

THE CONCEPT OF TYPE IN ARCHITECTURE

An Inquiry into the Nature of Architectural Form

Leandro Madrazo

“Le mot *type* présente moins l’image d’une chose à copier ou à imiter complètement, que l’idée d’un élément qui doit lui-même servir de règle au modèle. Ainsi on ne dira point (ou du moins auroit-on tort de le dire) qu’une statue, qu’une composition d’un tableau terminé et rendu, a servi de *type* à la copie qu’on en a faite. Mais qu’un fragment, qu’une esquisse, que la pensée d’un maître, qu’une description plus ou moins vague, aient donné naissance, dans l’imagination d’un artiste, à un ouvrage, on dira que le *type* lui en a été fourni dans telle ou telle idée, par tel ou tel motif, telle ou telle intention.”



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*A mis padres.
Para Jeannette.*

Por ellos.

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Zusammenfassung

Es ist das Ziel der vorliegenden Arbeit, die Bedeutung des *Konzepts* von Typus im Bereich der Architektur zu untersuchen. Der Gebrauch des *Begriffs* Typus durch Architekturtheoretiker ist ein relativ junges Phänomen, das auf Quatremère de Quincy im neunzehnten Jahrhundert zurückgeht. Die *Idee* von Typus findet sich jedoch schon seit Vitruv in Theorien über den Ursprung der architektonischen Form, in den verschiedenen Versuchen der Systematisierung von architektonischem Wissen und im unterschiedlichen Verständnis von Kreativität.

Eine grundlegende Prämisse dieser Arbeit ist, daß ein wirkliches Verständnis von Idee von Typus in der Architektur nur möglich ist, wenn man traditionelle Sichtweisen überwindet, die "Typus" mit der Arbeit von bestimmten Autoren wie Quatremère de Quincy, Semper oder Rossi assoziieren. Nur eine umfassende Studie der wichtigsten Theorien -von Vitruv bis zu den zeitgenössischen Designmethodologen- kann die Bedeutung oder die Bedeutungen von "Typus" zeigen. Der Versuch einer solch umfassenden Studie wird durch diese Arbeit vorgelegt.

Um die fundamentalen Bedeutungen von "Typus" aus den unterschiedlichen Theorien abzuleiten, ist es notwendig sowohl einer diachronen wie einer synchronen Linie zu folgen. Bei einer diachronen Herangehensweise ist es das Ziel, die Entwicklung der Typustheorien von einem Autor zum anderen, zum Beispiel von Laugier zu Quatremère de Quincy, zu verfolgen. Bei einer synchronischen Herangehensweise besteht das Ziel darin, die gemeinsamen Ideen der in verschiedenen Zeiten entstandenen Theorien aufzuzeigen, wie zum Beispiel zwischen Vitruvs Theorie des Ursprungs der architektonischen Form und der nach dem Entstehen der Gestaltpsychologie entwickelten Kunsttheorie.

In neuerer Zeit wird das Wort Typus von Autoren architektonischer Literatur als Synonym für Typologie verwendet. Unglücklicherweise führt diese Identifizierung zu einer Schwächung einiger essentiellen in "Typus" enthaltenen Bedeutungen. Im Kontext der architektonischen Tradition hat die Idee von Typus tiefere Bedeutungen als nur die Klassifikation und das Studium von Gebäudeformen. Vielmehr umfaßt "Typus" transzendente Fragen von ästhetischem, epistemologischem und metaphysischem Charakter, welche im

Zusammenhang mit den grundlegendsten Fragestellungen von Form stehen. Die essentielle Bedeutung von Typus ist mit Sicherheit eng mit dem transzendentalen Problem von Form verknüpft.

Es ist auch das Ziel dieser Forschungsarbeit die Beziehung zwischen der Idee von Typus und der historischen Entwicklung der architektonischen Form zu zeigen. Es soll dargestellt werden, daß die Vielfalt der von Typus assimilierten Bedeutungen untrennbar mit der Evolution der architektonischen Form verknüpft ist. Aus diesem Grund ist die vorliegende Arbeit sowohl eine Studie über die Idee von Typus als auch ein Forschungsbeitrag zur Natur der architektonischen Form.

Abstract

The purpose of this dissertation is to investigate the meaning of the concept of Type in the field of architectural theory. Even though the use of the term *type* by architectural theorists is a relatively recent phenomenon, which can be traced back to Quatremère de Quincy in the early nineteenth century, the *idea* of Type, as opposed to the explicit use of this term by theorists, has pervaded much of architectural theory ever since Vitruvius. In fact, many theorists have been concerned with issues which convey a notion of Type, like the origins of architectural form, the systematization of architectural knowledge and the understanding of the process of creativity.

A basic premise of this work is that to understand the true significance of the idea of Type in architecture, it is necessary to overcome certain traditional views that have associated Type with the work of specific authors at a given time like, for example, Quatremère de Quincy and Semper in the nineteenth century, or Rossi in the twentieth. Only a comprehensive study of the most relevant ideas formulated in the field of architectural theory -beginning with Vitruvius and finishing with contemporary design methodologists- can reveal the essential meaning, or meanings, of Type. This work attempts to provide such a comprehensive study.

To derive the fundamental meanings of the concept of Type from the body of the architectural tradition, it has been necessary to proceed, simultaneously, along two different lines: one diachronic, the other synchronic. From a diachronic point of view, the aim has been to trace the evolution of the theories of Type from one author to another, for example from Laugier to Quatremère de Quincy. From a synchronic point of view, the goal has been to disclose the common ideas that lie behind theories formulated at different times, for instance, between Vitruvius' theory of the origins of architectural form and the artistic theory developed after the advent of Gestalt psychology.

In recent times, the term *type* has been used by architectural writers as synonymous with *typology*. Unfortunately, establishing this identity between *type* and *typology* has served to undermine some of the essential meanings conveyed by Type. In the overall context of the architectural tradition, the idea of Type has

much deeper implications than those that are confined to the classification and study of building forms. Type embraces transcendental issues of aesthetic, epistemological and metaphysical character; issues that have to do with the most generic problem of Form. Certainly, the essential meaning of Type is intimately related with the more transcendental problem of Form.

To explore the relation between the idea of Type and the historical evolution of architectural form, has also been the purpose of this research. As this work attempts to show, the variety of meanings that Type has adopted through history are inseparably connected to the evolution undergone by architectural form. For that reason, this work, although primarily a study of the concept of Type, it is, at the same time, an investigation on the nature of architectural form.

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Introduction

A study of the notion of Type in Architecture raises a host of difficulties, that start with the meaning of the word itself. To give a precise definition of Type is as difficult as coming up with a definition of Form, a term often used as synonym of Type. Type and Form are tautological notions, self-evident truths that elude definition. Type, like its most generic equivalent, Form, is a fundamental category on which human knowledge is based. We find the notions of Form or Type underlying all intellectual work, from the distant past up to the present day. In fact, it would be difficult to find an intellectual creation, either a scientific theory or a work of art, in which a notion of Form has not played a central role.

The ubiquity of the terms Form and Type makes it difficult to delimit their study to a particular historical moment or even to a particular discipline. Moreover, it can be contended that any attempt to confine the study of Form or Type to a historical moment necessarily distorts the essential meaning of the concept. By the same token, a study of Type restricted to architecture could be, in principle, equally misleading. The essence of the meaning of Type transcends historical periods and specialized fields. Therefore, to grasp the true meaning of Type it is necessary to take the broadest possible view, considering the term Type as a 'conceptual model' or paradigm that permeates every intellectual creation.

The notion of Type in Architecture

With the regard to the notion of Type in Architecture, it is necessary to distinguish among the following cases:

1. *The explicit use of the term type in the texts of architectural theorists.* This case is limited to a few instances at particular historical moments. Among them, the definition of Type given by Quatremère de Quincy in 1825 stands out. This is still the main point of reference in any discussion about Type in architecture. The concept of Type of Quatremère re-entered the architectural debate in the 1960's and 1970's, particularly because of the article of Giulio Carlo Argan, 'On the Typology of Architecture', first published in 1962. About the same time, the concept of Type became the fundamental epistemological category in the theoretical work of Carlo Aymonino, Aldo Rossi, Giorgio Grassi, and others. Following the work of Italian

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architects and urbanists, a considerable number of articles and books dealing with the issue of Type in architecture has been published. To give a comprehensive list of those works is beyond the scope of this introduction.

2. *Other synonyms which convey the meaning of Type.* Ever since Vitruvius, architectural theorists have given expression to the idea of a first architectural model -a type or archetype- from which architecture derives, without making explicit mention to those terms. For example, Laugier did not use the term *type*, but turned to the simile of the *cabane rustique* to convey the idea of a first architectural model. Other authors have used terms which come close to the idea of Type as a first principle. Viollet-le-Duc, for example, used *style* in the sense of a formative principle that pervades every true work of architecture; a meaning that comes close to the previous definition of Type given by Quatremère. Similarly, in the field of the psychology of form a number of terms have been coined that convey the notion of a 'mental image' that matches the formative principle that lies in the object; that is, the type. The notion of *Gestalt* is a point in case. Art theorists who have based their work on the findings of the psychology of form have come up with their own terms. For example, Rudolf Arnheim's notion of 'structural skeleton' or Ernst Gombrich's 'conceptual schema'. More recently, some architectural theorists have preferred to use other terms to avoid the numerous connotations with which the words *type* or *form* have been loaded. Bruce Allsopp, for example, uses the word *format* to refer to a patterned structure which includes not only form but also function, design system and style.

3. *The illustrated architectural treatises which gave expression to the notion of type and typology without explicit mention of these words.* After the publication of Serlio's books in the Renaissance, the illustrated architectural treatise has given expression to the notion of type and typology in architecture, by means of images rather than words. Later books, such as those by Palladio, Scamozzi, Ledoux and Durand, among many others, have continued the tradition of giving expression to architectural typology by graphical means. In all of these treatises, the word *type* either was not mentioned at all or it was replaced by others that conveyed a similar meaning. For example, Durand, in his *Précis des leçons*, used the French *genre* instead of *type*.

4. *The evidence provided by architectural works.* The most eloquent manifestation of Type in architecture is provided by the architectural works themselves. Any coherent group of architectural works, like the Greek temples, the Palladian villas, the Prairie houses of Wright, as well as examples of vernacular architecture, are all tangible manifestations of the notion of Type.

Introduction

Structure of the work

This work is structured in two parts. The first part, confined to the first chapter, explores the different meanings of Form and its synonyms Idea, Type and Structure. The second part, consisting of the following ten chapters, explores in chronological order the notion of Type in architecture, covering each of the four manifestations of Type referred to above.

FIRST PART: Meanings of Form: Type, Form, Idea and Structure

The *first chapter* addresses the concept of Form in the broadest possible sense, by exploring the different meanings of Form in the realms of philosophy, science and art. One of the purposes of this inquiry is to establish a distinction between Type and other terms often used as synonyms, like Form, Idea and Structure. In this regard, this chapter aims to go beyond a simple etymology of those terms. It shows that each word -idea, type and structure- stands for a 'conceptual paradigm' or 'model of thought', that pervades the intellectual productions of a given period. Thus, it will be contended that the concept of Type stands for the epistemological meaning of the more comprehensive notion of Form; and that Type belongs to a territory where the differences between science and art tend to blur.

SECOND PART: The concept of Type in Architecture

The following ten chapters focus on the architectural meaning of the notion of Type. The overall structure of this second part is mostly chronological. It begins with the doctrine of imitation of Plato and ends with the most recent concepts developed around the application of computers to design. This sequential ordering does not imply that there is a historical continuity in the development of the different conceptions of Form and Type. Sometimes, a historical thread is stressed, for example the one that begins with the concern with form perception in the Renaissance and ends with the attainment of an identity of conception and perception in modern architecture. But, in general we have avoided following a strictly historical development because this would distort the essential meaning of the notion of Type. As can be seen in the course of the different chapters, Form, or Type, is the recurrent issue behind much architectural thought expressed by theorists at different times.

A brief description of the content of every chapter follows below:

Chapter two, is a study of the doctrine of imitation contained in Plato's theory of Ideas of Forms. The understanding of Plato's theory of imitation, particularly with regard to the different objects of imitation he considered, is a prerequisite for the appreciation of Quatremère's theory of Type.

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Chapter three, concerns itself with the theory of the origins of architectural form propounded by Vitruvius. Vitruvius' theory of the origins of architecture has remained the essential reference for later theoreticians who have addressed the issue of the first architectural model.

Chapter four, is a discussion of different aspects of the Renaissance conception of Idea, including the emergence of form perception in the architectural theory of Leon Battista Alberti; the relation between conception and representation with regard to the concept of *disegno*; the architectural treatise and the systematization of architectural knowledge; and the natures of the Renaissance conception of architectural form. The aim of this chapter is to demonstrate the specificity of the Renaissance Idea in contrast to later notions of Type.

Chapter five, makes a case for the increasing awareness with form perception, in the epistemological sense, that took place in the course of the seventeenth and eighteenth centuries. Topics in this chapter are: the theory of Claude Perrault, the work of British architects in the early eighteenth century and the ideas and projects of Etienne-Louis Boullée.

Chapter six, concentrates on the emergence of the concept of Type in architectural theory. The theories of Marc-Antoine Laugier and Quatremère de Quincy are the subject-matter of the chapter.

Chapter seven contains a critical review of the theoretical work of Jean-Nicolas-Louis Durand.

Chapter eight, discusses the intersection of meanings of Type and Style which took place in the first half of the nineteenth century, as manifested in the theories of Heinrich Hübsch, Gottfried Semper and Eugène Viollet-le-Duc.

Chapter nine, focuses on the meaning of Type as a mental image, in particular with regard to those artistic theories born under the influence of the psychology of form perception. The different ideas and terms developed by writers like Adolf Hildebrand, Heinrich Wölfflin, Paul Frankl, Emil Kaufmann, Rudolf Arnheim and Ernst Gombrich, are reviewed and discussed. The purpose of the chapter is to make a case for the identity of conception and perception as a distinctive feature of modern architecture. The ideas and buildings of Le Corbusier are a specific example.

In *chapter ten*, the alleged break of modern architecture with the idea of Type is questioned, while it is proposed that the transformation of architectural form from the Renaissance to the Modern Movement is characterized by the abandonment of the Palladian model and its subsequent replacement by the notion of formal language.

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Finally, *chapter eleven*, furnishes a view of Type as mind structure that derives from those fields that have attempted to study the mind scientifically, by modelling on the computer the creative processes, including design. In this chapter, the idea of a systematic design process supported by computer is contrasted with previous ideas formulated in architectural theory.

Chapter 1

Paradigms of Form: Idea, Type and Structure

1.1 Introduction

In the writings of authors who have dealt with the issue of Type and architecture, it is possible to find expressions such as [italics mine]: "Type represents the *idea* of an element which should itself serve as rule for the model...."(Quatremère de Quincy); "[Type] has to be understood as the *interior structure* of a *form*"(G. C. Argan); "Type is the very *idea* of architecture" (A. Rossi); "[Type is] a concept which describes a group of objects characterized by the same *formal structure*"(R. Moneo). Type is, according to the interpretations of these authors, an equivalent term to idea, form or structure.

In light of these and other references, the first question to be addressed is the distinction between the term type and the terms form, idea or structure. Unfortunately, the dictionary cannot provide much help in this regard. Among other definitions, *The Oxford English Dictionary* describes type as [italics mine] "The general *form, structure, or character* distinguishing a particular kind, group, or class of beings or objects", as "a *pattern or model* after which something is made", and as "a *figure or picture* of something; a representation; an *image* or imitation." According to the dictionary, type is equivalent to form, structure, pattern, model, figure and picture, all of them words that in one way or another carry connotations of Form. When we look up form in the same dictionary, the following definitions are to be found [italics mine]: "Shape, arrangement of parts"; "an *image, representation, or likeness*"; "the particular character, nature, *structure, or constitution* of a thing"; and also "a *model, type, pattern, or example*."

Chapter 1

Therefore, if we attend to the definitions given by the dictionary, it can be seen that form and type are, upon a first inspection, synonyms.¹ Moreover, not only do form and type appear to be exchangeable words but each one of these two terms shares with the other the same set of synonyms like model, pattern or structure. Thus, the difficulty of differentiating between form and type is the same as the difficulty of distinguishing between type and idea; between type and structure or, in general, between type and the many other synonyms of form, like model, pattern, figure, image, etc.²

The difficulty of defining precisely what type or form is, does nothing but remind us the tautological character of the concept of Form. Form and type are among the most elusive words in our vocabulary because the notions they convey are fundamental for the existence of human knowledge as a whole. Considered in its broadest sense, the question of Form-Type transcends the specific domain of architecture and architectural theory. Form, like Type, Structure and System, are categories that cut across the boundaries in which human knowledge has come to be divided.

It is a basic premise of this work that, to understand the fundamental meaning of the notion of Type, one must consider the most generic point of view, without restricting the study to a particular domain, in our case, the field of architectural theory. It is our contention that a study of the notion of Type, restricted to a particular field, would result in a loss of the fundamental meaning of the concept. For this reason, we will start our study of the concept of Type by looking at the different meanings with which Form and its equivalents have been endowed in the course of the history of ideas.

In this first chapter, the specificity of the word type will be unfolded by contrasting it with other three words which are usually taken as synonyms of type: form, idea, and structure. What follows is not so much an etymology of these words as a history of the concept of Form itself, more precisely, a history of the ideas that have found in the various synonyms of Form their means of expression. Most of the references that appear in this chapter are extracted from the realms of philosophy and science, with punctual references to the field of art and architectural theory. The history of Form that is outlined here has both a diachronic and a synchronic dimensions. First, it is diachronic insofar as it acknowledges that, because of the intrinsic dynamism of knowledge, the meanings of words are necessarily subjected to a constant process of change. As a result, new

¹The parallelism between Form and Type can be traced back to their earliest etymological meanings. According to *The Oxford English Dictionary*, some philologists maintain that the word Form derives from *ferire*, 'to strike'. Type, on the other hand, originally meant 'impression' and derived from a root word that meant 'to beat, strike.'

²It should be noticed, that apart from these synonyms, there are more words that denote Form, like *shape, arrangement* and *representation*; but also, *character, nature, constitution* and *example*, are terms that in one way or another denote Form.

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meanings are added to existing words while the original meaning of the word becomes blurred in the process. Second, it is synchronic since despite the continuous changes of words and meanings, the concept of Form emerges as a constant that permeates all intellectual productions, from the earliest times right up to the present.

1.2 Meanings of Form-Idea in Plato and Aristotle: metaphysical, epistemological and aesthetic

Originally, the Latin word *forma*, from which the English *form* derives, replaced two Greek terms: *eidōs*, which was used to refer to conceptual forms, and *morphē*, mostly used to refer to the sensible ones.³ Both meanings were inherited by the Latin *forma*, and this dual meaning has persisted up to the present time. Thus, the definition of Form in the dictionary as *shape* and *arrangement of parts*, corresponds respectively to the sensible and conceptual meanings of form.

The Greek word *eidōs* (*eidē* or *ideai*, in Greek 'to see'), from which the English word *idea* ultimately derives, acquired its abstract meaning in the theory of Ideas or Forms of Plato. According to *The Oxford English Dictionary*, In Platonic philosophy *Idea* means "a supposed eternally existing pattern or archetype of any class of things, of which the individual things in that class are imperfect copies, and from which they derive their existence." Other equivalent words for *Idea* that are listed in the same dictionary are *look*, *semblance*, *form*, *configuration*, *species*, *kind*, *class*, *sort*, *nature*, *type* and *model*.

To understand the original significance of the original concept of Form-Idea we will turn first to the theory of Ideas or Forms of Plato and to the alternative theory proposed by Aristotle. For our purposes, it will be enough to focus on three different meanings of Form that can be identified in the thought of the two classic philosophers: metaphysical, epistemological and aesthetic.⁴

1.2.1 The metaphysical meaning of Form

The abstract meaning of *Idea* or *Form* derives from the theory of Ideas of Plato. The essence of Plato's theory lies in the distinction between two distinct worlds:

³W. Tatarkiewicz, 'Form in the History of Aesthetics', *Dictionary of the History of Ideas*, p. 216.

⁴Tatarkiewicz distinguishes five different meanings of form in the history of aesthetics: 1. form as equivalent to the disposition, arrangement, or order of parts 2. form as what is directly given to the senses 3. form understood as the boundary or contour of an object 4. form as the conceptual essence of an object, in the sense of Aristotle's *entelechy* and 5. form as contribution of the mind to the perceived object, as it was understood by Kant. *Ibid.* In our study, we have opted for a more generic classification of Form (metaphysical, epistemological, aesthetic) that transcends the particular field of aesthetics.

