Pavilion. But with the twentieth century, one mainly witnesses a destabilization of the authority of the academic corpus of precedents, and the emergence of a new interest in domains of precedents that were traditionally excluded from architecture as direct sources of invention. Again, Le Corbusier’s numerous sketches and design studies contain references to multiple precedents taken from various fields of material production including vernacular architecture, various products of industrial design and engineering, as well as classical buildings of antiquity. The *Unité d’habitation* in Marseilles, for instance, was based on a combination and reinterpretation of forms, spatial organization and principles extracted from the pilotis system of the Swiss vernacular hut, the ocean liner and the bottle rack. Since the late 1960’s, a global reevaluation has been undertaken regarding the relevancy of past and contemporary material culture to architectural design. An unprecedented openness toward the totality of occidental and even oriental architectural culture is manifest. Furthermore, the whole array of contemporary cultural production — including works in cinema, electronic media, machines, publicity, natural artefacts, and every day artificial objects in general, is also being explored in the search for regenerating ideas and formal innovations in architecture.

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4 "Take the case of Le Corbusier’s *Unité d’habitation*, the "pre-parametric" way he conceived the building’s spatial concept, grasping from the outset, seemingly effortlessly and spontaneously, its fundamental aspects, inventing a truly complex multi-functional unprecedented form synthesized out of, and in analogy to, a multitude of precedents: the savage hut, the liner, the wine bottle rack, the Greek temple, and more, recalling these precedents from memory, examining them, dissecting them, trying them and recombining them, putting old tools to new uses and old one in new compositions." in Tzonis, *op.cit.*, (1991) p.145.
There is indeed today a compulsive tendency among students and architects to draw from anything but architecture as a source of ideas and justifications for building design. The metaphorical appropriation of forms and principles taken from so many diverse fields of production might be perceived as an exhilarating means of formal innovation and so-called cultural commentary, but only in rare cases do they offer viable solutions to design problems.

These investigations should be made distinct from a reasoned and critical use of precedents for problem solving in design thinking. Recently, in a more instrumental and disciplinary perspective, many efforts have been made to develop data banks of built precedents and automated means of design based on the use of precedents. Many of these works however, tend to approach precedents in a cultural and historical vacuum. They appear as means for increasing the instrumental power of the designer and as more or less neutral tools for design. The economy and cognitive advantages of precedent-based design over abstract, principle-based design has indeed often been evoked as a main argument for the use of precedent in the context of the rationalisation of design thinking. This attitude, I believe, must also be incorporated into a more global vision embodying cultural dimensions. As this study has attempted to show, the use of precedents is inconceivable outside more complex reasoning patterns and conceptual systems which ultimately relate to systems of belief. Therefore, an intelligent and conscious use of precedent depends on a responsible integration of these structures in the critical, reflective process of design thinking.

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5 A recent attempt to develop more complex means to represent and describe precedents, integrating qualitative and cultural dimensions in the form of "stories", has been hinted at by Rivka and Robert Oxman in "Remembrance of Things Past: Design Precedents in Libraries," in A. Tzonis and I. Whyte, op.cit., (1994), 55-68.
Recent studies in architectural typology have been among the most responsible and creative responses to the problem of the integration of precedents in design thinking. The reflections of C.G. Argan, A. Rossi, R. Moneo and A. Vilder have opened a way to a more global and critical dialogue with architectural culture. Contemporary efforts to develop forms of architecture, and design strategies responsive to contextual elements and conditions have also produced fascinating and diversified results in the architecture of Carlo Scarpa in Italy, Tadao Ando in Japan, Rafael Moneo in Spain, Álvaro Siza in Portugal, and more recently in the work of Herzog and De Meuron in Switzerland, to mention only some of the most important figures. These have been described in turn as "critical regionalist" and "critical conventionalist" works.

Precedents can have a strong methodological value as tools for design and critical reasoning. But their main function again is perhaps less rigidly instrumental than communicational. Indeed precedents have held, and continue to hold, a central place in the professional debates on architecture,

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8 This term is used by Stanford Anderson especially in reference to Adolf Loos's reinterpretation of Viennese architectural conventions in "Critical Conventionalism in Architecture", in *Assemblage* 1, (October 1986), 7–24.
as a locus of interaction and negotiation between individuals within a particular community of professionals. Precedents offer a stabilizing framework within a permanently changing flux of ideas and intellectual orientations. In France, the orders of architecture were, for over a century and half submitted to successive reinterpretations, debates, and re-design processes. They embodied both the most traditional and the most progressive trends in architectural thinking, and served as a locus of confrontation, negotiation and possible fruitful dialogues between conflictual norms, methods and world views.