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the abstract world of Ideas and the sensible world of physical things. According to Plato, the world of reality is composed of Ideas (*eidōs* or *ideai*) while the world of experience is made of Images (*eikones*, *eidola*, *mimēmata*, *phantasmata*) which are only the 'shadows' or 'reflections' of the intelligible Forms or Ideas. The duality Ideas-Images constitutes then the core of Plato's philosophy. Plato considers Ideas and Images as the antithesis of each other. Thus, if Ideas are transcendent, intelligible, unique, immutable, eternal and non-spatial then Images are immanent, sensible, multiple, mutable, ephemeral and spatial. Plato's concept of Idea or Form does not apply solely to the Forms of physical artifacts and living creatures but also to mathematical Forms, notions of equivalence (Sameness and Difference) and virtues (Justice, Beauty, Piety), among others. Plato did not distinguish between these different sorts of Ideas or Forms but subsumed all of them under the same category of *eidōs*.

Later, Aristotle responded to Plato's theory of Forms or Ideas. He could not accept that Forms existed separated from the sensible world: "Again, it would seem impossible that the substance and that of which it is the substance should exist apart; how, therefore, should the Ideas, being the substances of things, exist apart?"⁵ In the *Metaphysics*, Aristotle defined Form in the following terms: "By form I mean the essence of each thing";⁶ and, in another passage as "that by reason of which the matter is some definite thing." For Aristotle, Form and Matter were inseparable components of the same Substance. The concept of Substance is the distinctive tenet of the Aristotelian concept of Form. Like Plato, Aristotle saw Form as the intelligible structure of things;⁷ unlike Plato, he thought that Form was embodied in the matter. Aristotle's concept of Form is less fixed and stable than the one of Plato. Form is for Aristotle a sort of potency concealed in the matter seeking to become the actual Form. In the *Physics*, he wrote that "Form and matter are not separate from the thing", for "the form....is a kind of power immersed in matter";⁸ and in the *Metaphysics* that "the proximate matter and the form are one and the same thing, the one potentially, the other actually."⁹ Form was for Aristotle basically the formal cause, one of the four causes that made a thing to be what it is; the other three being the material, final and efficient causes.

To summarize, according to Plato, Forms exist in an eternal world and they are the models from which all things are derived. In the Aristotelian approach, Form exists potentially in the matter as a sort of internal active principle, in much the same way as a seed contains the germ of future growth of a plant. These two approaches towards Form, one which conceives Form as separated from matter

⁵*Metaphysics*, I 9, 991a-b, translated by William D. Ross, *Aristotle*, Oxford, 1923.

⁶*Metaphysics* VII 17, 1041b; Ross, op. cit.

⁷According to William D. Ross, op. cit., in the *Metaphysics*, Aristotle used the terms *eidōs*, *logos* and *ti ēn einai* to refer to the 'intelligible structure', 'formula or definition', and 'what it was to be so-and-so' respectively. Quoted in N. Emerton, *The Scientific Reinterpretation of Form*, 1984, p. 48.

⁸*Physics* IV 2, 209a; *On Generation and Corruption* I 5, 322a; quoted in Emerton, op. cit., p. 50.

⁹*Metaphysics*, VIII 6, 1045b; Ross, op. cit.

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(Platonic), and another for which Form is inseparable of matter (Aristotelian), have remained as essential paradigms for subsequent interpretations of Form.

1.2.2 The epistemological meaning of Form

The Platonic concept of Form conveys a double meaning, metaphysical and epistemological. In a metaphysical sense, it refers to the conceptual form as opposed to the sensible form or Image. But because the conceptual form or Idea can only be apprehended through intellectual reasoning it also has an epistemological significance. In the *Timaeus*²⁹, Plato opposes the metaphysical separation between conceptual and sensible form to the epistemological distinction between knowledge and belief: "For being has to becoming the same relation as truth to belief."

In Plato's view, knowledge cannot be derived from sense experience but rather from the acquaintance with the Ideas. Knowledge (*epistēmē*), which Plato equates to truth, is the apprehension of the intelligible forms which can only be achieved with the exercise of reasoning, and to achieve that knowledge is the main concern of the philosopher. Belief, is what concerns to the 'lovers of sights and sounds' (*philothaemenes*); the amateurs or sophists who, unlike philosophers, "admire beautiful sounds and colours and figures and all things fashioned out of such, but their understanding is incapable of seeing or admiring the beauty of real beauty."¹⁰ From the point of view of epistemology, the Platonic Ideas stand for the objective contents of thought that constitutes the basis of knowledge.¹¹

Plato thought of the Ideas as being what later philosophers have known as universals, that is to say, as the sort of generic concept which is assigned to a word (*onoma*). Thus, in the *Republic*^{596a} Plato refers to the Form with the following words: "We have been in the habit, if you remember, of positing a Form, wherever we use the same name in many instances, one Form for each 'many'." Also, in the *Phaedo* he writes that "the name of the form is attached not only to the form in an eternal connection; but something else which, not being the form, yet never exists without it, is also entitled to be called by that name."¹² However, the determination of the exact relationship between the universal Form and the particulars has traditionally been considered as one of the major difficulties of Plato's philosophical system. Plato was aware of the conflictive relationship between Forms and their particulars, and used different expressions to convey that relation. He spoke, for example, of Forms 'being in' their particulars, of particulars

¹⁰*Republic*476b.

¹¹According to Richard Patterson, "Plato's Forms do the work of meanings and (objective) concepts, in that they are what is grasped in thought, they are what is attributed to or said of things in *logos*, they are the objects of shared knowledge, and they are the intelligible objects under which sensibles fall." R. Patterson, *Image and Reality in Plato's Metaphysics*, 1985, p. 158.

¹²Quoted and translated in Emerton, op. cit., p. 258.

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'participating in' their Forms, and of particulars 'copying' their Forms.¹³ It is also an object of debate whether Plato maintained at some point that the number of Forms was limited.¹⁴

It is precisely the problematic relationship between universals and particulars in Plato's system that led Aristotle to propose an alternative system in which the universal -the Form- exists *in* the particular rather than being separated from it. Then, in contrast to Plato's, the epistemology of Aristotle is based on the inference of the universals from the particulars. For Aristotle, "to know something about a thing is to be able to subsume it under species and genus and thus to know what is essential to it."¹⁵ Since the essential aspect of a thing is embedded in the thing itself, classifying becomes for Aristotle a fundamental operation to acquire knowledge, especially knowledge in natural science. Also, unlike Plato, Aristotle puts more emphasis on the psychological aspects in the acquisition of knowledge. For Aristotle, knowledge lies in the mind or intellect (*nous*). In *De Anima* 429b, he writes that "one must indeed applaud those who say that the soul (*psyche*) is the place of forms."

1.2.3 The aesthetic meaning of Form

In Plato's philosophy, the three supreme values -*Pulchrum, Bonum, Verum*- were part of the same idea. Thus, in the *Republic* 508, Plato writes that "knowledge and truth are both beautiful." Hence, along with the metaphysical and epistemological meanings of Form, a third meaning -aesthetic- should be added to the previous two. This aesthetic meaning of Form-Idea is also implicit in the Latin *forma*. In Latin, something having a 'good form' was called *formosus*, while the noun *formositas* meant configuration and beauty.¹⁶

In accordance with the major theme of his theory -the distinction between intellectual and sensible realms- sensible things are for Plato imperfect copies of some perfect Form. For beauty is for Plato one kind of Form that cannot exist in the sensible objects but only as an independent, immutable being. Hence, a thing

¹³A. D. Woozley, article 'Universals', in *The Encyclopedia of Philosophy*, vol. 8, p. 197.

¹⁴In this regard Patterson writes: "It is sometimes contested whether Plato consistently held a theory of Forms restricted in population. Republic 596a might seem to postulate a Form for every (general) onoma and so contradict the Phaedrus, Statesman, and other dialogues- including, perhaps, itself- on this point." Patterson, op. cit., p. 125. And in the article 'Metaphysics', in the *Encyclopedia Britannica* it is contended that "the question of how the one Form was supposed to relate to the many particulars that participated in or resembled it was nowhere satisfactorily answered." *Encyclopedia Britannica*, 15th ed., vol. 24, p. 6.

¹⁵Quoted and translated in D. W. Hamlyn, 'History of Epistemology', in *The Encyclopedia of Philosophy*, vol. 3, p. 13.

¹⁶Tatarkiewicz, op. cit., p. 218. In the Romance languages, the relationship between form and beauty was still apparent. In old Castilian, *formoso* also meant beautiful; the same as in today's Italian, *formoso*.

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will be more or less beautiful to the degree in which the perceptible form approximates the archetypal form.¹⁷ In the *Philebus*, however, Plato distinguishes between two kinds of beauty: one that applies to perceptible things and another to abstract entities. He contends that living bodies and paintings please us because their changing forms can be perceived, while geometric figures like straight lines, circles, planes and circumferences, have a beauty which is not relative as the one of the sensible things: this is the beauty that only intelligence can understand. Again, as with the identity between Ideas and words, the question of the identification of the Ideas with geometric figures -that this reference in the *Philebus* seems to suggest- has led to various conjectures among students of Plato.

Aristotle, in his references to beauty, focused on the qualities which are intrinsic to the things themselves, as well as the psychological aspects of perception. In the *Metaphysics* he contends that the most important properties of beauty are order (*taxis*), symmetry (*symmetria*) and limitation (*orismenon*). In the *Poetics* he referred to beauty in perceptual terms: "Beauty depends on size and order; hence an extremely minute creature could not be beautiful, for our vision becomes blurred as it approaches the point of imperceptibility, nor could an utterly huge creature be beautiful, for, unable to take it in all at once, the viewer finds that its unity and wholeness have escaped his field of vision."¹⁸

1.2.4 The unique meaning of Form

It is necessary to point out that these three aspects of Form that we have identified above - metaphysical, epistemological and aesthetic- are so intimately related in Plato's theory of Ideas that to consider them as separate might be contrary to the original spirit of the theory. Therefore, the distinction between different meanings of Form that we have adopted here is a reflection of a view of Form which is more in accordance with our own epoch than with the time of the Greeks. The necessity and usefulness of this distinction between the different meanings of Form will be revealed in the course of the present work, as we constantly refer to the shift from different meanings of Form that take place in the course of history.

¹⁷This notion of an eternal, immutable Beauty is expressed in the *Symposium*211a-b, where Plato writes that: "Beauty always is, and neither comes to be nor perishes, neither waxes nor wanes; moreover neither is it in one way beautiful, another ugly, nor beautiful at one time, ugly at another, nor beautiful here, ugly there, nor beautiful in the eyes of some, ugly for others. Nor, either will it appear to the beholder as a face or hands or anything else corporeal, nor as words or knowledge, nor as in anything else, as in animal or in earth or heaven or something else, but in and of itself alone, of a single form, always being whereas the rest partake of it in such a manner that while they come to be in perish, it neither grows any greater or less nor affected at all." Quoted in Patterson, op. cit., p. 78.

¹⁸*Poetics*1451a.

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1.3 Ideas in the realm of the mind

Apart from its original Platonic meaning, *The English Oxford Dictionary* defines Idea as “mental image, conception, notion” and also as “a picture or notion of anything conceived by the mind; a conception.” This notion of ‘idea in the mind’ was alien to the Platonic philosophical system. The shift that the term Idea underwent, from the eternal and separate world where Plato had placed it to the human mind, was a consequence of a gradual process of philosophical development that began with the Neoplatonists, continued with the Scholastics in the Middle Ages and culminated with the Rationalist and Empiricist philosophers of the seventeenth and eighteenth centuries.

1.3.1 Ideas in the divine mind: the scholastics

In Plato’s philosophy, particularly as manifested in the *Timaeus*, Ideas had an existence independent from God. They were not considered as products of a divine will, but on the contrary, as existing patterns which the divine artificer or *demiourgos* used to create the cosmos. But Plato’s concept of Idea was reinterpreted by the Neoplatonists, especially Plotinus, as being the thoughts of God. This was the interpretation that passed over the Scholastics in the Middle Ages. Hence, St. Augustine spoke of Ideas as being contained ‘in the divine intelligence.’ Following the translation of Aristotle’s works in the thirteenth century, the Platonic -or Neoplatonic- and Aristotelian interpretations of Form, were merged by the Scholastics.¹⁹ St. Thomas Aquinas, under the inspiration of Aristotle, thought that universals were contained in sensible things, and that “the process of thinking that accompanies knowledge consists of the active intellect (*intellectus agens*) abstracting (*abstrahens*) a concept from an image (*phantasma*) received from the senses.”²⁰ Thus, Idea came to represent both the “archetypes in the mind of God and universals immanent in worldly things.”²¹

1.3.2 Ideas in the human mind: empiricists and rationalists

Following the separation of science and theology, which Scholasticism had held together, Ideas became secularized. Philosophers in the seventeenth and eighteenth century considered Ideas to be in the human mind, rather than in

¹⁹The combination of the Platonic and Aristotelian theories was already evident in the Latin translation of the *Timaeus* made by Calcidius, which became the vehicle for the propagation of Platonism throughout the Middle Ages. Calcidius thought that what Plato called the Idea was the intelligible form which God the Maker conceived in his mind, and he referred to this idea as concept, primary or principal or intelligible species, archetype, exemplar and exemplary source. To Aristotle’s specific form, he referred with the words sensible species, image, copy, picture, similitude and corporeal source. See Emerton, *op. cit.*, p. 159.

²⁰In the article ‘Epistemology’, *Encyclopædia Britannica*, 15th ed., vol. 18, p. 477.

²¹Patterson, *op. cit.*, p. 156.

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mind's God. This shift of the Idea from the divine sphere to the human realm was apparent in the language itself: the common meaning of the word idea in the sixteenth century, both in French and English languages, was 'mental representation.'²² About the same time, the word was also used in the sense of 'figure', 'form' and 'image'. In his *Méditations*, 1641, René Descartes used the term idea to mean 'image or representation' in the mind, according to the common usage of the word in his time: "*Quelques-unes (de mes pensées) sont comme les images des choses, et c'est à celles-là seules que convient proprement le nom d'idée.*" Unlike later philosophers in the empiricist tradition, Descartes used the term idea to designate any thinking activity in general, regardless whether originated in a sensible image or not. After Descartes, idea was used in philosophy "to denote any object of thought."²³

Descartes exemplifies the rationalistic and nativistic approach adopted in the seventeenth and eighteenth centuries to explain the origins of knowledge, in so far as he believed that reason alone was the cause for knowledge and that some knowledge -as mathematics or geometry- was inborn to the mind rather than being obtained through the senses. Thus, for example, he wrote that "Nothing comes from external objects to our mind through the organs of senses save certain corporeal motions... but not even these motions, and the configurations to which they give rise, are conceived by us as they occur in the sense-organs...Whence it follows that the very ideas of motions and configurations are innate in us."²⁴

In contrast to the nativist approach of Descartes, the three classic British empiricists -Locke, Berkeley and Hume- contended that there was no innate knowledge and that all ideas derive from sense experience. The Empiricists, following the Aristotelian interpretation of Form, believed that general Ideas did not have a different existence from particulars. In their belief, they identified Ideas with Images as well as with 'impressions'. John Locke was the first to maintain that all ideas derive from 'impressions'. According to Locke, Ideas are formed by abstracting the features that are common to a series of individuals leaving only what is common in all of them. At some point, he made a distinction between 'ideas of sense' and 'ideas of reflection', and among the first he further distinguished between primary qualities and secondary qualities. Primary qualities are those without which an object could not exist, such as solidity, number, figure and motion. Secondary qualities -such as color, sound and taste- are "nothing in the objects themselves but powers to produce the various sensations in us by their primary qualities."²⁵ Locke claimed that there is a resemblance between the

²²J. O. Urmson, article 'Ideas', in *The Encyclopedia of Philosophy*, vol. 4, p. 119.

²³*Ibid.*

²⁴R. Descartes, *Notes Directed Against a Certain Program*; quoted and translated by Urmson, *op. cit.*, p. 119.

²⁵Quoted in D. W. Hamlyn, 'History of Epistemology', in *The Encyclopedia of Philosophy*, vol. 3, p. 22. The distinction between primary and secondary qualities is another recurrent issue in philosophy, that can be traced back to the times of the Greeks. Democritus had already distinguished between

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primary qualities of things and the idea that we have of them, a claim that was later refuted by Berkeley.

George Berkeley took a more radical stand than Locke, as he claimed that all Ideas are 'sensibles'. According to Berkeley, universals could not exist separated from sensibles. He denied, for example, that the general idea of a triangle existed because no idea (he probably meant 'image') of a triangle could exist which is "neither oblique nor rectangle, neither equilateral, equicrural, nor scalenon, but all and none of these at once"- he wrote, paraphrasing Locke.²⁶ Moreover, he rejected Locke's contention that the meaning of the general words is given by the abstract ideas to which correspond, by saying that "there is no such thing as one precise and definite signification annexed to any general name, they all signifying indifferently a great number of particular ideas." He argued, for example, that the definition of a triangle as a plain surface comprehended by three right angles, does not say "whether the surface be great or small, black or white, nor whether the sides are long or short, equal or unequal, nor with what angles they are inclined to each other."²⁷ In Berkeley's view, the distinction between primary and secondary qualities made by Locke had also to be rejected since only secondary qualities exist.

David Hume adopted a more skeptical position than Berkeley, since he was not absolutely convinced of the capability of the senses to give a full knowledge of reality. Like Berkeley, Hume also thought that ideas derived from the material provided by sense experience: "There is a copy taken by the mind, which remains after the impression ceases; and this we call an idea."²⁸ Contradicting Locke, he distinguished between impressions and ideas, and subsumed both under the category of perception. Thus, impressions are the perceptions of sense while ideas are perceptions of the imagination or memory.²⁹ Furthermore, he claimed that impressions are perceptions that enter with 'most force and violence' in the mind, while ideas are 'faint images' that appear in the act of reasoning. In other words, impressions are felt while ideas are thought. Some of the concepts introduced by Hume had strong psychological orientation, chief among them was the notion of 'association of ideas', meaning that an idea prepares the mind to receive similar ideas. Thus, he wrote that "all inferences from experience, therefore, are effects of custom, not of reasoning."³⁰

Immanuel Kant reversed the arguments of the empiricists: is not the mind that has to accommodate to ideas originated in sense experience but, on the contrary, is

properties that belong to the object -like size and shape- and properties that the mind assigns to the object as, for example, color. See Hamlyn, op. cit., p. 9.

²⁶G. Berkeley, *A Treatise Concerning the Principles of Human Knowledge*, 1710, p. 14.

²⁷*Ibid.*, p. 18.

²⁸D. Hume, *Treatise of Human Nature*, Book I, Part I, Sec. ii; quoted in A. R. Manser, 'Images', in *The Encyclopedia of Philosophy*, vol. 4, p. 134.

²⁹Quoted in Hamlyn, op. cit., p. 26.

³⁰D. Hume, *An Enquiry Concerning Human Understanding*, 1748.

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the world of experience that has to conform to the mind. Accordingly, Kant understands Idea as "a necessary concept of reason to which no corresponding object can be given in sensation."³¹ According to Kant, there is some a priori synthetic knowledge, like space and time, that cannot be derived from experience. These are categories of the understanding that exist a priori of all sense experience. Moreover, as Kant put it, the world of experience could not exist without the mediation of those categories.

In Kant's 'transcendental idealism', every sensory experience is simultaneously sensuous and abstract. He gave to this combination of sensible and abstract experience the name of 'transcendental schema': "It is clear that a third thing must be given which must stand in a relation of being of the same sort with the category on the one hand and with the appearance on the other, and which makes possible the application of the former to the latter. The mediating representation must be pure (without anything empirical) and yet not simply intellectual; it must be at the same time sensuous. Such a thing is the transcendental schema."³²

1.3.3 The aesthetic meaning of Idea

In the artistic domain, the notion of Idea in the mind of the artist can be traced back in Antiquity to the writings of Aristotle, Plotinus and Cicero. During the Middle Ages, writers like Robert Grosseteste had already contended that "Form is the model which the artist has in his mind" (*forma est exemplar ad quod respicit artifex*).³³ By the sixteenth century, the concept of Idea acquired the status of an ar-theoretical concept. Panofsky has pointed out that in the texts of Melanchthon, Ideas were considered as thoughts in the mind of the artist that reveal themselves in artistic creativity.³⁴ After the Renaissance, the word *disegno* was used to refer to the idea or concept in the mind of the artist, as well as to its external materialization. Thus, Vasari writes that "*il disegno, padre delle tre arti nostre....cava di molte cose un giudizio universale, simile a una forma ovvero idea di tutte le cose della natura, la quale è singolarissima nelle sue misure....e perchè da questa cognizione nasce un certo giudizio, che si forma nella mente quella tal cosa, che poi espressa con le mani si chiama disegno, si può concludere, che esse disegno altro non sia, che una apparente espressione e dichiarazione del concetto, che si ha nell'animo, e di quello, che altri si è nella mente immaginato e fabbricato nell'idea.*"³⁵

³¹I. Kant, *Critique of Pure Reason*, Transcendental Dialectic, I, 2; quoted in J. O. Urmson, op. cit., p. 120.

³²I. Kant, *Critique*, A137-138, B176-177; quoted in Charles W. Hendel, introduction to *The Philosophy of Symbolic Forms* from E. Cassirer, p. 12.

³³R. Wittkower, *Architectural Principles in the Age of Humanism*, 1973, pp. 151-152.

³⁴E. Panofsky, *Idea: A Concept in Art Theory*, 1968, p. 6.

³⁵Quoted in Panofsky, op. cit., p. 61.

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In the course of the seventeenth to eighteenth centuries, both meanings of Idea, the epistemological and the aesthetic, gradually converged into one. At some point the overlapping of the aesthetic and epistemological meanings of Idea was such that it was no longer possible to distinguish between both. An example of this is the following definition of beauty made by Francis Hutcheson, who in the *Enquiry into the Original of Our Ideas of Beauty and Virtue*, 1725, wrote: "Let it be observed, that in the following papers, the word beauty is taken for the idea raised in us"³⁶ and "a sense of beauty for our power of receiving this idea."³⁷

1.3.4 Platonic Idea versus rationalist Idea

The concept of Idea is fundamental to the theories about the origins of knowledge postulated by empiricists and rationalists. But, paradoxically, in the hands of the empiricist philosophers the content itself of Idea disintegrates. What interests the philosopher is the process by which the Idea comes to being, rather on what the Idea actually is. In this regard, there is a substantial difference between the notion of Idea held by the empiricists and the Platonic Idea. Even though Plato eluded the question of what the Ideas actually are (he only hinted what they could be) his Ideas were meant to have a positive existence: they were eternal essences living in their own distant world. In other words, Plato's Idea was mostly non-psychological and non-empirical while the theories of Hume, for example, Idea had a strong empirical and psychological component.

This trend towards the understanding of the mechanisms by which the mind acquires knowledge would continue in the following centuries, culminating with the creation of experimental psychology in the middle of the nineteenth century. Outside of the empirical tradition, the term Idea soon ceased to appear in later philosophical writings.³⁸ Other terms, like Type, came to replace the traditional Idea in those areas of knowledge that needed new words to express new concepts.

1.4 The notion of Type

Etymologically, the term *type* derives from the Greek *typos*, which in turn comes from the Indoeuropean word *týpto*, that meant 'to beat, to hit, to mark'. In Epicurean philosophy, the notion of *prolepsis* (i.e. anticipation, preconception) would be the act of associating a word with a *typos*, considered as the outline left in the mind as the result of repeated exposures to an object. In Greek philosophy, the word *typos* was associated to the notion of model, considered as a set of

³⁶Quoted in J. Stólnitz, 'Beauty', in *The Encyclopedia of Philosophy*, vol. 1, p. 265.

³⁷Quoted in, H. Dieckmann, 'Beauty to the Mid-Nineteenth Century', in *Dictionary of the History of Ideas*, vol. 1, p. 198.

³⁸Urmson, op. cit., p. 120.

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characteristics present on a group of concrete individuals, and that this meaning has remained stable since then.³⁹

In classical Greek, a clear distinction between *eidōs* and *typos* was hard to establish. This identity between the Idea and Type stems from the use that Plato gave to the word Idea. At some point, Greek writers seem to have used both words, *eidōs* and *typos*, indistinctively. Thus, in the *Histories* 1, 109, Thucydides speaks of 'many ideas (kinds) of warfare'.⁴⁰ Although the word *typos* was used both by Plato and Aristotle in their writings,⁴¹ it has been questioned whether the term had played any important role in their philosophy.⁴² Similarly, it has been contended that the concept of *typos* played no major role in the field of artistic criticism in the time of the Greeks.⁴³ At that time, the word *typos* was used mostly by sculptors, who employed it in the sense of 'mould' or 'relief'. Nevertheless, some scholars have argued that *typos* meant also the 'abstract model' or 'sketch' from which the sculptor would have created his work.⁴⁴

A clear-cut distinction between form and type or archetype was hard to establish during the Middle Ages. For example, the definitions of Form given by Robert Grosseteste in the thirteenth century would conform to the notion of Type as it was understood after the seventeenth century. In his *De unica forma omnium*, Grosseteste distinguished these three meanings of Form: 1. as a model, for example a sandal used as a form (pattern) for making other sandals 2. as a casting mould, to make a statue 3. as an image in the mind of an artist.⁴⁵

In the Christian tradition, the words type and archetype were used to refer to the figures of the Old Testament as prefigurations of what was to come. In Abel

³⁹T. De Mauro, 'Tipologia', in Casabella, 509/510, 1985.

⁴⁰Quoted in Urmson, op. cit., p. 118.

⁴¹For example, Plato uses the word *typos* in the *Cratylus* 432e, in the sense of a 'general character' of a thing. See Patterson, op. cit., p. 110. The word appears also in *Philebus* 51d, where he refers to colors 'of the same type.' See P. M. Schuhl, *Platon et l'art de son temps*, 1933, p. 42, note 1.

⁴²Thus, for example, Wolfgang Bassler contends that Type "ist kein klassischer philosophischer Begriff wie etwa Substanz, Idee, Materie, Ursache, Sein, Wesen, etc." W. Bassler, 'Zum Begriff des Typus in Philosophie und Psychologie', in *Typus, Modell, Leitbild*, 1986, p. 10. Bassler bases his argument on the fact that the term type does not appear in philosophical dictionaries and, in those in which appears, it only deserves a very short reference.

⁴³Pollitt contends that *typos* "is not, strictly speaking, a critical term; it never signifies a criterion by which the quality of a work of art is evaluated." J. J. Pollitt, *The Ancient View of Greek Art*, 1974, p. 272.

⁴⁴In his account of the different interpretations of *typos*, Pollitt mentions the one from Georg Lippold, who argued that, for a Greek sculptor, *typos* would have meant the abstract model or sketch from which the sculptor would have created his work, in opposition to the concrete model or *paradeigma*, which stood for a sort of prototype to be replicated exactly. For Pollitt, however, the notion of abstract model is already part of the concept of *paradeigma*, which according to him could be of three different sorts: physical, intellectual, and ideal or spiritual. Pollitt, op. cit., p. 211.

⁴⁵R. Grosseteste, *De unica forma omnium*, in *Opuscula philosophica*, ed. L. Baur, *Bäumkersche Beiträge*, 1912; quoted in Tatakiewicz, *Form in the History of Aesthetics*, p. 224. Emerton claims that this work is not ascribed anymore to Grosseteste. See Emerton, op. cit., p. 26, note 14.

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Boyer's *Dictionnaire Royal Anglois-françois*, 1727, the word *type* was described as a 'figure', 'shadow' or 'representation.'⁴⁶ This meaning was related to the readings of the Bible, in which figures and facts were interpreted 'as anticipations and exemplary signals of Christ, with Adam seen as the *typos*, exemplary figuration of Jesus.'⁴⁷

1.4.1 The emergence of Type and the rise of science

The modern usage of the term *type* can be traced back to the beginnings of the seventeenth century, when the rise of scientific knowledge brought out a renewed interest in form theory. It is also related to the debate about the nature of Ideas and to the incipient interest in understanding the mechanisms of the mind as manifested in the work of philosophers like Hume and Kant. At the outset, it can be contended that a main reason for the emergence of the concept of *Type* in the seventeenth century was the need to stress the epistemological sense of *Form* over the aesthetic, metaphysical and religious meanings that had acquired in the past.

A basic task for the natural philosophy of the seventeenth century was the formulation of different theories to account for the composition of matter, especially minerals. One of the predominant theories of the time was that the form of a mineral persisted in the particles and atoms of which this is composed. Sometimes, the particles, atoms or corpuscles were thought of, in an Aristotelian fashion, as seeds which contained the 'seminal principle' from which the mineral grows. The chemist Thomas Sherley, for example, wrote in 1672 that "there is an internal Mind, virtue, and Idea, contained in the Seeds of things" and that "the Ideas and Seeds do work upon Matter, and form themselves bodies."⁴⁸ Within the following decades, this 'seminal principle' containing the seeds for further growth started to be referred as 'primary or primitive form' and later as *type*. Domenico Gulielmini, in a work published in 1719, explained the composition of crystals in terms of *schema*, or shapes of the primary particles, and *typos*, the primary form created after joining the elementary particles.⁴⁹

⁴⁶Quoted in A. Vidler, 'The Idea of Type: The Transformation of the Academic Ideal, 1750-1830', in *Oppositions*, 1977.

⁴⁷De Mauro, *op. cit.*

⁴⁸T. Sherley, *A Philosophical Essay: Declaring the Probable Causes whence Stones are Produced in the Greater World*, London, 1672; quoted in Emerton, *op. cit.*, p. 142.

⁴⁹"Smaller particles of salt joined together make up larger crystals of the same figure as their primary type or, what comes to the same thing, one of their primary particles.... Every crystal proceeds from one type, i. e. from one particle surrounded by other equal and similar ones.... Part of the saline matter separated from water and forming into crystals is used to make the type, and part to add on it.... The types of crystals arrange the additional material to make the perfect shape". *De salibus dissertatio epistolaris physico-medico-mechanica*, from the *Opera omnia*, Geneva, 1719. Quoted and translated by Emerton, *op. cit.*, p. 267.

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The theory of the 'seminal principle', postulated by naturalists in the sixteenth and seventeenth centuries, can be thought as a combination of the theories of Plato and Aristotle. The theory is mainly Aristotelian insofar as the 'seminal principle' or 'primitive form' is embedded in the matter itself. However, it is also Platonic since this primitive form is associated with certain geometric figures, in line with the theory expressed by Plato in the *Timaeus*.

1.4.2 Type and the biological sciences

Classification of nature

The conviction that scientific knowledge could be achieved through the appropriate classification of nature (a basic tenet of Aristotelian philosophy) was particularly strong in the early stages of scientific development. The comprehensive classification of the natural world carried out by Linneaus in the seventeenth century epitomizes this belief. In his *Systema Naturae*, Linneaus introduced the binomial nomenclature and assigned every organism to the lowest taxonomic category, the species. The classification of organisms in species adopted by Linneaus was eminently morphological, as the grouping of natural beings in species was based on form similarity.

The system of classification proposed by Linneaus brought up the issue of whether the taxons were a reflection of the real characteristics of natural beings or a pure artificial construct. The debate brought to the fore the disagreement between realism and nominalism concerning the question of universals. For the realists, universals exist in themselves and they could have their own existence even if there would be no minds to be aware of them. Nominalists, on the other hand, consider that only words can be claimed to have an objective existence. A third approach, conceptualism, has been later added to the previous two. Conceptualists think that universals exist only in the mind.

In the system adopted by the French biologist Georges Cuvier, animal species were classified according to function rather than form. Cuvier thought that the form of an organism is related to its 'conditions of existence'. He explained that relationship by means of two anatomical rules: the 'correlation of parts' and the 'subordination of characters'. By the first he meant that "all the organs of one and the same animal form a single system of which all the parts hold together, act and react upon each other; and there can be no modifications in any one of them that will not bring about analogous modifications in them all."⁵⁰ By the second principle he meant that certain organs had a greater functional importance than others in the conformation of the organism.

⁵⁰G. Cuvier, *Rapport Historique sur le Progrès des Sciences Naturelles depuis 1789 et sur leur Etat Actuel*, 1808, p. 330. Quoted and translated in P. Steadman, *The Evolution of Designs*, 1979, p. 35.

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Even though Cuvier was against the idea of evolution, his theory about the relationship between the organism's constitution and the conditions of existence paved the way for the evolutionary theory of Darwin. Unlike Cuvier, Darwin thought that the relationship between organism and the 'conditions of existence' was not fixed but rather subjected to changes and, therefore, amenable to scientific study.

The idea that all knowing is classifying has come under attack in recent times. The awareness that there are no objective facts, but only facts that are mediated by the predominant paradigms has undermined the old Aristotelian belief according to which knowledge, meaning scientific knowledge, could be derived from the systematic ordering of the natural world.

Goethe's morphology

The notion of archetype played a fundamental role in the development of Goethe's morphology.⁵¹ Goethe thought that by determining the archetypal plant (*Urpflanze*), it would be possible to derive from it all existing species of plants. This archetypal plant would be the standard against which the various plants would be classified in genus and species. Moreover, Goethe was convinced that such an ideal plant could be precisely defined. At some point he wrote: "The Primal Plant is going to be the strangest creature in the world, which Nature herself shall envy me."⁵²

Goethe used sometimes the word *Gestalt* to convey meanings which are closely related to those of the archetypal plant. But, the concept of *Gestalt*, as was used by Goethe, conveyed a different meaning from the concept of Type that was being used by contemporary biologists like George Cuvier who, at the beginning of the nineteenth century, was the first to make a conscious application of the word type as a taxonomic category in zoology.⁵³ As Cassirer has remarked, a *Gestalt* was for Goethe a dynamic principle -a formation or *Bildung* -as opposed to the static

⁵¹References to the notion of the archetypal plant (*Urpflanze*) can be found in his *Italian Journey*: "Here where I am confounded with a great variety of plants, my hypothesis that it might be possible to derive all plant forms from one original plant becomes clear to me and more exciting. Only when we have accepted this idea will it be possible to determine genera and species exactly." (*Botanical Gardens, Sicily, 1797*).

⁵²W. Goethe, *Italian Journey*, Rome, 1787. Quoted and translated in R. Brady 'Form and Cause in Goethe's Morphology', in *Goethe and the Sciences: A re-appraisal*, 1987. According to Brady, this does not mean that Goethe was searching for an actual plant but that he thought that he could arrive to a precise description of it. Philip Steadman, on the other hand, thinks that, at some point in the early development of his ideas about the *Urpflanze*, Goethe thought that he could find the actual archetypal plant, and that only later, the idea became more abstract. See P. Steadman, op. cit., 1979, p. 26.

⁵³G. Cuvier, *Sur un rapprochement à établir entre les différentes classes des animaux*, 1812. See J. Hoffmeister, *Wörterbuch der philosophischen Begriffe*, p. 624.

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geometric scheme referred by contemporary biologists with the word *type*.⁵⁴ Goethe understood 'form as movement', i.e. a characteristic pattern of development rather than a static pattern.⁵⁵ Here is where, according to Cassirer, lies the originality of Goethe's concept of Form: "This peculiar intermingling of being and becoming, of permanence and change, was comprehended in the concept of form, which became for Goethe the fundamental concept."⁵⁶ Furthermore, according to Cassirer, there exists a close affinity between Kant's transcendental schema and Goethe's *Gestalt*; an affinity that stems from both terms implying a unity of sensuous intuition and intellectual form.

Apart from the word *Gestalt*, Goethe also used other words that have connotations with *Type*, like for example *Urbild*.⁵⁷ However, it was not until his later writings that he explicitly used the term *Typus* in the sense of the Aristotelian *entelechy*, i.e. as the immanent cause of any life form that "designates potential rather than actual forms."⁵⁸ All in all, there are some differences between Goethe's concept of *Typus* and his former theory of the *Urpflanze*. While he was convinced that the *Urpflanze* could actually be described, he ruled out the possibility that the *Typus* could be identified with any concrete individual. In *Entwurf einer vergleichenden Anatomie*, Goethe thought that "once one has grasped the idea of this type he will see how impossible it would be to set up a single order as a criterion. An individual cannot serve as a standard of the whole, and so we must not seek the model in any one. Classes, orders, species, and individuals are related as cases to a law; they are included under it, but do not constitute it."⁵⁹

⁵⁴Cassirer thought that "to Cuvier or Candolle 'type' was an expression of definite and basic constant relationships in the structure of living things that are fixed and unalterable and upon which all knowledge of them depends. Candolle insisted that the disposition of the parts was the most important factor for the establishment of the plan of symmetry of a plant....But this view was not Goethe's. He did not think geometrically or statically, but dynamically throughout. He did not reject permanence, but he recognized no other kind than that which displays itself in the midst of change, which alone can discover it to us." Quoted and translated in Brady, op. cit., p. 274. And, in other part, Cassirer contended that in the case of Goethe, "Form belongs not only to space but to time as well, and it must assert itself in the temporal[...].It is remarkable how everything developed logically and consistently from this one original and basic concept of Goethe." In E. Cassirer, *The Problem of Knowledge*, pp. 139-140.

⁵⁵As Brady later explained, it is the movement itself which defines the *Gestalt* of Goethe [italics mine]: "Thus the movement is not itself a product of the forms from which is detected, but rather *the unity of those forms*."Brady, op. cit., p. 279. This interpretation of Form, or Type, as a characteristic pattern of development has found a continuation in the work of the Swiss botanist Jochen Bockemühl. Bockemühl understands the development of a plant in terms of a series of 'transformations' (*Bildebewegungen*), which he considers to be four: shooting, articulating, spreading and stemming. J. Bockemühl, 'Bildebewegungen im Laubblattbereich höherer Pflanzen', in *Elemente der Naturwissenschaft* 4, 1966, pp.7-23.

⁵⁶Cassirer, op. cit., pp. 138-139.

⁵⁷R. Eisler, *Handwörterbuch der Philosophie*, 1913, p. 691.

⁵⁸Brady, op. cit., p. 286 and p. 298.

⁵⁹Translated and quoted in Cassirer, op. cit.; quoted in Brady, op. cit.

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Phylogenetic derivation versus typology

Goethe's speculations on the fact that plants could derive from a common archetype are not to be interpreted as theories aimed at explaining their *actual* process of growth in nature. As Cassirer has pointed out, Goethe's archetype "is an ideal, not a real genesis."⁶⁰ To come up with a scientific explanation of the actual evolution of species was a goal later pursued by Darwin.

It has been suggested that the concept of archetype, as interpreted by Goethe, played a part in the development of Darwin's theory of evolution. In chapter thirteen of *The Origins of Species*, Darwin referred to that "the ancient progenitor, the archetype as it may be called...." Even if Darwin was aware of Goethe's theories on the archetypal plant, his interpretation of the notion of archetype took a different direction. As Bertalanffy has pointed out, "while classical morphology only knew ideal relationships, Darwin introduced the idea of real phylogenetic derivation. If organic forms appeared previously as variations of a prototype, they now appear as the changed descendants of a concrete ancestor."⁶¹ For Bertalanffy, in the period of idealistic morphology or typology previous to Darwin, organisms were classified "according to their formal similarity without consideration of the time dimension" while Darwin's phylogenetic derivation introduced the time dimension.⁶²

In the evolutionary theory of Darwin, organisms are seen as being in continuous interaction with the environment. The ultimate purpose of the organism is to achieve adaptation to the environment. This 'organism-environment' model, along with the idea of the 'survival of the fittest', was adopted by other disciplines, particularly those which were being forged at the time, like psychology, sociology or anthropology.

Homology and analogy

According to Bertalanffy, the origins of Goethe's morphology are closely related to the concept of homology; a term made popular by Richard Owen who used this concept to refer to a standard resulting from the comparison between the forms of different organisms. Geoffrey St. Hilaire, however, anticipated in 1818 the notion of homology with his concept of the '*unité de plan*', by which he meant that

⁶⁰Ibid.

⁶¹For Bertalanffy the origins of morphology should be traced back to Goethe's interpretation of the intermaxillary bone in man. He realized that in mammals the upper incisor teeth is embedded in a special bone, the intermaxillary, and searched for the traces of it in man. L. von Bertalanffy, *Perspectives on General System Theory*, 1975, p. 86. It should be mentioned that Bertalanffy's interest in the concept of homology is based on what he calls the *isomorphic* nature of the term. By this he meant that the concept of homology transcends the realm of zoology, to become a fundamental concept in a more general science which Bertalanffy named as General System Theory. Ibid., p. 88.