The role of precedents becomes increasingly important in periods of instability and pluralism in the belief systems and values of a society. Indeed a precedent-based design can be perceived as a mode of reactualization of cultural forms and memory. But most importantly it constitutes a point where a communication between professionals and the society can be established, and where the merging of the subjectivity of individuals with an ideal of community can be contemplated as the most important impetus behind human creativity in an era of relativization.
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Summary

This study analyses the role of precedents in the definition of design directives for the five classical orders of architecture in the normative discourse published in France between 1650 and 1793. More specifically, it documents the transformation of the role and status of precedents in design reasoning during a formative period in the history of modern architecture.

Drawing from the method of Discourse Analysis, the study argues that during this period, the profound changes that occurred in the conceptual systems of architecture, which led to the relativization of norms in design, directly affected the way precedents were used in design thinking. During this period, the emergence of a modern, rational, and critical conception of precedents and tradition can be witnessed. Thus, the thesis put forward in this study departs from the general conception of precedents as a static memory bank, a notion shared by many architects, theoreticians and historians today. The study promotes instead a conception of precedents as a central element for design reasoning and decision making. Finally, it is suggested that precedents can serve as a meeting ground for discussion and dialogue during the design process, and therefore help in creating consensus and, ultimately, relevant and responsible design products.
PRECEDENTS AND DESIGN THINKING IN AN AGE OF RELATIVIZATION
Samenvatting

Deze studie analyseert de rol van precedenten bij het definiëren van ontwerprichtlijnen voor de vijf klassieke kolommen der architectuur in de normatieve verhandelinger die in Frankrijk tussen de jaren 1650 en 1793 werden gepubliceerd. Meer in het bijzonder dokumenteert ze de transformatie van de rol en status van precedenten in het vormgevingsdenken gedurende de beginperiode van de moderne architectuurgeschiedenis.

Uitgaande van de methode der verhandelingsanalyse, wil deze studie bewijzen dat de grondige veranderingen die plaatsvonden in de conceptuele systemen in de architectuur tijdens deze periode, en welke geleid hebben tot de relativering van de designnormen, een rechtstreekse invloed uitoefenden op de manier waarop de precedenten gebruikt werden bij het vormgevingsdenken. Tijdens deze periode wordt de noodzaak van een modern, rationeel en kritisch conceptueren van precedenten en tradities duidelijk waarneembaar.

De stelling vooropgesteld in deze studie distancieert zich alsdanig van de algemeen gangbare opvatting van precedenten als statische geheugenbank, die door vele hedendaagse architecten en historici naar voren wordt gebracht. Deze studie verdedigt daarentegen het gebruik van precedenten als centraal element voor vormbenadering en besluitvorming. Naar het eind wordt er gesuggereerd dat precedenten kunnen aangewend worden als ontmoetingsplaats voor discussie en dialoog tijdens het ontwerproces, en hierdoor bijdragen tot het creëren van een eenstemmigheid. Uiteindelijk kan dat leiden tot toepasbare en verantwoorde design produkten.
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Denis Bilodeau was born in Canada, in 1957. Upon completing his first degree (B.Arch.) at the School of Architecture at Laval University in Quebec City, in 1980, he terminated a Master degree in History and Theory of architecture (M.Sc.A.) at the Faculté d'aménagement, University of Montreal. From 1982 to 1983, he carried research in the Faculty of Architecture, Delft University of Technology, as a Fellow of the Dutch Government. From 1984 till 1987 he was researcher at the Canadian Centre for Architecture in Montreal. In 1986 he joined the Department of Art History and Archaeology at Columbia University in New York, where he earned two graduate degrees, Master of Arts (1988), and Master of Philosophy (1993). In 1993, he entered the Design Knowledge Systems Research Group at the Faculty of Architecture, Delft University of Technology, The Netherlands. He was co-author with Alexander Tzonis and Liane Lefaivre of the book De taal van de klassicistiese architektuur, (Nijmegen, SUN 1983) which was translated in several languages including French, Spanish, English and German, and has also published extensively in France, the United States, and Canada. Since 1990, he is professor in the School of Architecture of the University of Montreal where he teaches design, theory and history.