⁶²Ibid., p. 90.

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similarities between different animals are identified according to recognition of identical position in a common plan.

Later, in 1848, Owen distinguished between homologous and analogous organs. He defined a homologous organ as “the same organ in different animals under every variety of form and function” whereas an analogous organ was “a part or organ in one animal which has the same function as another part or organ in a different animal.”⁶³ This means that, for example, the fins of fishes are homologous to the limbs of tetrapods while the wings of an insect and those of a bird are analogous.

Owen made a further distinction between special homology and general homology. Special homology exists between corresponding organs in different organisms, as previously described. General homology, however, refers to the relation “in which a part or series of parts stands to the fundamental type.”⁶⁴ In the first case, it is the empirical or sensible forms of organs which are being compared. But, in general homology, empirical forms are compared to an ideal or invented form; the *tertium quid* that acts as intermediate between two things. Owen went as far as suggesting some ideal representations of vertebrae and archetypal skeletons.⁶⁵

1.4.3 Type and the scientific study of the mind

Whereas during the seventeenth and eighteenth centuries the concept of Type was mainly applied in the domain of natural philosophy, and later in the newly formed natural sciences, in the course of the nineteenth century the term type began to also be used in the new disciplines whose purpose was the scientific study of the mind. By the end of the nineteenth century and beginning of the twentieth, the concept of Type can be found in semiotics, in the distinction made by Charles S. Peirce between *types* and *tokens*; in logic, in the *theory of types* of Bertrand Russell;

⁶³Brady, op. cit., p. 259.

⁶⁴Ibid., p. 262.

⁶⁵Brady criticizes Owen's notion of general homology on the grounds that he compares two different sorts of forms: empirical forms and invented forms. The issue at stake is whether a 'type', 'schema' or 'idea' can actually be represented by means of a sensible form, like a schematic diagram or a geometric figure. Owen's general homology is based on the assumption that is possible to represent the type by means of a regular and simplified diagram of an organ. The question behind this discussion is not much different from the one regarding the idea of the triangle and triangularity which concerned philosophers like Berkeley and Kant. It was precisely Kant who rejected the possibility of an idea to be expressed through a concrete image. In the *Critique of Pure Reason*, 1781, he wrote: “In truth, it is not images of objects, but schemata, which lie at the foundations of our pure sensuous conceptions. No image could ever be adequate to our conception of triangles in general. For the generalness of the conception it never could attain to, as this includes under itself all triangles, whether right-angled, acute-angled. etc., while the image would always be limited to a single part of this sphere.”

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in psychology, in the notion of *Gestalt* of Max Wertheimer; and in psychoanalysis, with the *theory of archetypes* of Carl Jung.

The fact that the notion of Type was adopted by those sciences concerned with the study of the mind, does not contradict the previous contention that the emergence of Type is symptomatic with the reification of the world concomitant to the rise of scientific thought. On the contrary, that the concept of Type was used also in the disciplines concerned with the mind can only make evident the fact that, at some point in the evolution of Western thought, the mind itself became the object of scientific study.

Jung's archetypes

The fact that the notion of Type, as was used in the domain of natural sciences, was later adopted by other disciplines concerned with the mind is best exemplified in the theory of the archetypes of Jung. An archetype is for Jung an unconscious content of the collective mind. Significantly, Jung appeals to the example of the structure of crystals to illustrate the psychological meaning of his archetype. Thus, he argues that the archetype of the mind is much like an "axial system of a crystal, which, as it were, preforms the crystalline structure in the mother liquid, although it has not material existence of its own."⁶⁶ The parallelism between the mind archetype and the structure of crystals is pursued further by Jung: "With regard to the definiteness of the form, our comparison with the crystal is illuminating inasmuch as the axial system determines only the stereometric structure but not the concrete form of the individual crystal. This may be either large or small, and it may vary endlessly by reason of the different size of its planes or by the growing together of two crystals. The only thing that remains constant is the axial system, or rather, the invariable geometric proportions underlying it. The same is true of the archetype. In principle, it can be named and has an invariable nucleus of meaning -but always only in principle, never as regards its concrete manifestation."⁶⁷

But Jung's archetypes are not only associated with the notion of Type -as was first developed in the natural sciences- but also with the philosophical notion of Idea. In this regard, the archetypes of Jung represent a combination of the two previously distinct notions of Idea: the one from Plato and the one of the empiricist and rationalist philosophers. As we have already seen, Ideas, according to Plato, lay in an eternal world while for the empiricist philosophers these existed in the human mind. In the case of Jung's archetypes, these two views of Idea are no longer opposites but become integrated within the same theory. Thus, Jung's archetype, in much the same way as the Platonic Idea, transcends the individual

⁶⁶C. G. Jung, 'Psychological Aspects of the Mother Archetype', in *The Collected Works of C. G. Jung*, vol. 9, Part I, p. 79.

⁶⁷*Ibid.*, p. 80.

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mind: "'Archetype' is an explanatory paraphrase of the Platonic *eidōs*. For our purposes this term is apposite and helpful, because it tells us that so far as the collective unconscious contents are concerned we are dealing with archaic or -I would say- primordial types, that is, with universal images that have existed since the remotest times."⁶⁸ But, even though the archetypes transcend the individual and the temporal, they are at the same time part of the structure of the individual psyche and as such, become the determining factor the individual actions: "(Archetypes) are present in every psyche forms which are unconscious but nonetheless active-living dispositions, ideas in the Platonic sense, that preform and continually influence our thoughts and feelings and actions."⁶⁹ However, unlike Plato, Jung explicitly admits to the archetype being subjected to a process of change: "The archetype is essentially an unconscious content that is altered by becoming conscious and by being perceived, and it takes its colour from the individual consciousness in which it happens to appear."⁷⁰

Still, Jung's archetypes are ambivalent in another regard: they seem to be both a priori categories of the mind as well as patterns formed from sense experience. According to Jung, archetypes correspond to the first 'thoughts' created by man with the purpose of understanding external reality, whilst "'thoughts' were objects of inner perception, not thought at all, but sensed as external phenomena- seen or heard, so to speak."⁷¹ But archetypes are also formed as a result of the repetition of similar situations, much in the same way as the *prolepsis* held by the Greeks: "Endless repetition has engraved these experiences into our psychic constitution, not in the form of images filled with content, but at first only as forms without content, representing merely the possibility of a certain type of perception and action."⁷² Once these archetypes have been formed, they "can rearise spontaneously, at any time, at any place, and without any outside influence."⁷³ Similar to the Platonic Idea, Jung's archetypes cannot be known a priori; they only become noticeable through their external manifestations.

1.4.4 Type versus Idea

In the second half of the nineteenth century, Wilhelm Wundt -the founding father of experimental psychology- summarized the different meanings of Type in the following terms: "*Erstens bezeichnet der Typus die einfachste Form, in welcher ein gewisses Gesetz der Struktur oder der Zusammensetzung repräsentiert sein kann.... Zweitens versteht man unter dem Typus diejenige Form, in welcher die Eigenschaften einer Reihe verwandter Formen am vollkommensten repräsentiert*

⁶⁸C. G. Jung, 'Archetypes of the Collective Unconscious', op. cit., pp. 4-5.

⁶⁹C. G. Jung, 'Psychological Aspects of the Mother Archetype', op. cit., p. 79.

⁷⁰C. G. Jung, 'Archetypes of the Collective Unconscious', op. cit., p. 5.

⁷¹Ibid., p. 33.

⁷²C. G. Jung, 'The Concept of the Collective Unconscious', op. cit., p. 48.

⁷³C. G. Jung, 'Psychological Aspects of the Mother Archetype', op. cit., p. 79.

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sind... Drittes endlich nimmt der Typus zuweilen noch eine Bedeutung an, daß er lediglich eine formale Eigenschaft bezeichnet, die den Gliedern einer Gattung oder mehreren Gattungen gemeinsam zukommt."⁷⁴

This description of the meanings of Type made by Wundt provides a cue to draw a distinction between the concepts of Idea and Type. As has been shown in the previous section, the notion of Idea played a fundamental role in the writings of philosophers concerned with how knowledge was generated by the mind. For them, the concept of Idea necessarily conveyed a participation of the mind in the acquisition of knowledge. If we consider the previous definitions of Wundt, however, we can see that unlike the notion of Idea, the concept of Type puts the emphasis on the object, rather than on the subject.

In summary, it can be contended that the modern concept of Type emerged originally within the natural sciences. In biology, the notion of Type appeared in the classification of plants and animals, as well as in the morphology of Goethe, and in the distinction between homology and analogy from Owen. In the study of minerals, the notion of Type is present in the notion of the 'seminal principle' or primitive form of a crystal. At some point, it became important for the development of science as a whole to come up with a term for Form which was not only more specific than the terms used before but also free of the metaphysical connotations associated with terms like idea, archetype and also form itself. As Western culture evolved towards the scientific study of the mind itself, the notion of Type was transferred to the newly emerging areas of psychology, semantics, and logic. In this case, it was the mind itself that became the object of its own study, and the use of the concept of Type in such disciplines is consistent with the original purpose of the term.

In the modern conception of Type we can see the roots of the Structuralism of the twentieth century. Like the notion of Structure, Type embodies a whole methodological approach which can be applied to different realms, whether it be philosophy, science or art. In this regard, Type is a 'conceptual paradigm' applicable to every intellectual discipline. Furthermore, the modern notion of Type, with its emphasis on the object, contains the seeds that lead to a more radical negation of the subject that characterizes Structuralist thinking.

⁷⁴W. Wundt, *Logik I-III*, vol. II, 1880-83, p. 48.

1.5 The methodological meaning of Form: Structure and Structuralism. System and Systems Theory

In his *Diccionario de filosofía*,⁷⁵ José Ferrater Mora distinguishes these five notions of Form: *philosophical* or *metaphysical*, as in the difference between form and matter in Aristotle; *logical*, as in the distinction of form and content in a proposition; *epistemological*, as in the a priori categories of Kant; *methodological*, which includes the notion of form as a structure; and *aesthetic*, as in the distinction between form and content in a work of art. Unlike the previous meanings of Form that we have examined at the beginning of this chapter, the methodological meaning is relatively recent. According to Ferrater, it can be traced back to the work of Ernst Cassirer and his studies on the problem of knowledge.

The English word structure derives from Latin *structura*, which comes from the verb *struere*, 'to build.' In classic Latin the word *structura* was used in three different senses: 1. the architectural schema of a building 2. the ordering of the organs in the human body 3. in rhetoric, the ordered connection between the thoughts and the words in a speech.⁷⁶ These meanings of structure have persisted until the present time. Thus, in *The Oxford English Dictionary*, the word structure is described as "the action, practice, or process of building or construction", as the "mutual relation of the constituent parts or elements of a whole as determining its peculiar nature or character," and as "an organized body or combination of mutually connected and dependent parts or elements."

The term structure, understood as the form reflecting the internal disposition of bodies, had already been used during Scholasticism. It was revived in the seventeenth century, among others by Francis Bacon, who used words like 'structure', 'texture' and 'configuration' to stress the material and efficient causes over the formal cause.⁷⁷ The word structure entered the vocabulary of biology in the seventeenth century, being applied later in the nineteenth century to language, literature and philosophy.⁷⁸ René-Just Haüy, in his *Essai d'une théorie sur la structure des cristaux*, Paris, 1784, defines structure in the following terms: "To determine the forms of the molecules of crystals and the way in which they are arranged together in each crystal. It is this combination that is called structure."⁷⁹ Structure and type, therefore, emerged about the same time in the works of scientific writers of the seventeenth century, especially in those concerned with the study of minerals. While type came to signify mainly the primitive form that determined the form of the whole crystal, structure referred to the internal

⁷⁵J. Ferrater Mora, *Diccionario de filosofía*, 1979, p. 1269.

⁷⁶P. Bora, 'Strukturalismus', in the *Europäische Enzyklopädie zu Philosophie und Wissenschaften*, vol. 4, p. 461.

⁷⁷Emerton, op. cit., p. 69.

⁷⁸P. Caws, 'Structuralism', in the *Dictionary of the History of Ideas*, vol. 4, p. 322.

⁷⁹Quoted and translated in Emerton, op. cit., p. 259.

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composition of the elemental particles that determines the external form of the mineral.⁸⁰

Nowadays, the usage of the term structure is not limited to the scientific realm. It also has aesthetic connotations. Wladyslaw Tatarkiewicz writes that structure "usually refers only to non-accidental forms created by inner forces or internal drives. Consequently it applies rather to biological or geological structures; but recently, the term and concept of structure have been adopted in the theory of art. This usage expresses the tendency to regard forms of works of art as products of natural processes." In the aesthetic sense, according to Tatarkiewicz, structure can be considered a particular case of the notion of Form, understood as the correct disposition, arrangement or order of parts.⁸¹

1.5.1 Structuralism

The notion of Structure that was at the origin of the intellectual movement called Structuralism, had its origins in the work of the linguist Ferdinand de Saussure. Saussure's work was devoted to the study of the structure of the language system, even though he did not use the word *structure* but *arrangement*.

The most comprehensive definition of the notion of Structure, as it was understood by structuralist thinkers, is the one offered by Jean Piaget. According to Piaget, "*une structure est un système de transformations, qui comporte des lois en tant que système (par opposition aux propriétés des éléments) et qui se conserve ou s'enrichit par le jeu même de ses transformations, sans que celles-ci aboutissent en dehors de ses frontières ou fasse appel à des éléments extérieurs. En un mot, une structure comprend ainsi les trois caractères de totalité, de transformations et d'autoréglage.*"⁸² Structure then denotes an active form (a system of transformations) as opposed to a passive concept of Form.

The structuralist approach has been presented as an alternative to the atomistic view of the world that dominated in previous times. While the atomistic view focuses on the constituents parts of a whole, the structuralist approach stresses the relations between the parts, independently of what these parts actually are. Saussure already referred to this notion of structure in the domain of language: "Language is a system of inter-dependent terms in which the value of each term results solely from the simultaneous presence of the others."⁸³ This idea of structure as a set of relations was extrapolated to other domains like, for example, anthropology. In this regard, Claude Levi-Strauss contended that "the error of

⁸⁰As Haüy put it, "external form and composition are the image of one another." *Traité de minéralogie*, 2nd ed., vol. 1, p. 26; quoted and translated in Emerton, op. cit., p. 271.

⁸¹Tatarkiewicz, 'Form in the History of Aesthetics', op. cit., p. 219.

⁸²J. Piaget, *Le structuralisme*, 1968, pp. 6-7.

⁸³F. de Saussure, *Course in General Linguistics*, translated by Wade Baskin, 1959, p. 114.

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traditional anthropology, like that of traditional linguistics, was to consider the terms and not the relations between the terms.”⁸⁴ This way of looking at the world in terms of relations instead of things, constitutes the basic tenet of the structuralist movement. Structuralism is then “a way of thinking about the world which is predominantly concerned with the perception and description of structures.”⁸⁵

1.5.2 System and Structure

System and Structure are two terms that have a long tradition in the history of ideas, although the concept of System seems to be the oldest. At the beginning of the modern era, the term system is found in the realms of theology, philosophy and law. Already from its earliest usages, the concept of System has been associated with the question of the systematization of knowledge. This association became particularly evident in the philosophy of the seventeenth century, particularly in Leibniz’s *System nouveau*, 1695. During the Enlightenment, the idea of System epitomized the materialistic view of the world. In his *Système de la Nature*, Baron d’Holbach “defines man as a product entirely of nature, subject to the laws governing the physical universe which, in turn, constitutes the whole of reality.”⁸⁶ It is in the scientific disciplines, however, where the notion of System has become fundamental. In fields as diverse as thermodynamics, biology or computer science, System stands for an abstract model of reality through which this can be subjected to the control of reason. The idea of System, therefore, epitomizes the materialistic and rationalistic view of the world traditionally associated with scientific thinking.

Structure and System are sometimes taken as synonyms. There is, however, a difference between the two, in the sense that a Structure normally refers to ‘the structure of a system’: “According to the standard structuralist account, structures are structures of systems; systems function, structures in themselves do not function- but systems function because they have the structures they do.”⁸⁷ Another distinction between both terms refers to the fact that Structure is mostly used in the sciences that deal with inert matter, like for example mineralogy, while the term System has traditionally played a major role in the life sciences, like biology. As is applied in biology, the notion of System refers not only to isolated natural beings but to the relationship of these with the environment. Thus, Ludwig von Bertalanffy -a biologist who became a leading advocate of System

⁸⁴As Terence Hawkes writes, “that the world is made up of relationships rather than things, constitutes the first principle of that way of thinking which can properly be called ‘structuralist.’” T. Hawkes, *Structuralism and Semiotics*, 1977, pp. 17-18.

⁸⁵Hawkes, op. cit., p. 17. N. Troubetzkoy was expressing similar thoughts he wrote that “the epoch in which we live is characterized by the tendency of all scientific disciplines to replace atomism by structuralism. N. Troubetzkoy, ‘La phonologie actuelle’, in H. Delacroix, *Psychologie du langage*, Paris, 1933; quoted and translated in Caws, ‘Structuralism’, in the *Dictionary of the History of Ideas*, vol. 4, p. 324.

⁸⁶A. Vartanian, ‘Baron d’Holbach’, in *The Encyclopedia of Philosophy*, vol. 4, p. 50.

⁸⁷Caws, op. cit., p. 322.

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theory- defined a systems as "a set of elements standing in interrelation among themselves and with the environment."⁸⁸ In this regard Structure differs from System in so far as the first deals with the internal relationship between elements, while the second considers, in addition to this, the relationship of the elements with an external environment.

The same relationship that exists between the notion of Structure and Structuralism, occurs between the concept of System and the intellectual movement known as General System Theory. A distinction between Structuralism and System theory is difficult to establish, since both intellectual movements partake of a similar spirit. Systems theory, in much the same way as Structuralism, supports a view of the world that consists of relations as opposed to individual things.⁸⁹ Also, both Structuralism and System theory want to overcome the boundaries that separates different realms of knowledge. According to Bertalanffy, "General system theory, then, is scientific exploration of 'wholes' and 'wholeness' which, not so long ago, were considered to be metaphysical notions transcending the boundaries of science."⁹⁰ Bertalanffy thinks that these questions remained metaphysical in the past "because mathematical techniques were lacking and the problem required a new epistemology."⁹¹ Ultimately, the idea of a System science is based on the same premise on which Structuralism is based, that is to say, on the assumption that the methods used by the physical sciences are applicable to the social sciences.⁹²

Critics of General System Theory have focused on the vagueness of the term System, a criticism that could be also made to the notion of Structure.⁹³ Some authors have expressed doubts that Systems Theory could ever achieve the status of a scientific discipline. In this regard it has been contended that Systems Theory

⁸⁸Bertalanffy, op. cit., p. 159.

⁸⁹In a similar line, Ludwig von Bertalanffy claims that his General System Theory has superseded the 'atomistic' view of the world that, according to him, had prevailed in the past: "General System Theory is symptomatic of a change in our world view. No longer do we see in the world a blind play of atoms, but rather a great organization. It is a world view which was advocated by Leibniz and Goethe but which we begin to take seriously only now." Bertalanffy, op. cit., p. 123.

⁹⁰Ibid., p. 158.

⁹¹Ibid., p. 153. As Bertalanffy put it: "The program of the Society for General System Research, founded in 1954, was: 1. investigate the isomorphy of concepts, laws, and models in various fields, and to help in useful transfers from one field to another; 2. encourage the development of adequate theoretical models in the fields which lack them; 3. minimize the duplication of theoretical effort in different fields; 4. promote the unity of science through improving communication among specialists." Bertalanffy, op. cit., p. 155.

⁹²See J. van Gigh, *System Modelling and Metamodeling*, 1991.

⁹³Alfred Kuhn has expressed his criticism to the notion of System in these terms: "If you tell me something is a mammal or a level, I immediately know something about it. But if you tell me something is a system, I am not sure there is anything I can know from your statement that I did not know before, however well versed I might be in systems analysis." A. Kuhn, 'Types of social systems and system controls'; in *Man in Systems*, Milton D. Rubin, ed., 1971. Seen in this light, the concept of System has some resemblance to the notion of 'paradigm' as used by Thomas S. Kuhn in his book *The Structure of Scientific Revolutions*, 1962.

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should be seen as "a collection of concepts useful for conceptualizing or describing the general features of the behavior of objects within an environment, where 'objects' may refer to entities of any sort, whether animate, inanimate or conceptual; and where 'environment' is taken to refer to conditions affecting the objects."⁹⁴

1.5.3 System and Cybernetics

From its very origins, General System Theory is closely related to the world of computers and cybernetics. In fact, some authors contend that Systems Theory is nothing but a synonym for the cybernetics of Ross Ashby.⁹⁵ Cybernetics, from the Greek word *kybernēiēs* ('steersman', 'governor') was coined by Norbert Wiener (*Cybernetics*, New York, 1948) to refer to "the entire field of control and communication theory, whether in the machine or in the animal." Bertalanffy, however, rejected this identification and claimed the superiority of Systems Theory. He considered that cybernetics is only a special case of a general system, and that "it is therefore incorrect to equate cybernetics with general system theory, which is a common mistake."⁹⁶

In the writings of Herbert Simon, the concept of System is applied to the study of the working of the mind. With the concept of System, Simon attempts to attain the 'simulation of cognitive process' in much the same way as natural phenomena can be simulated through abstract models. Simon considers that both natural and man-made systems are instances of what he calls physical symbol systems. He goes as far as contending that a computer and a human brain are both physical symbol systems, the first made out of 'glass and metal', the second of 'flesh and blood'. Moreover, Simon denies the separation between mind-machine since for him the physical symbol systems are comparable to the abstract symbol systems of mathematics and logic.

The parallelism between the notions of Structure and System again arises with regard to the hierarchically structured systems that Simon proposes. In much the same way as the mineralogist in the eighteenth century thought that the overall form of a mineral was determined by the form of its smallest particles, Simon thinks that a complex system (natural or artificial) can be decomposed in smaller parts in a hierarchical fashion: "The basic idea is that the several components in any complex system will perform particular subfunctions that contribute to the overall function." It can be contended then, that Simon's application of the notion of System to cognition is part of the same materialistic thought that characterized Holbach's *Système de la Nature*.

⁹⁴J. Bryant, *Systems Theory and Scientific Philosophy*, 1991.

⁹⁵*Ibid.*

⁹⁶Bertalanffy, *op. cit.*, p. 122.

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1.5.4 Gestalt psychology

Gestalt psychology is the branch of psychology founded by Max Wertheimer, Kurt Koffka, and Wolfgang Köhler in the beginnings of the twentieth century. Gestalt psychologists rejected the prevalent associationist theories of their time and contended that perception is based in organized wholes or *Gestalten*. A Gestalt was more than the mere aggregation of individual elements: it is a whole or structure in which, as Wertheimer put it, “what happens to a part of the whole is determined by intrinsic laws inherent in this whole.”⁹⁷ Because of the apparent similarity between the concepts of Gestalt and Structure, Gestalt psychology has been sometimes considered as part of the mainstream of Structuralism.⁹⁸ However, some of its founders, particularly Wolfgang Köhler, have denied any connection between the branch of psychology and Structuralism.

Independently from the question of the connection with Structuralism, the notion of Gestalt, as understood by Gestalt psychologists, can be traced back to the philosophy of Kant and, particularly, to his concept of Form as an innate principle or category of the mind that is at the same time sensuous and abstract: the transcendental schema. As we have seen, this concept of Form, first expressed by Kant, might have later influenced Goethe’s notion of Gestalt. In the same way as Goethe’s notion of Gestalt aims at overcoming the distinction between sensual and intellectual realms, the notion of Gestalt in psychology “seems to cut across the traditional distinction between subject and object, between form as a pattern of the mind and form as an objective property of things.”⁹⁹

One of the fundamental principles of Gestalt psychology is known as the law of *Prägnanz*, which Wertheimer formulated in the following terms: “psychological organization will always be as ‘good’ as the prevailing conditions allow.”¹⁰⁰ The impossibility of coming up with a precise definition of what a ‘good’ Gestalt means (apart from the generic properties of simplicity, stability, regularity, symmetry and the like) has turned out to be one of the weakest points of Gestalt psychology. It should be noticed that the qualities traditionally attributed to the object itself became, in the context of Gestalt psychology, essential attributes of the human mind as well.

Other key notions of Gestalt psychology had a long philosophical tradition as well. A point in case is the notion of ‘perceptual constancy’, by which Gestalt psychologists attempted to explain the relationship between the object as it is perceived and the object as it is understood to exist; the real object. A beholder, for example, thinks that a dish placed on a table is circular even though it appears to

⁹⁷Quoted in the article ‘Gestalt Theory’, *The Encyclopedia of Philosophy*, vol. 3, p. 318.

⁹⁸Ferrater, *op. cit.*, p. 1043.

⁹⁹Quoted in *The Encyclopedia of Philosophy*, vol. 3, p. 321.

¹⁰⁰Quoted in K. Koffka, *Principles of Gestalt Psychology*, 1935, p. 110.

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be elliptical when is seen from the majority of viewpoints. This is a case of 'shape constancy'. Other perceptual constancies refer to size, brightness and colour. The constancy is then something like the ideal state of the object, stripped of the particular circumstances that determine its appearance at a given moment. In this regard, the notion of constancy is reminiscent of Plato's Ideas,¹⁰¹ as well as of Kant's distinction between phenomena and noumena.

For Wolfgang Köhler, the notion of Gestalt has also some points in common with the notion of System used in physics. According to Köhler, a perceptual Gestalt aims at regularity in much the same way as a physical system tends to return to a state of equilibrium after being disturbed. This isomorphism between physical and perceptual Gestalten is a fundamental tenet of Gestalt psychology. For amidst the concept of Gestalt lies the hope of overcoming traditional dualisms like subject-object or mind-brain. Basically, three kinds of Gestalt are postulated by Gestalt psychologists: 1. in nature or physical world 2. in the brain and cortical correlates 3. in the percepts, that is the say the conscious experience.

Aesthetic implications of the Gestalt concept

In the transition from the nineteenth to the twentieth century, similar ideas to the ones that were giving rise to the field of Gestalt psychology were being developed and applied simultaneously in the realms of artistic theory. The original work of Adolf Hildebrand on perception of form in art, presented in his *Das Problem der Form in der bildenden Kunst*, 1893, exerted a notable influence on the architectural theory propounded later by Paul Frankl in his *Die Entwicklungsphasen der neueren Baukunst*, 1914.

The deliberate application of Gestalt ideas to the study of art has been the main concern of Rudolf Arnheim. In his *Art and Visual Perception*, Arnheim sought to establish a connection between Gestalt psychology and the Modern art of the twentieth century. In his book, Arnheim formulated a distinction between form and shape; a distinction that is far from being self-evident. With shape Arnheim refers to "two quite different properties of visual objects: 1. the actual boundaries produced by the artist: the lines, masses, volumes, and 2. the structural skeleton created in perception by these material shapes, but rarely coinciding with them."¹⁰² He distinguishes between shape and form as one being the content of the other. Shape, he writes, is "the form of a content."¹⁰³ Thus, he argues, it is possible for a

¹⁰¹In the *Republic* 598, Plato refers to the multiple appearances of an object when is seen from different points of view. In the dialogue in Book X, Socrates asks: "Does a bed really differ from itself when you look at it from the side or from straight in front or from any other point of view, or does it remain the same but appear different?"

¹⁰²R. Arnheim, *Art and Visual Perception*, 1974, p. 93.

¹⁰³*Ibid.*, p. 96. In a previous passage, paraphrasing the painter Ben Shahn, Arnheim exchanges form and shape to claim that "form is the visible shape of content." *Ibid.* p. 197. Compare this definition to

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shape to be perceived without being aware of its content, but a shape which expresses a content is a form. His notion of shape is reminiscent of the Aristotelian notion of species, that is to say, it stands as the representation of a class rather than as a characteristic of a single individual. In this regard, he writes that a shape "is never perceived as the form of just one particular thing, but always as that of a kind of thing."¹⁰⁴

The notion of 'structural skeleton' proposed by Arnheim is less ambiguous than his distinction between form and shape. For Arnheim, a structural skeleton is the "simplest structure obtainable with the given shape."¹⁰⁵ The structural skeleton is an invisible pattern, underlying the visible shape or outline, which only coincides with this in the case where the visual shape adopts the most stable and simplest expression.

1.5.5 Problem-solving, Artificial Intelligence

In a later book titled *Productive Thinking*, Max Wertheimer extended Gestalt theory into the realm of problem-solving. His pioneering work in problem-solving found continuation in the research areas involved in the study of knowledge representation, like information theory and artificial intelligence.¹⁰⁶ In these fields, the conceptual structures of the mind have become the object of scientific investigation. In the theories formulated by different authors to explain the process by which the mind operates, there seems to be complete agreement about one basic point: that the human mind can only be creative within some established limits. Different names have been used to express this notion of 'limit', among them: *matrix*¹⁰⁷, *frame*¹⁰⁸, *script*¹⁰⁹, *theme and variations*¹¹⁰ and *conceptual space*.¹¹¹

the one of Aristotle, *Metaphysics* V 25: "The form (is) whatever we ought to call the shape present in the sensible thing."

¹⁰⁴Arnheim, op. cit., p. 96. A more straightforward distinction between form and shape is usually adopted in English texts. For example, Wucius Wong, considers Form as "the total visual appearance of design." W. Wong, *Principles of Form and Design*, 1993, p. 246. Shape, on the other hand, designates each of the two-dimensional projections of a three-dimensional object onto a two-dimensional surface. It is one of the visual elements of a form, together with size, color and texture. Ibid., pp. 242-243.

¹⁰⁵Arnheim, op. cit., p. 94.

¹⁰⁶See M. Wertheimer, *A Brief History of Psychology*, 1970.

¹⁰⁷A. Koestler, *The Act of Creation*, 1964.

¹⁰⁸M. Minsky, 'A framework for representing knowledge'. In *The Psychology of computer vision*, ed. P. Winston, 1975.

¹⁰⁹R. C. Schank, and R. P. Abelson, *Scripts, plans, goals and understanding*, 1977.

¹¹⁰D. Hofstadter, 'Mathamagical Themas. Variations on a theme as the essence of imagination', 1982.

¹¹¹M. Boden, *The Creative Mind*, 1990.

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These attempts to conceptualize the structures of the mind, can be seen as the ultimate consequence of the structuralist movement. As Hawkes puts it, "the ultimate quarry of structuralist thinking will be the permanent structures into which individual human acts, perceptions, stances fit, and from which they derive their final nature. This will finally involve what Fredric Jameson has described as 'an explicit search for the permanent structures of the mind itself, the organizational categories and forms through which the mind is able to experience the world, or to organize a meaning in what is essentially in itself meaningless.'"¹¹² Similar thoughts have been expressed by other authors. Thus, Douglas Hofstadter thinks that "science is criticized as being too 'Western' or 'dualistic' -that is being permeated by the dichotomy between subject and object, or observer and observed. While it is true that up until this century, science was exclusively concerned with things which can be readily distinguished from their human observers -such as oxygen and carbon, light and heat, stars and planets, accelerations and orbits, and so on- this phase of science was a necessary prelude to the more modern phase, in which life itself has come under investigation. Step by step, inexorably, 'Western' science has moved towards investigation of the human mind -which is to say, of the observer."¹¹³

1.5.6 Type versus Structure

From the comparison between the notions conveyed by Type and those conveyed by Structure and System, a series of conclusions can be derived. First thing to point out is the static nature of the notion of Type as opposed to the intrinsic dynamism of the notion of Structure. A second element of divergence between Type and Structure has to do with the relation between subject and object. While Type seems to imply a subject who perceives, the idea of Structure, as it is understood in Structuralism, conveys a dissolution of the boundaries between subject and object, if not the plain elimination of the subject. This trend towards the suppression of the subject in the conceptual system of Structuralism has already been pointed out. Thus, Ricoeur has defined Structuralism as 'Kantianism without transcendental subject.'¹¹⁴ Similarly, Ferrater has also remarked that 'some eliminate tend to minimize and even eliminate completely, at least from the methodological point of view, man as subjects as well as the infinite circumstances and historical changes.'¹¹⁵

¹¹²See Fredric Jameson, *The Prison-House of Language: A Critical Account of Structuralism and Russian Formalism*, p. 109.

¹¹³D. R. Hofstadter. *Gödel, Escher, Bach*, 1979, p. 699.

¹¹⁴Quoted in Bora, op. cit., p. 464.

¹¹⁵In the original Spanish: "Algunos estructuralistas tienden a reducir al mínimo, y hasta a eliminar por completo, cuando menos desde el punto de vista metodológico, al hombre como sujeto y las infinitas circunstancias y cambios en la historia." Ferrater, op. cit., pp. 1048-1049.

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1.6 Conclusions

The following conclusions can be drawn with regard to the previous summary:

- All the different meanings of Form are so intertwined that the notion of Form appears to be one and the same in all cases: an extremely elusive and ubiquitous one that escapes any attempt of definition. This ubiquitous notion of Form can be only expressed as ‘the arrangement of the parts within a whole’.
- The different meanings of Form are so much interrelated that any attempt to distinguish between them should be questioned. The most clear example of this unity in the diversity of meanings is the Platonic Idea, in which the metaphysical, ethical, epistemological, and aesthetic meanings are all subsumed under the same Idea. Something similar occurs with later conceptions of the Idea. In the Renaissance, the notion of Idea considered as a concept that arouses in the mind is amenable to epistemological as well as aesthetic interpretations.
- The concept of Type acquired its modern meaning during the rise of scientific thought in the seventeenth century. Its emergence reveals the need to eliminate metaphysical, religious and even aesthetic connotations, from previous notions of Form, keeping only the epistemological one (Figure 1.1). It can be asserted, therefore, that Type stands for the epistemological meaning of Form. Furthermore, Type stands for a paradigm in the sense of a mode of thinking.

Greece	form: METAPHYSICAL + AESTHETIC + EPISTEMOLOGICAL= eidōs
Renaissance	form: METAPHYSICAL + AESTHETIC + EPISTEMOLOGICAL= idea
Enlightenment	form: METAPHYSICAL + AESTHETIC + EPISTEMOLOGICAL= idea
XVIIIth-XIXth c.	form: EPISTEMOLOGICAL= type
XIXth-XXth c.	form: METHODOLOGICAL= structure

Figure 1.1. Type as the epistemological meaning of form.

- Any given concept of Form, regardless of the intellectual domain where the concept is first applied and regardless the historical moment in which emerges, is susceptible of being considered as a philosophical system within which the relationships between subject and object, or between intellectual and sensible realms, are determined. In this way, the Platonic Idea stands for a conceptual system in which intellectual and sensible realms are completely separate; the concept of Type places the emphasis on the object more than in the subject; and the notion of Structure, with its emphasis in the isomorphic relation between the structures of the mind and the structures of the sensible world, aims at overcoming the separation between subject and object.

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- Therefore, the distinction between Idea, Type and Structure needs to be figured out considering that each term conveys a particular philosophical system or, in other words, a paradigm through which to grasp the objective world. Thus, the Platonic Idea differs from the Rationalist or Empiricist Idea insofar as the first can dispense with the conscious subject, while for the second the participation of the subject in the creation of the Idea is fundamental to the theory. Similarly, the distinction between the Empiricist Idea and the modern notion of Type -as was first applied in the natural sciences- can be drawn in terms of the relationship between subject and object. Thus, while the Empiricist or Rational interpretation of Idea relies on the close connection between subject and object, the concept of Type, on the other hand, emphasizes the object at the expense of the subject. In the same way, a possible criteria for demarcation between Type and Structure is that in the later the subject tends to be removed from the conceptual system.

- When they are seen in a temporal sequence, the notions of Idea, Type and Structure reveal themselves as part of a strand of thought whose final aim is the scientific understanding of the human mind itself (see Chart 1.1).

FORM PARADIGMS

FORM (eidōs, morphē)	IDEA	TYPE	STRUCTURE
- Neoplatonism and Scholasticism: Ideas are divine thoughts.	- perception as acquisition of knowledge - innate Ideas vs. acquired Ideas - Kant's transcendental schema	- mental schema - Gestalt	- simulation of thought processes
- multiple meanings of form: metaphysical, epistemological, aesthetic, ethical, logical - two paradigms of form: 1. Platonic: Form as transcendental essence, inhabiting a separate world 2. Aristotelian: Form as immanent cause, discoverable through analysis and observation	- multiple meanings of form: metaphysical, aesthetic, epistemological - ideas are in the human mind, as well as in the divine mind - the idea is derived from the direct confrontation of the individual with nature	- epistemological meaning of form: becomes primary - application of scientific methods to social sciences, including art - two simultaneous meanings of Form: 1. in the Platonic sense, an idea amenable to geometric representation 2. in the Aristotelian sense, an inner principle or cause	- methodological meaning of form becomes primary - structuralism: model of thought applicable to different disciplines - elimination of the subject
<i>Antiquity</i>	<i>Renaissance</i>	<i>Enlightenment</i>	<i>XIXth-XXth c.</i>

Chart 1.1. The different meanings adopted by the four paradigms of Form.

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The intention of this first chapter, and the purpose of these conclusions, has been to bring to the fore the notion of Form-Type as a fundamental category on which human knowledge is based, regardless of historical or disciplinary boundaries. Bearing this premise in mind, we will begin in the next chapter the investigation on the meaning of Type in the concrete realm of architecture. In the following pages, the question of *architectural form* (as opposed to Form in the generic sense) and particularly, the issue of *type* and its implications in the *creation of architectural form*, will be at the center of the discussion. As in this chapter, the following study of type and architectural form will also have a diachronic and synchronic dimensions. From a diachronic point of view, the sequence Idea-Type-Structure, that we have addressed first in a broad cultural context, will prove equally meaningful when applied to the specific domain of architecture. From a synchronic perspective, the concept of Form in architecture will reveal itself as permanent and ubiquitous as the concepts of Form are in the overall cultural context considered in this first chapter.

Chart 2.1 summarizes both the content and the structure of the work. As the chart aims to show, a study of the notion of Type in architecture needs to be carried out simultaneously in both dimensions, temporal and a-temporal: the horizontal axis of the chart represents the time dimension; the vertical one represents the different form paradigms that are prevalent in a given time.

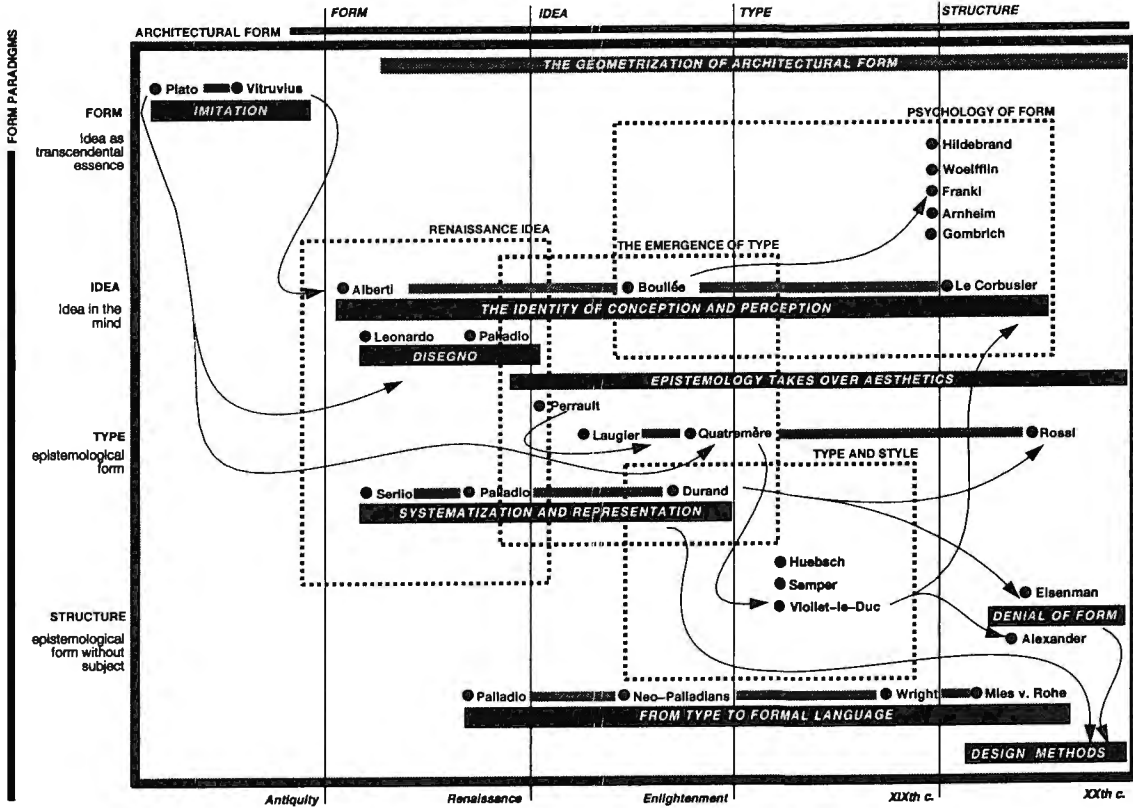


Chart 2.1. Conceptual map reflecting the content and structure of the work.

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With the risk of anticipating some of the arguments that will be developed in the following chapters, the application of the conceptual framework developed here to the specific domain of architecture and architectural form will reveal the following issues:

- In the same way that the different meanings of form (metaphysical, epistemological, aesthetic) appeared closely knitted in Plato's theory of Ideas, different meanings (structural, sculptural, geometric) are equally blended in Vitruvius' account of architectural form.
- The modern notion of Idea as concept in the mind is closely connected to the emergence of *disegno* in the Renaissance. In the Renaissance began a concern with form perception that would inexorably lead to a subsumption of the aesthetic meaning of form under the epistemological one.
- This subsumption of the aesthetic meaning of form starts to be manifested in the theories of Claude Perrault.
- The same driving force that ever since the Renaissance has worked towards the subsumption of the different realms of spiritual life under the logical-scientific or epistemological realm, is ultimately accountable for the geometrization of architectural form that first took place in the eighteenth century and culminated later in the architecture of the Modern movement.
- The notion of Type as mode of thinking or patterned process is at the core of the theories of J.N.L. Durand.
- The notion of System or Structure, as mode of thinking or paradigm is at the core of the nineteenth century theories about style, particularly, the one of Gottfried Semper.
- The notion of System is the underlying paradigm behind the projects of Le Corbusier. Projects like the Villa Savoye can be seen as the result of the dynamic interaction between different (formal) systems.
- The notion of autonomous design process that is concomitant to Structure/System, finds its architectural expression in the work of Peter Eisenman: the object of creation becomes the design process itself.
- The last step in this sequence is the autonomous generation of architectural works via computers. With the advent of computers, the ultimate quest of Structuralism seems to be on the verge of being fulfilled: objects are replaced by processes, while the subject gives place to the computer.

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Plato's Theory of Ideas: The Metaphysics of Architectural Form

2.1 Introduction

The notion that all physical things, natural and artificial, derive from a first model can be traced back to the philosophy of Plato. In Plato's philosophical system, particular things derive from some universal Forms or Ideas that exist in an eternal world, away from the world of experience. Apart from its philosophical significance, Plato's theory of Ideas or Forms also touches upon questions that became fundamental in later art theory, for example the doctrine of imitation or *mimēsis*.

The division of the arts into imitative (e.g. painting, sculpture) and original (e.g. architecture) arises from the distinction between Ideas and Images; a distinction that exerted a perennial influence on subsequent art theory. In the case of architectural theory, Plato's doctrine of imitation was to play a fundamental role in the development of the theory of Type formulated by Quatremère de Quincy at the verge of the nineteenth century. The distinction that Plato drew between different objects of imitation was still the underlying theme behind Quatremère's distinction between *type* and *modèle*. All in all, the metaphysical dimension of architecture, or specifically architectural form, is first revealed in the philosophy of Plato.

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2.2 The doctrine of imitation in Plato's theory of Ideas

2.2.1 Plato's concept of *mimēsis*

The Greek doctrine of *mimēsis* -imitation or representation- plays a fundamental role in the philosophy of Plato. According to G. F. Else, before Plato the word *mimēsis* and its cognates -the verb *mimēsthai* and the nouns *mimos* and *mimēma*- had been used in three different ways: 1. miming or impersonation, that is to say, as "direct representation of the looks, actions, and/or utterances of animals or men through speech, song, and/or dancing" 2. "imitation of the actions of one person by another, in a general sense, without actual miming", usually referred as *mimēsthai* 3. "replication: an image or effigy of a person or thing in material form", usually associated with *mimēma*.¹

The innovations that Plato brought to the existing concept of *mimēsis* are, according to Eva C. Keuls, basically two: first, Plato's *mimēsis* is more static than dynamic, particularly when it is compared to the original meanings of *mimēsis* in drama (enactment or impersonation); second, Plato gives to *mimēsis* the new sense of "copying the appearance of, as closely as the medium allows"² (i.e. 'photographic reproduction'). Moreover, according to the same author, the notion of *mimēsis* acquires with Plato pejorative connotations that did not have before, since in Plato's system the objects of the sensible world become imperfect copies of the perfect and eternal Ideas. Before Plato, the notion of imitation -considered either in the sense of 'impersonation' or 'replication'- did not convey any value judgements derived from the comparison between copy and original.³

Altogether, it seems to be certain that, after Plato, the concept of *mimēsis* acquires a more abstract meaning than the ones it previously had. This greater abstractness that Plato assigns to *mimēsis* is concomitant with the spirit of Plato's philosophy. In effect, the emergence of a more abstract notion of *mimēsis* in Plato's thought is directly related to the separation between the intellectual world of Ideas and the phenomenal world; a distinction which constitutes the core of Plato's theory of Ideas.

¹G. F. Else, 'Imitation in the Fifth century' CP 53, 1958, pp. 73-90. Cited by J. J. Pollitt, *The Ancient View of Greek Art. Criticism, History and Terminology*, 1974, pp. 37-38.

²Eva C. Keuls stresses that before Plato *mimēma* had the sense of symbolic imitation in the sense that it was a substitute of the represented object. In this regard, Keuls objects to Else's contention that, before Plato, *mimēma* already meant the 'exact coping of nature'. E. C. Keuls, *Plato and Greek Painting*, 1978, p. 12, note 11.

³"The actor playing a part in a drama is neither better nor worse than the character he portrays. The palmtree does not enter into competition with the stone column to which it has lent its pattern....The conception of the mimema as an inferior version of the original-a conception basic to Plato's thought-can only arise when the process of mimesis is understood as aiming at, but not achieving, virtual identity with its model; in other words, the mimesis-notion first has to be stripped of reminiscence of the mask." Keuls, op. cit., p. 13.

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2.2.2 Making and thinking: *technē* and *epistemē*

In one of the most celebrated passages in the Book X in the *Republic*, Plato discusses the nature of imitation by comparing three different beds made by the divine artificer -God-, the carpenter and the painter⁴. Each one of them -Plato argues- produces a different kind of bed: "Painter, carpenter, and God, these three are set over the three classes of bed." Thus, Plato says that the painter who represents a bed copies only the appearance of it; he does not produce a real bed but "makes a bed in appearance." The carpenter who makes an individual bed is closer than the painter to the real bed - 'that which the bed is'. However, the bed of the carpenter cannot be considered the real bed either: he makes something that is of the same nature as the real bed but which is not the real one. The real bed, the only bed that exists in nature, was made by the divine artificer: "And God, whether because he so willed or because there was some necessity upon him not to make more than one bed in nature, made that one which is the reality of a bed and only that." This bed, to be the real one, had to be unique. So, Plato concludes, "two or more beds were never produced by God, and never will be."

Plato's example of the bed is open to a variety of interpretations, depending which aspect of Form -metaphysical, epistemological or artistic- is to be stressed. Considered from the point of view of metaphysics, we can think that, using the example of the bed as a metaphor, Plato wanted to express the ontological priority between Idea and Image, in the sense that the former always precedes the latter. For Plato then, paintings and sculptures, mirrors and shadows are all the same, insofar as they are images of something that already exists.

When Plato's account is considered from an epistemological point of view, then the *eidōs* of the bed should be equated with the knowledge -*technē* or *epistēmē*- that the carpenter needs to have to produce the artifact bed.⁵ Then, the carpenter is able to manufacture the bed because he has the skill to produce this particular object, that is to say, he knows the names of the parts with which the bed is made, their real dimensions, and how to put them together.⁶ In this light, Plato's simile of the bed reveals the intimate connection that existed in the time of the Greeks

⁴*Republic*595-598.

⁵Plato's view of the carpenter's work is consistent with the Greek notion of art as *technē*, that is to say, as the production of artifacts according to some skills whose possession distinguished the craftsman from the layman. The Greek concept of *technē* included the manual crafts like weaving or carpentry; theoretical sciences like geometry or arithmetic; and what we refer today as fine arts, like painting and sculpture. See W. Tatarkiewicz, 'El arte. Historia de la relación del arte con la poesía', in *Historia de seis ideas*, 1987, p. 110.

⁶Ernst Gombrich has expressed this epistemological meaning of Plato's couch in more familiar words: "If you telephone a carpenter to order a couch, he must know what the word means, or, to put it somewhat pedantically, what pieces of furniture are subsumed under the concept 'couch'. A painter who draws the interior of a room need not trouble his head about the names given in the furniture trade to the objects in front of him. He is not concerned with concepts or classes but with particular things." E. Gombrich, *Art and Illusion*, 1959, p. 84.

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between *making* and *thinking*, practical skill and abstract knowledge. As in the question of *mimēsis*, also in the interpretation of *technē* Plato appears as a follower of a trend initiated before him, aiming at endowing the concept of *technē* with a more abstract meaning. In effect, the Sophists were the first in expanding the meaning of *technē* from the crafts to other intellectual activities, such as rhetoric or politics.⁷

Mimēsis and *technē* stand for two different lines of thought that converge in Plato's concept of Idea. The first is associated with the primitive notion that all productions of man are imitations of what is seen in nature; the second, with the idea that manual skill precedes intellectual knowledge. In the context of Plato's theory, both concepts - *mimēsis* and *technē* - lost much of their previous sensible connotations to become the recipient of more abstract meanings. In this way, Plato uses the concept of *mimēsis* to illustrate the relationship between particulars and universals, in the sense that the former are just imperfect copies of the later. Similarly, in Plato's philosophy the concept of *technē* came closer in meaning to the notion of abstract knowledge or *epistēmē*.

2.2.3 Imitative and original forms

In the closing passages of the bed example, Plato draws a distinction between *manufacturer* and *imitator*.⁸ For Plato, the divine artificer and the carpenter are both manufacturers, although each one makes a different kind of couch. The painter, on the other hand, is "an imitator of what the other two manufacture."⁹ This distinction between *making* and *imitating* is tantamount to the existence of two kinds of forms: original and imitative. Original forms are the result of *poiesis* - for the Greeks, the cause that transforms a non-being into a being - and they can be produced both by nature and man.¹⁰ Imitative forms, on the other hand, are copies that the artist produces from the sensible appearances of objects and natural beings.

From this distinction between original and imitative artistic forms, the division of the arts into *original* or *productive* (e.g. architecture) and *imitative* (e.g. painting and sculpture) springs naturally.¹¹ In Plato's view, the artifacts produced

⁷Pollitt, op. cit., pp. 34-35.

⁸In Greek, manufacturer was called *poeta*, *phytourgon*. R. Patterson, *Image and Reality in Plato's Metaphysics*, p. 124.

⁹*Republic* 597e.

¹⁰*Poieia* is the noun used by the Greeks to refer to fabrication, while *poeta* was the artist who practiced a creative art or *poietikē*. E. de Bruyne, *Historia de la Estética*, p. 67. *Poiein*, is the equivalent to the verbs 'to make', 'to create'. Patterson, op. cit., p. 124.

¹¹According to Tatariewicz, "Plato based his classification on the fact that different arts are differently related to real objects; some produce things, as does architecture, and others imitate them, as does painting." Tatariewicz thinks that this classification overlaps another Platonic classification, according to which there are "arts which produce *real things*, e.g., architecture, and those which produce *only images*, e.g., painting. For Plato, however, this classification was in fact

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by the craftsman have the same value as the beings created by nature. Similarly, paintings are equated to shadows since, in Plato's view, both are the by-product of physical things. Architecture, then, falls within the category of original-productive arts because the craftsman-architect produces real things as opposed to mere appearances, whereas sculpture and painting are imitative arts because they reproduce the appearances of things previously made either by nature or by man. The opposition original versus imitative arts is expressed in the *Sophist* 266 in the following terms: "But what about our art? Shall we not say that by the art of architecture we make a real house, but by that of painting another one which is like a human dream wrought to for the waking?" However, in this distinction between original and imitative arts Plato seems to have overlooked the fact that a sculpture or a painting is as much a physical artifact as a building or a piece of furniture can be. He also failed to consider that a painting has to be made by an individual artist while the mirrored image or the shadow are a natural phenomena.

Considered from the artistic point of view, rather than from metaphysical and epistemological ones, the comparison between the beds made by God, painter and carpenter (or, for that matter, architect) conveys a certain hierarchy among different artistic forms. First in the hierarchy is the unique Form of the bed, which only the divine artificer could have created.¹² The bed made by the carpenter comes next since, in order to produce the individual bed, the carpenter needs to have knowledge of the *eidōs* of the bed, that is to say, the real bed. Plato thinks that, unlike the carpenter, the painter does not need to know about the true Form-bed: he only needs to imitate the appearance of the individual bed as it appears to his eyes from a particular position. Therefore, the bed made by the painter occupies the last step in a sequence of artistic forms ordered according to their distance from an original, unique and true Form.¹³

the same as the former. Imitations of things are no more than images of them." W. Tatarkiewicz, 'Classification of the Arts', in *Dictionary of the History of Ideas*, vol. 1, p. 457.

¹²According to David Ross, the introduction of God as the maker of the Form-bed is considered as inconsistent with the general spirit of the theory of Ideas and, therefore, should not be taken seriously. He thinks that "God is introduced merely to give the ideal bed some maker, answering to the carpenter and the painter who are the makers of the physical bed and of its likeness." D. Ross, *Plato's Theory of Ideas*, 1951, p. 79. Moreover, he thinks that "to describe any Idea as 'made' is to deprive it of the complete independence which everywhere else Plato ascribe to the Ideas." *Ibid.*, p. 235. Ross thinks that a fundamental tenet of Plato's theory is the consideration that Ideas are not the product of any divine will but should exist independently from it.

¹³This hierarchy of artistic forms parallels the classification proposed in the simile of the Line, in which shadows and reflections occupy the lower segment of the line, with Ideas located at the other extreme. Similarly, paintings and sculptures occupy now the lower position, while the artifacts produced by the useful arts would correspond to the next segment. With regard to this passage of the bed in the *Republic*, Ross has contended that what Plato is concerned "is not metaphysics, but the inferiority of the imitative to the useful arts[...]. His theme is that the imitative arts -painting, sculpture and poetry- produce objects that are removed by two degrees from complete reality." Ross, *op. cit.*, pp. 235-236. Keuls provides another interpretation of this passage of the *Republic*, according

2.3 Artistic theory in Plato's theory of Ideas

The intermingling of art and metaphysics that takes place in Plato's philosophy has given rise to different conjectures. At least three different interpretations of the relation between art and metaphysics in Plato's thought can be identified. Firstly, references to the works of craftsmen, like the previous one of the bed in the *Republic*, are seen as necessary metaphors or allegories to illustrate some transcendental concepts regarding his theory of Ideas, that is to say, as means 'to express the inexpressible'. Concomitant to this approach is the opinion that there is not such a thing as an artistic theory in Plato's thought. Secondly, criticisms of artists are considered as value judgements on the artistic production of Plato's time and, therefore, as constituent parts of an artistic theory in its own right. And thirdly, references to art works, are taken as the very source of the philosophical concepts, rather than as metaphors to illustrate them.

With regard to the first interpretation, critics of the notion of the existence of a genuine Platonic theory of art have considered the references to the arts to be purely metaphorical. According to this view, the purpose of Plato's theory of Ideas would be primarily metaphysical rather than aesthetic. An example of this approach are these comments of Erwin Panofsky, who at the beginning of his book *Idea* writes that "Plato, who established once and for all the metaphysical meaning and value of the beautiful, and whose doctrine of Ideas has become ever more important for the aesthetics of the representational arts, was nevertheless unable to do full justice to these representational arts themselves."¹⁴ Panofsky contends that "Plato applied to the products of sculpture and painting the concept -utterly foreign to their nature- of cognitive truth."¹⁵ In a similar line, Pollitt contends that "Plato's stern evaluation of the arts, consistent throughout his mature life, was epistemological."¹⁶ Some authors have gone as far as to doubt any genuine interest of Plato in the arts. In this regard Wilamowitz thinks that "*Platon für die bildende Kunst überhaupt kein Herz hat[...]Er redet von der Malerei oft aber ohne wirkliches Verständnis.*"¹⁷ Similarly, Eva C. Keuls writes that "Plato's views of the fine arts did not, in fact, constitute any doctrine or theory."¹⁸

to which the target of Plato's diatribe would be not illusionistic painting but poetry, more precisely, Homer's work. Keuls, op. cit., p. 43.

¹⁴E. Panofsky. *Idea. A Concept in Art Theory*. 1955, p. 3.

¹⁵*Ibid.*, p. 4.

¹⁶Pollitt, op. cit., p. 45.

¹⁷U. von Wilamowitz, *Platon, sein Leben und seine Werke*, Berlin, 1948; p. 703. Quoted in Keuls, op. cit., p. 28.

¹⁸Keuls, op. cit., p. 27. Keuls supports this contention on two grounds: "1. that Plato's interest in painting was motivated by its metaphorical potential and that individual styles and techniques are not even mentioned in the dialogues except for the purposes of symbolism and wordplay. 2. that the major technical advances in painting were made at least a generation before Plato's floruit and that, therefore, the view of the philosopher as a crusader against illusionistic techniques invented during his life cannot stand the scrutiny of the historical background." *Ibid.*, pp. 4-5.

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In contrast to the refusal to recognize the existence of any art theory in Plato's thought, other authors have vindicated such a theory by setting Plato's artistic judgements in the context of the artistic trends of his time.¹⁹ Thus, and regarding the references to the work of painters and sculptors made by Plato, Pierre-Maxime Schuhl contends that "*le peintre et le sculpteur auxquels il se réfère ne sont pas des êtres abstraits, intemporels: il pense, nous voudrions essayer de le montrer, aux artistes de son temps.*"²⁰ According to this view, when Plato stigmatizes the works of painters as being only images of the truth, rather than truth itself, he is not only using the work of painters as a simile to convey the distinction between sensible and intellectual worlds but, more than anything else, he is criticizing the naturalistic or illusionistic tendencies that characterized the sculpture and painting of his time. Particularly, Plato would have expressed his opposition to the practice of modifying the proportions of the statues to compensate visual foreshortening, and to the technique of *skiagraphia*, or shadow painting, used by contemporary painters.

The connection between making and thinking, *technē* and *epistēmē*, that characterized the early stages of Greek civilization provides a cue for a third interpretation concerning philosophy and art in Plato's thought. Some authors think that what Plato did was to project concepts taken from the realm of art, i.e. crafts, to the more transcendental realm of philosophy. Arnold Lawrence, for example, has suggested that Plato might have derived his theory of Ideas from the architecture of his time: "Adherence to types characterizes Greek art as a whole; this must have aided Plato to formulate his doctrine of Ideas, which strikes a modern reader as far-fetched, but no doubt seems obvious in his own surroundings. In architecture the types were closely related to one another and utilized the same few structural methods and decorative elements. All alike retained to the end clear signs of having originated from the adaptation in stone of domestic buildings constructed largely of timber and unbaked brick."²¹ In a similar line of thought, Indra Kagis McEwen has contended that the notion of *paradeigma* or pattern in the philosophy of Plato could be an extrapolation made after the manual work of the artisans. Thus, she writes: "It is my contention that, with the dawn of Greek thought, the pattern discovered, or allowed to appear, through making was universalized to become the pattern that eventually came to be understood as the one embodied in the cosmos as we understand the word."²²

¹⁹Thus, for example, D. R. Grey, in 'Art in the *Republic*' writes that "certainly the practice of art (whatever may have been the theory about it) becomes more and more 'realistic' from the late fifth century onward—the schools of illusionistic painting, the proverbial hare of Polygnotas— and we can trace the change from the time of Euripides as it persists through the Hellenistic period and beyond, whether in comedy or sculpture..." Quoted in Patterson, op. cit., p. 34.

²⁰P. M. Schuhl. *Platon et l'art de son temps*, 1933, p. 1.

²¹A. W. Lawrence, *Greek Architecture*, 1957.

²²I. Kagis McEwen, *Socrates' ancestor: an essay on architectural beginnings*, 1993, p. 42.

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With all these diverse interpretations, it seems clear that the question of the relationship between philosophy and art cannot be decided in favor of one or the other. There is an intricate connection in Greek thought regarding both spheres, art and philosophy, which from our contemporary viewpoint is difficult to understand. The origins of the term *symmetria*, for example, illustrates the complex relationship that existed between art and philosophy in Greece. As Pollitt explains it, there are two different sources of the concept of *symmetria*: 1. the treatise of the sculptor Polyclitus on proportions -the *canon*-, where *symmetria* refers to "the perfect 'commensurability' of all the parts of the statue to one another and to the whole" 2. the doctrines of proportion, harmony and cosmology attributed to Pythagoras.²³ Whether the term *symmetria* was first forged in sculpture and then adapted by philosophers or, conversely, it was Polyclitus who borrowed the term from the theory of numbers of Pythagoras, would be hard to establish. The most reasonable thing to say in this regard is, as Pollitt has written, that probably there was a "mutual exchange of ideas" between Polyclitus and the Pythagoreans.²⁴

Furthermore, it should be remembered that, at the time of the Greeks, human knowledge had not yet been divided into separate compartments as it is the case in our times. In Plato's theory of Ideas, philosophy, ethics, science and art are constituent parts of a single and unified human knowledge. This is reflected in the various meanings -metaphysical, ethical, epistemological, aesthetic- that the concept of Form or Idea acquires in his theory. Therefore, a strict separation of art and philosophy can only be made from a historically conditioned perspective, looking at Plato from the point of view of contemporary thought. There is the evident risk, however, that by looking at Plato from a contemporary point of view, the original spirit of his thought might be lost. The risk of misinterpretation needs to be taken into account when one aspect of Plato's theory of Ideas, in this case the artistic side, is stressed.

2.4 Imitation and art: the different objects of imitation

While the existence of a genuine artistic theory within Plato's philosophical system can be debated, the influence that his thought has exerted on subsequent art and architectural theory seems to be unquestionable. Particularly influential was the distinction between different sorts of imitation; a distinction that springs directly from the theory of Ideas. In the account of the bed in the *Republic* previously mentioned, Plato appeals to the doctrine of *mimēsis* to distinguish the work of the painter from the work of the craftsman. In this particular example, imitation means for Plato copying of the appearances of things. However, in later

²³Pollitt, *op. cit.*, pp. 15-18.

²⁴*Ibid.*, p. 20.

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dialogues Plato mentions other objects of imitation apart from sensible appearances, like the true dimensions of an object. In Plato's theory, therefore, there is already a distinction -which since then has pervaded in later art theory- between two kinds of imitation: one in which the object of imitation is the sensible appearance of things, and a second one in which what is imitated is an abstract form.²⁵ The question whether the Ideas themselves are to be considered objects of artistic imitation is one of the conflictive issues of Plato's theory.

2.4.1 Imitation of sensible appearances

In the course of the different dialogues, Plato seems to have applied gradually the doctrine of *mimēsis* to the different arts: first he applied the concept of *mimēsis* to music and dance, then to painting and sculpture and later he extended it to poetry.²⁶ In all of these cases, *mimēsis* meant for Plato "copying of the appearances of things", as opposed to a previous doctrine of imitation held by Democritus who had considered that art imitated 'the way nature functions.'²⁷

Occasionally, the idea of 'imitation of appearances of things' has been extrapolated to become equivalent to 'imitation of nature' in general. Tatarkiewicz, for example, considers both objects of imitation -appearances and nature - to be the same.²⁸ This equivalence between appearances and nature, however, might not be right if we take into account that Plato's concept of nature also includes his Ideas or Forms. In the account of the manufacturing of the bed in the *Republic*, Plato effectively refers to the bed created by God as "the bed which exists in nature" (597b), and God is said to be the maker of "this one natural bed" (597d). Later, he refers to the Idea as a "reality in nature" (598a).²⁹ If nature as a whole would be the object of imitation in Plato's *mimēsis*, then the distinction between

²⁵Pollitt distinguishes two kinds of imitations in Plato: literal imitation, and imitation by psychological association. The first applies for example to the painter that depicts a man, tree or animal, while the second imitates "states of mind-courage, indolence, and so on which exist in the 'real' world but are not so much copied as re-created by art." Pollitt, op. cit., p. 39. Later, these two sorts of imitation became known as *natura naturans*, meaning indirect *mimēsis*, and *natura naturata*, that is direct *mimēsis*.

²⁶W. Tatarkiewicz, 'Mimesis', in *Dictionary of the History of Ideas*, vol. 3, p. 226. At first, the Greeks thought that poetry was not an art because it sprung directly from the inspiration of the poet, rather than from a system of established procedures. It was not until Aristotle formulated the rules of poetry that this was considered as imitative, and therefore, art. Tatarkiewicz, 'Classification of the Arts', op. cit., vol. 1, pp. 456-457.

²⁷Tatarkiewicz, 'Mimesis', op. cit., p. 226.

²⁸Ibid., p. 226.

²⁹Patterson thinks that "further testimony concerning the naturalness of Forms could be gathered from these and other dialogues, including the *Philebus* and *Laws*. But when Socrates describes Forms as 'models fixed in nature' (or 'in the nature of things', *paradeigmata hestanaí en tēi physei*, Parmenides 132d) he is only making explicit a basic connection between two thoroughly Platonic conceptions of Forms (at least as they appear in middle dialogues): one as the *paradeigmata* of which worldly participants are images, the other as *natural* essences or types". Patterson, op. cit., p. 125.

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making and imitating drawn in the concluding paragraphs of the example of the bed would be unnecessary since, in this case, both the painter and the carpenter could be called imitators: the first would imitate the sensible appearances, while the second would copy the abstract Forms or Ideas. Since *only* the painter is an imitator, the possibility that the Form or Idea can be the object of imitation should, in principle, be discarded. Therefore, the contention that *mimēsis* meant for Plato the copying of nature can only be true with regard to a restricted realm of nature represented by the sensible appearances. It should not be extended though to the totality of nature.

2.4.2 Imitation of abstract forms

In the *Sophist* -a dialogue written after the *Republic*- Plato suggested the existence of two sorts of imitation. There is a first kind of imitation in which what is copied are the true properties of an object, that is to say, those dimensions that can be measured like length, width and depth.³⁰ This constitutes the art of *eikastikē*, what Pollitt has described as "the production of images that are other than but like what they imitate."³¹ In the second kind of imitation, what is copied is the appearance of the object as opposed to its true properties. This is the art of *phantastikē*, "the production of images that appear to be like what they imitate but are in reality quite unlike it", in Pollitt's words.³² There are, consequently, two distinct objects of imitation: one abstract -the dimensions of the length, width and depth- susceptible to being reduced to number and geometric figures and as such, perceptible only to the intellect; and the other sensible -the appearances of things- which cannot be reduced to either number nor geometric figures and is perceived directly by the senses. The first are the "true proportions"; the second, the "apparent proportions."

In Plato's view, the first sort of imitation (imitation of abstract dimensions) was superior to the second one (imitation of appearances). This predilection for one sort of imitation is exemplified in Plato's taste for Egyptian art -expressed in a passage in the *Laws*- and in his rejection of some practices in contemporary Greek art.³³ In sculpture, particularly, Plato praised the geometric forms of Egyptian

³⁰According to Schuhl, in this first kind of imitation "*l'artiste exécute sa reproduction en se conformant aux proportions du modèle pour la longueur, pour la largeur, pour la profondeur.*" Schuhl, op. cit., pp. 5-6.

³¹Pollitt, op. cit., p. 46.

³²Ibid.

³³In the *Laws*, Plato, rejects the license that the Greek allow to their musicians "to teach whatever rhythm or tune" while praises the Egyptians who "determined on the rule...that the youth of a State should practise in their rehearsals only postures and tunes that are good: these they prescribed in detail and posted up in the temples, and outside this official list it was and still is forbidden to painters and all other producers of postures and representations to introduce any innovation or invention, whether in such productions or in any other branch of music over and above the traditional forms. And if you look there, you will find the things depicted or graven there 10,000 years ago (I

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sculpture while he criticized the practice, extended among contemporary Greek sculptors, of applying optical corrections to compensate for visual distortions. Panofsky thinks that Plato would have seen in the geometric forms of Egyptian sculpture an expression of the sort of imitation in which true forms, as opposed to appearances, are copied.³⁴ These true forms -which Panofsky calls 'objective proportions' as opposed to 'technical proportions'-³⁵ are contained in the geometric drawings -plans and elevations- that the Egyptian sculptor used to make the statues.³⁶ In contrast to Egyptian sculptors, Greek sculptors, like Phidias, would take the distorted appearances as object of imitation; appearances that according to Plato did not represent the 'real proportions', but only 'seem to be beautiful.'³⁷ This way, Greek artists were producing, according to Plato, an art which was not truthful but false.

Instead of the practices of sculptors like Phidias, Plato would have advocated a return to a system of proportions as the one established by Polyclitus in the *canon*. In this case, as in other criticisms on artistic matters, Plato's view appears to be mostly conservative, as he systematically rejects the recent developments in the art of his time and advocates instead a return to the past.³⁸

In the *Metaphysics*, Aristotle pointed out that at some point Plato had introduced a third class of objects, the objects of mathematics, that would occupy an intermediate position between the Ideas and the sensible things. These 'intermediate' objects differ from sensible things in that they are eternal and unchangeable, and from the Idea in that they are many rather than one.³⁹ The

mean what I say, not loosely but literally 10,000) and no whit better or worse than the productions of today, but wrought with the same art...." Quoted in Gombrich, *op. cit.*, pp. 107-108.

³⁴Egyptian sculpture -according to Panofsky- neglected these three facts: "First, the fact that within an organic body each movement changes the dimensions of the moving limb as well as those of the other parts; second, the fact that the artist, in accordance with normal conditions of vision, sees the subject in a certain foreshortening; third, the fact that a potential beholder likewise sees the finished work in a foreshortening which, if considerable (e.g., with sculptures placed above eye level), must be compensated for by a deliberate departure from objectively correct proportions." E. Panofsky, 'History of the Theory of Human Proportions', in *Meaning in the Visual Arts*, 1955, p. 84.

³⁵Panofsky thinks that "to determine the 'objective' proportions of a subject, i.e., to reduce its height, width and depth to measurable magnitudes, means nothing else but ascertaining its dimensions in frontal elevation, side elevation and ground plan." *Ibid.*, p. 87. Panofsky concludes that in Egyptian sculpture exists an identity between 'objective proportions' and 'technical proportions' as would not occur again in any other style.

³⁶Commenting on a papyrus that illustrates the mason-like method of working of Egyptian sculptors, Panofsky writes that "as if he were constructing a house, the sculptor drew up plans for his sphinx in frontal elevation, ground plan and profile elevation[...].So that even today the figure could be executed according to plan." *Ibid.*, p. 86.

³⁷Pollitt, *op. cit.*, p. 28.

³⁸Thus, Schuhl writes that "*Plato parait donc bien opposer-qu'il s'agisse de peinture ou de sculpture- les anciens aux modernes.*" Schuhl, *op. cit.*, p. 13.

³⁹The account of Aristotle in the *Metaphysics*987b14-988a15, runs as follows: "Further, besides sensible things and Forms he says there are the objects of mathematics, which occupy an intermediate

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concept of *symmetria* might have been for Plato one of those 'intermediate' forms that Aristotle had referred to. In the *Philebus*^{64e} Plato refers to measure (*metron*) and commensurability (*symmetria*) in the following terms: "Measure and commensurability, as it turns out, are everywhere identifiable with beauty and excellence." Then, as Pollitt has pointed out, "at the end of the dialogue Plato proceeds to construct a hierarchy of possessions (*ktēmata*) that are essential to man's experience of the good. First in this list comes measure, followed by *symmetria* (*Philebus* 66a-b)." This placement of *symmetria* immediately after measure suggests that *symmetria* was for Plato one of those 'intermediate' forms, half-way between the sensible world and the world of Ideas. If this is so, then *symmetria* was for Plato, as for the sculptors who used the term in their treatises on proportions, an object of abstract or intellectual imitation.

It is not hard to see behind these abstract forms a notion of form that is more architectural than sculptural. In principle, architectural forms, unlike sculptural or pictorial forms, cannot be thought as being direct imitation of sensible appearances. According to this, the source for architectural forms must be found in the same abstract realm to which geometry and proportions belong. It should be noticed, however, that the strict separation between original and imitative arts previously drawn by Plato, is at odds with his later admittance of two objects of imitation, visible appearances and abstract forms. In effect, the admittance of two objects of imitation implies that architecture could also be considered an imitative art, in much the same way as sculpture. As we will see in Chapter 6, Quatremère de Quincy gave this abstract object of imitation the name *type*, which in turn allowed him to defend the view of architecture as imitative art. But, it was Vitruvius, who in *De architectura libri decem*, first exploited this imitative nature of architecture hinted by Plato's doctrine of imitation. According to Vitruvius, in much the same way as sculptors derived *symmetria* from the established system of proportions or *canon*, architects could also apply a similar system of proportions to the construction of temples. With Vitruvius, therefore, the notion of abstract form as object of imitation is no longer restricted to sculpture but becomes the object of architectural imitation as well.

2.4.3 Imitation of Ideas

At different occasions in his dialogues, Plato had drawn a comparison between the Ideas and geometric figures and mathematics. At some point, Plato seems to have thought that mathematics and geometry are the expression of those abstract Forms or Ideas that only exist in an intelligible realm. For example, in the *Republic*^{527b}, geometrical knowledge is equated with the sort of absolute, eternal truth that Ideas stand for: "For geometrical knowledge is of that which always is." Later, in the

position, differing from sensible things in being eternal and unchangeable, from Forms in that there are many alike, while the Form is in each case unique." Quoted in Ross, op. cit., p. 177.

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Timaeus, the form of the universe is assimilated to a sphere, while the smallest components from which all matter is composed are associated with the Pythagorean solids.

The question that arises then is to which extent Plato's Ideas should be considered the same as geometric figures or mathematics. At this juncture, we are confronting one of the most intricate problems in Plato's theory of Ideas: the relationship between the abstract universals and the sensible particulars. In spite of Plato's equation of Ideas with mathematics and geometry, it cannot be concluded that he thought that these were the same as the Ideas. David Melling makes this point clear when he writes that "knowing the importance of the Pythagorean influence on Plato, and noting the importance of mathematics in the programme of education designed to lead to knowledge of the Forms, we may be led to suspect they are mathematical realities of some kind. There is, however, nothing in the text of the *Phaedo* or the *Republic* to force us to such a conclusion, and we might come to quite a different view, for example that the Forms are eternal archetypes or paradigms of sense-perceptible things."⁴⁰ Moreover, Plato consistently maintained during the later development of the theory of Ideas that there are three kinds of entities: Ideas, mathematical objects and sensible objects. Even though he explored the connections that exist between Ideas and mathematical objects, he was far from conceding that they were the same. Plato only admitted to the identity of Ideas with 'ideal numbers' (e.g. the notion of oneness, twoness) but did not contend that Ideas were expressed through particular numbers (e.g. 1, 2, 3, 4).⁴¹ Something similar could be said with regard to an hypothetical identity of Ideas with geometric figures: the Idea of a circle is not so much a perfect circle as the abstract notion of circularity.⁴²

A second possibility, for the Ideas to be considered as objects of imitation, is that Ideas are taken as sensible models of paradigms after which other individuals are produced. At different moments in the development of his theory, Plato spoke of the particulars 'sharing' and 'imitating' the Ideas. In the *Parmenides* 132d, for example, Socrates says that the Ideas are "as it were paradigms" and that "other things are like them and are copies of them."⁴³ According to this, the particulars

⁴⁰D. J. Melling, *Understanding Plato*, 1987, pp. 114-115.

⁴¹As Ross explains, Plato "did not, strictly speaking, identify the Ideas with numbers, but assigned numbers to Ideas, i.e. classified the Ideas as respectively monadic, dyadic, triadic..." Ross, op. cit., p.220. It was Xenocrates, not Plato, who identified Ideas with the objects of mathematics. Ross, op. cit., p. 206.

⁴²In this regard, Woozley writes: "While this gives rise to the question, which cannot be pursued here, whether Plato distinguished between the Form of Circularity (of which there could not be more than one) and a Perfect Circle (of which, if there could be one, there could be more than one...) there is no doubt that he did think a Form not only was the perfect pattern, of which a particular was an imperfect manifestation, but also was what the particular would be if, *per impossibile*, it could be perfect." A. D. Woozley, 'Universals', in *The Encyclopedia of Philosophy*, vol. 8, p. 196.

⁴³Quoted in J. O. Urmson, 'Ideas', in *The Encyclopedia of Philosophy*, vol. 4, p. 118. The assumption that Ideas are patterns or paradigms would invalidate the theory of Ideas of Plato since it would

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would be imperfect exemplifications of the Ideas. However, when expressions like particulars 'imitating' the universals or Ideas are taken literally the true meaning of Plato's theory is falsified. As Ross has contended, "the expressions 'share' and 'imitate' [...] are alike metaphors inadequate to express the relation of particulars to an Idea, because they both treat the Idea as if it were a thing, instead of being a characteristic of things."⁴⁴

It seems to be established then that Plato's Ideas should be excluded from being considered as objects of imitation,⁴⁵ although some authors have speculated on such possibility.⁴⁶ In Plato's theory, abstract Ideas are absolute essences separated

make this liable to infinite regress (the third man argument). This is one of the criticisms of the theory of Ideas that Plato himself makes in the *Parmenides*.

⁴⁴Ross, op. cit., p. 88. Plato gives to the terms model (*paradeigma*) and imitation (*mimēma*) ambivalent meanings: they can be images of a model as well as duplicates of standard instances. As Richard Patterson has contended: "Plato's own usage, like common English usage, encourages that conflation to some extent, for not only can the same *paradeigma* ('model') serve for both a standard instance to be duplicated and a model to be imaged, but the term 'imitation' (*mimēma*) can apply both to duplicates or copies of a standard and to images or likenesses (e.g., paintings or reflections) of a model." Patterson distinguishes up to five different kinds of *paradeigmata*: 1. Illustrative Examples, 'that point beyond themselves either to a general type or principle of which they are more specific illustrations' 2. Paradigm Cases and Standard Instances, when a series of instances are produced after a perfect particular that serves as standard. For example, when the architect of a temple after having made one Corinthian capital instructs the masons to produce a series of identical ones 3. Patterns or Structures, in the sense of 'patterns fixed in the nature of things', that were later known as natural laws. 4. Models, both as copies of a standard and as images or likenesses 5. Other cases that are a combination of the previous ones, as for example, when a *paradeigma* is at the same time a perfect example and intelligible model. Patterson, op. cit., pp. 11-23.

⁴⁵Eva C. Keuls rejects any possibility that Ideas or Forms could be the objects of imitation, particularly with regard to painting: "I see in the dialogues no indication that Plato seriously examined the relationship between a painting and its model. The passages cited by critics to prove that Plato upheld an art which relates to the *eidos* of its model are invariably metaphorical and deal with topics other than painting. Such a notion, moreover, would violate the metaphysical scheme of reality, propounded by Plato in the works of the middle period. Objects are material manifestations of Forms; at least the Forms of objects should, therefore, have some visual properties. Plato's 'reality', nevertheless, is essentially conceptual and abstract. The manifestation of a Form in an art medium which is exclusively visual, painting, is not conceivable in this context." Keuls, op. cit., p. 49.

⁴⁶Pollitt, for example, has speculated with the possibility that Ideas themselves could have been considered as objects of artistic imitation by Plato. He bases his contention on two passages, one in the *Sophist* and a second one in the *Timaeus*. In the *Sophist* Plato distinguishes two modalities of imitation in statues and paintings: *phantastikē*, are those works that deceive our senses but the beauty of their proportions is only an appearance; and *eikastikē*, are the works that reproduce the real proportions. In the *Timaeus*, Plato seems to concede that an artist, like the philosopher, is capable of grasping the truth behind the changing appearances. This truth would become then a sort of 'divine paradigm' for the work of art. Pollitt then proposes that from a combination of *eikastikē* of the *Sophist* and the 'divine paradigm' of the *Timaeus* would be possible to concede that Ideas themselves would become the objects for a sort of 'spiritual *mimēsis*'. His speculation notwithstanding, Pollitt nevertheless acknowledges that Plato himself did not address explicitly the possibility that Ideas were objects of artistic imitation, and concludes that "if Plato had felt strongly that there was a spiritual mimesis, he would have discussed the subject explicitly." Pollitt, op. cit., pp. 46-48.

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from the human world of mind and action.⁴⁷ As Panofsky has contended, the Platonic Ideas, unlike the Ideas of philosophers and art theorists in the sixteenth century, are not "notions or concepts residing in the mind of man" that "reveal themselves in artistic creativity" but rather they are "metaphysical substances existing outside the world of sensory appearances as well as outside the human intellect."⁴⁸ In the same line, Ross contends that "there is nothing in Plato to justify the view sometimes expressed by scholars, both ancient and modern, that the Ideas are simply thoughts, in the divine or in the human mind."⁴⁹ Therefore, the possibility that the artist-craftsman would have first conceived and Idea in his mind and then transferred this to the work of art should be considered alien to the spirit of Platonic theory because, even though Plato's carpenter might have an eye on the *eidōs* of the bed when he produces a particular bed, he is not *imitating* the abstract Form-bed but actually *making* an individual bed that *participates* in the nature of the universal Form.

2.5 Conclusions

Even though Plato seems not to have been directly concerned with architectural issues, in the course of his dialogues he touches on questions that would play an important role in the later development of architectural theory, among them: the metaphysical nature of architecture as opposed to the imitative arts (painting and sculpture); the relationship between building form and architectural form; and the notion of the first model from which architectural works derive.

⁴⁷In this regard, Patterson writes that "Plato's Forms, however, exist independent of mind and matter, so to speak; they are apprehended by mind and imaged by worldly things, but do not exist in either." Patterson, op. cit., p. 156. The possibility that Ideas can be identified with concepts or thoughts is one of the problematic issues of Plato's theory of Ideas which is criticized in the *Parmenides*. David Melling has summarized the discussion as follows: "If we accept that there are Forms and that all sensible particulars exist by participation in the Forms, then we cannot accept that Forms are merely concepts or ideas in the mind. Tempting as such a reductionist view might be, it would leave us with a world consisting solely of thoughts; if things are what they are by participation in the Ideas, and if the Ideas are mental contents, then there seems no way in which things could be other than mental contents. The Forms are not concepts or thoughts, they are objects of thought. Without the Forms thought would have no objects and no content." Melling, op. cit., p. 123.

⁴⁸Panofsky, op. cit., p. 6. Tatariewicz provides further arguments to support the view of an alleged passivity of the mind of the Greek artist in artistic creation: "The ancient theory of imitation was founded on typically Greek premises: that the human mind is passive and, therefore, able to perceive only what exists. Secondly, even if it were able to invent something which does not exist, it would be ill-advised to use this ability because the existing world is perfect and nothing more perfect can be conceived." Tatariewicz, 'Mimesis', op. cit., p. 227. His opinion contrasts to the one of Panofsky, who thinks that the doctrine of *mimēsis* does not necessarily convey the neglect of the creative capability of the artist: "Thus despite its adherence to the concept of mimesis, ancient Greek thought was thoroughly familiar with the notion that the artist's relation to nature is not only that of an obedient copyist but also that of an independent rival, who by his creative ability freely improves on her necessary imperfections." Panofsky, *Idea*, p. 15.

⁴⁹Ross, op. cit., p. 88.

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The distinction between imitative and original forms made by Plato implicitly acknowledges the metaphysical character of architectural form. After asking how it is possible for the painter to know what the real bed is since “a bed really differ from itself when you look at it from the side or from straight in front or from any other point of view”, Plato concludes that the bed is the same in every case, but appears different depending on the point of view. What distinguishes then the painter from the carpenter, is that the knowledge that the painter has of the bed is limited to some views or appearances of the bed, and what he reproduces in the canvas is this incomplete knowledge. The carpenter, on the other hand, needs to have a full grasp of the form of the bed to manufacture it. The comparison between painter and carpenter drawn by Plato can be extended to architecture and, as a matter of fact, to all man-made artifacts. The architect, in much the same way as Plato’s carpenter, needs to have full grasp of the form of the building and not only of particular appearances. Within Plato’s theory, this ‘complete form’ possessed by the architect-craftsman is closer to the Idea than the deceptive appearances that the painter takes as model.⁵⁰

Working within the conceptual framework of the doctrine of imitation, Plato could provide a theory of the origins of the works of painters and sculptors but he could not explain though the forms of the artifacts produced by different craftsmen, like shoemakers, carpenters, shipbuilders, and also architects. In Plato’s view, the model after which craftsmen produced artifacts could not be found in the realm of sensible things, as the models used by painters and sculptors. They should be found in higher instances, away from the world of sensible things; basically, the same kind of world where Ideas exist.⁵¹

⁵⁰With the advent of non-figurative art, however, it was no longer clear that this was a valid criteria for demarcation between the different arts. In the work of the European avant-gardes of the beginning of the twentieth century, painting and sculpture were as original and metaphysical as the crafts were for Plato.

⁵¹The conviction that architecture is essentially metaphysical, and that this is what distinguishes it from painting and sculpture, implicit in the theory of Ideas of Plato, has pervaded well up to the nineteenth century. The metaphysical dimension of architecture, has always been, implicitly or explicitly, acknowledged in the theoretical discussions on architecture, at least until the eighteenth century. In that time, critics like Winckelmann, Algarotti and Quatremère de Quincy, were still claiming the metaphysical nature of architectural form as the distinctive essence of architecture. Winckelmann, for example, contended that “*la Sculpture et la Peinture atteignent plutôt un certain degré de perfection que l’Architecture. La raison est que celle-ci a beaucoup plus d’idéal que les deux autres. Elle n’a point un objet déterminé dans la Nature qu’elle doivent imiter: elle est fondée sur les règles générales & les lois de la proportion. La Sculpture et la Peinture, ayant commencé par la simple imitation, trouverent leurs règles dans la contemplation de l’homme. Ce model les renfermoit toutes, et elles n’avoient pour-ainsi-dire qu’à voir et exécuter. L’Architecture étoit obligée de chercher les siennes dans la combinaison de plusieurs proportions: une infinité d’opérations étoient nécessaires pour les découvrir.*” Winckelmann, *Histoire de l’art chez les anciens*, 1766, vol. 1, pp. 236-237. A few years later, Algarotti repeated similar words: “These (painting, poetry or music) have, in a certain sense, merely to open their eyes, contemplate the objects around them, and base a system of imitation upon them. Architecture, on the other hand, must raise herself on high through the intellect, and derive her system of imitation from ideas about more universal things, things far removed from human sight. It might also be said with good reason that she has the same place among the arts as metaphysics

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It must be noticed, however, that for Plato both the building that the architect makes and the bed that the carpenter produces are artifacts of the same sort. Plato fails to distinguish then, between architectural forms and forms of other man-made artifacts, like a couch. In Plato's classification of the arts, the designation of architecture as original art is made at the expense of neglecting other aspects of architectural form, namely, the symbolic or ornamental nature inherent to the architectural orders. In fact, the strict separation between original and imitative arts is only possible when the symbolic and sculptural nature of architectural form -the orders- are overlooked. Had Plato considered the orders as the distinctive feature of architectural form, it would no longer be evident that architectural forms are purely 'original'. Rather he should have considered the possibility that they are both imitative *and* original. In order to contend that architectural forms are original, Plato sees only what architectural form has in common with other artifacts: the pure building form, stripped from any other symbolic connotations. In these conditions, *technē* alone can be made accountable for the form of a building, so the Idea of the building is embedded in the rational procedures that characterize the craft of building.

It seems reasonable to conclude that the question of the orders did not concern Plato as much as it concerned later architectural theorists. Vitruvius, writing within the framework of architectural theory, could not ignore the value of the orders as the distinctive expression of architectural form. Thus, in his account of the origins of the Greek temple, Vitruvius found it necessary to acknowledge the existence of two kinds of architectural form: the structural skeleton (e.g. building form) and the orders (e.g. ornamental, symbolic form). For Vitruvius, the structural skeleton (basically, a work of carpentry) was still a work of *technē*, the embodiment of the Idea, in the terms expressed previously by Plato. After Vitruvius, this 'structural skeleton' would still be considered by eighteenth century theorists as a sort of materialized Idea, an objective form that stemmed directly from *technē*.

The connection between Plato's theory of Ideas and architectural theory reveals itself more clearly with regard to the question of the origins of architectural form and, particularly, with the speculations regarding the 'first house', the first architectural model from which architectural works would derive. The 'first house' is a recurrent topic in architectural theory, from Vitruvius to Le Corbusier. In the theory of Vitruvius, the Platonic Idea gave place to a positive archetype: the prototype of the wooden house, directly derived from nature and, indirectly, through *technē*. For Renaissance theorists, the first model became an ideal form

has among the sciences." Francesco Algarotti, Saggio sopra l'architettura, in *Opere scelte*, 1823, vol. 1, p. 20. Cited in J. Rykwert, *On Adam's house in paradise*, 1981, p. 63. Also Quatremère de Quincy vindicated the metaphysical character of architecture: "Ainsi cet art, en apparence, plus asservi à la matière que les deux autres, est dans le fait plus idéal, plus intellectuel, plus métaphysique qu'eux." Q. de Quincy, *Encyclopédie Méthodique*, 1788-1825, vol. 1, p. 120.

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which was at the same time a symbol of an harmonic universe, a system of proportions to be applied in design, and a mental image that unified the conceptual and perceptual realms. Other theorists like Villalpando, applied the christianized interpretation of Plato's Idea to the domain of architecture. For Villalpando, the first house that served as a model for architecture would be the Temple of Salomon, which according to the Christian tradition, was endowed with some divine proportions. In the eighteenth century, the notion of the first model acquired psychological and epistemological connotations. Laugier's primitive hut is an 'idea' that the mind extracts from the works of nature. This 'idea' of Laugier is the direct antecedent of the concept of Type introduced later by Quatremère de Quincy. The distinction between *type* and *modèle*, which is at the core of Quatremère's theory, is directly related to the different objects of imitation considered by Plato. Quatremère contended that architecture was imitative, the only difference with the other arts being that its object of imitation was abstract rather than sensible. Later, Le Corbusier's interpretation of the first model was essentially mentalistic: he claimed that the first model was to be found in the human mind, more precisely, in the conceptual instruments with which the mind has been endowed, like geometry and mathematics.

Chapter 3

Vitruvius' *De architectura*: The Natures of Architectural Form

3.1 Introduction

Some of the issues traditionally associated with the idea of Type in architecture, like the first model or archetype and the classification of architectural forms, were already addressed by Vitruvius in *De architectura libri decem*. Vitruvius' treatise combines, in an eclectic manner, different artistic and philosophical views formulated earlier by the Greeks. Following the premises of the doctrine of *mimēsis*, Vitruvius strove to demonstrate that architecture was an imitative art. Some of the terms of his critical vocabulary, particularly *symmetria* and *eurhythmia*, were directly taken from the artistic vocabulary of the Greeks.

As we have seen in the previous chapter, the concept of Form held by Plato was not purely metaphysical. It encompassed *simultaneously* metaphysical, aesthetic, ethical and epistemological meanings. In his theory, Vitruvius played down the metaphysical aspects inherent to Form, while he stressed the role of nature as the original creator of architectural form. Hence, he considered that the first wooden constructions were the models that nature provided to architecture. This primitive wood construction is for Vitruvius a sort of 'materialistic version' of the Platonic Idea adapted to the specific needs of architectural theory. The question of the Idea is also present in the classification of temple-forms provided by Vitruvius, as well as in the different kinds of *dispositio*, or forms of representation of a building.

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3.2 Building form and architectural form

3.2.1 Nature as a form maker

In Book II, chapter 1, with the title 'Origin of the Dwelling House',¹ Vitruvius relates how men, who were living like wild beasts, were terrified by the discovery of fire. The storm was the origin of the lighting, and the wind, rubbing the branches against each other, brought about the fire. They discovered the comfort provided by the fire, so they kept it alive feeding it with new logs. As men gathered together, they felt the need to communicate with each other and, as a result, the first words were uttered. "Therefore -Vitruvius concludes- it was the discovery of fire that originally gave rise to the coming together of men, to the deliberative assembly, and to social intercourse." Afterwards, men discovered that, unlike animals, they could do what they wanted with their hands, so -Vitruvius continues- "[men] began in that first assembly to construct shelters. Some made them of green boughs, others dug caves on mountain sides, and some, in imitation of the nests of swallows and the way they built, made places of refuge out of mud and twigs. Next, by observing the shelters of others and adding new details to their own inceptions, they constructed better and better kinds of huts as time went on"(II,1,2).

To recapitulate the content of the legend that Vitruvius proposes: men were first part of nature, they lived together with other animals and there was no dividing line between the world of man and the world of nature. The first actions taken by men were instinctive, meaning that they followed the dictate of nature in the same way as other living creatures did. The fire, it should be noticed, was not created by the ingenuity of man, but rather by the accidental intervention of nature. Moreover, the discovery of fire brought men into social contact and this, in turn, gave rise to the outbreak of language. The assumption, that fire and language were more the product of nature than of the ingenuity of man is then implicit in the tale that Vitruvius tells us.

Indeed, the idea that all is given by nature pervades the whole theory of Vitruvius. He assumes that the first dwellings were either a product of nature herself, like for example a cave, or an imitation of nature's procedures, like a house built as imitation of the swallow's nest. In this regard, Vitruvius' account of the origins of architecture seems to be in line with some previous Greek theories of *mimēsis*, like the one postulated by Democritus, who wrote that "in art we

¹Vitruvius, *The Ten Books on Architecture*; English translation of Morris Hicky Morgan, 1914.

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imitate nature: in weaving we imitate the spider, in building the swallow, in singing the swan or nightingale."²

3.2.2 The first dwellings

Vitruvius continues his account on the origin of the dwelling house with a description of the construction of the first shelters. He describes two models of primitive house. The first, which he claimed to have found among the Colchians in Pontus, was built in the following manner (Figure 3.1): "They lay down entire trees flat on the ground to the right and the left, leaving between them a space to suit the length of the trees, and then place above these another pair of trees, resting on the ends of the former and at right angles with them. These four trees enclose the space for the dwelling. Then upon these they place sticks of timber, one after the other on the four sides, crossing each other at the angles, and so, proceeding with their walls of trees laid perpendicularly above the lowest, they build up high towers. The interstices, which are left on account of the thickness of the building material, are stopped up with chips and mud. As for the roofs, by cutting away the ends of the crossbeams and making them converge gradually as they lay them across, they bring them up to the top from the four sides in the shape of a pyramid"(II,1,4).

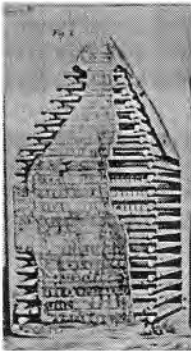


Figure 3.1. The primitive house of the Colchians. From the French translation of Vitruvius made by Claude Perrault.

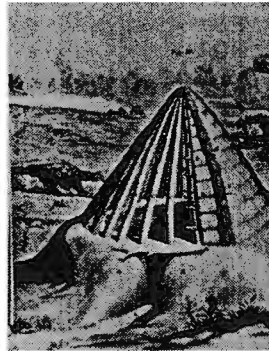


Figure 3.2. The primitive house of the Phrygians. From the French translation of Vitruvius made by Claude Perrault.

Vitruvius systematically neglects the role played by man in the creation of the first houses. Thus, as Vitruvius describes it, the first house would have resulted, *naturally*, from laying out of single logs, as if the act of piling up logs would be as

²Plutarch, *De Sollert. anim.* 20, 974A; quoted in W. Tatkiewicz, 'Mimesis', in the *Dictionary of the History of Ideas*, vol. 3, p. 226. Tatkiewicz contends that Vitruvius was just applying the Greek theory of *mimesis* to architecture.

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instinctive for men as it is for swallows.³ The apparent similarity between the primitive construction and the nest of the bird, might have provided Vitruvius with an argument to support the natural origin of architectural forms. Vitruvius, however, does not make much of the fact that unlike branches in the nest, the logs in the primitive house are set at right angles, and that the resulting forms can be described in terms of geometric figures, like prism and pyramid.

The second model of primitive house proposed by Vitruvius is the one of the Phrygians, who lived in an open country where timber was scarce (Figure 3.2). This was the reason why, according to Vitruvius, they came up with a sort of construction that required less wood. First, they made a trench on the ground and then they built a pyramidal roof of logs on top, which they covered with reeds and brushwood. In both models of primitive construction, Vitruvius implies that the geometric forms are the consequence of direct operation with physical objects rather than abstractions that pre-exist in the mind of the builder.

In the *Physics*, Aristotle had contended that art imitates nature by reproducing the processes by which nature works. To illustrate his notion of *mimēsis*, he gave the example of the construction of the house, which can be summarized as follows: "If a house were one of the things produced by nature, it would be the same as it is now when produced by art. And if natural phenomena were produced not only by nature but also by art, they would in this case come into being through art in the same way as they do in nature. One step in their development exists for the sake of the next one. In short, art either completes the processes which nature is unable to work out fully, or it imitates them."⁴

Vitruvius' account of the origins of the first houses fully conforms to Aristotle's interpretation of *mimēsis*, in the sense that art is both imitation of nature and completion of the processes that nature has not finished. In effect, Vitruvius implies that the first builders imitated nature when they built their

³From a contemporary point of view, however, the previous description of Vitruvius could be interpreted as an expression of a mind archetype, in the sense proposed by Jung. According to this view, the first builders of Vitruvius would have built their primitive constructions according to a pattern which was part of their mental equipment. This connection between mental and architectural archetypes has been drawn by Bettina Knapp, *Archetype, Architecture, and the Writer*, 1986, who describes an archetype in the following terms: "The term (archetype) is not meant to denote an inherited idea, but rather an inherited mode of psychic functioning, corresponding to the inborn way in which the chick emerges from the egg, the bird builds its nest, a certain kind of wasp stings the motor ganglion of the caterpillar, and eels find their way to the Bermudas." Knapp quotes Edward Edinger, who wrote that: "An archetype is to the psyche what an instinct is to the body. The existence of archetypes is inferred by the same process as that by which we infer the existence of instincts. Just as instincts common to a species are postulated by observing the uniformities in biological behavior, so archetypes are inferred by observing the uniformities in psychic phenomena. Just as instincts are unknown motivating dynamisms of biological behavior, archetypes are unknown motivating mechanism of the psyche."

⁴Aristotle, *Physics* 199a15-19. Quoted and summarized by Pollitt, *The Ancient View of Greek Art. Criticism, History and Terminology*, 1974, p. 41.

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dwellings in much the same way as the swallows built their nests. Moreover, by considering that the wooden construction was the prototype from which the Greek temple derived, Vitruvius also assumes that there is an inherent form in the material wood and that 'if nature would have built' the house, the result would have been the same form as the one made by the first builders. In other words, the form of the logs is given by nature, and so are the procedures by which these logs have to be put together to create the overall form of the house. Men did not have to possess an idea of the house before they built it. Nature gave to men the form of the first house, not as a model to imitate in the Platonic sense, but a form which was implicit in the materials themselves.

The comparison between Aristotle's example of the house and Vitruvius' theory of the origins of the first dwellings reveals the different purposes of philosophy and architectural theory, or, more precisely, between Greek philosophy and Vitruvius' architectural theory. Aristotle's doctrine of *mimēsis* is eminently philosophical: his speculations on matter and form have a teleological intention. For Vitruvius, on the other hand, the question of matter is reduced to a simple accidental episode: the material of the first houses was wood because this was the available material in the area where they were built. Metaphysical questions have no place in Vitruvius' theory of architecture: they are either ignored or camouflaged under a veil of history and legend.

3.2.3 The theory of transformation

The description of the origin of the first dwellings constitutes a starting point for a theory devised by Vitruvius to explain the process by which architecture, i.e. the Greek temple, came to existence. According to Vitruvius, after the first wooden constructions, the art of building went through a period of refinement that culminated in the stone temple of the Greeks.

Vitruvius appeals to the "imitative and teachable nature"(II,1,3) of man to explain this transformation from the primitive wooden construction to the temple. For example, he writes that "as men made progress by becoming daily more expert in building, and as their ingenuity was increased by their dexterity so that from habit they attained to considerable skill, their intelligence was enlarged by their industry until the more proficient adopted the trade of carpenters"(II,1,6).

In Book IV, in the chapter entitled 'The Ornaments of the Orders', Vitruvius attempts to demonstrate the validity of the theory of the transformation of the wood house into the stone temple. First, he gives a detailed description of the different members that composed the timber work of the roof: "The main beams are those which are laid upon columns, pilasters, and antae; tie-beams and rafters are found in the framing. Under the roof, if the span is pretty large, are the crossbeams and struts; if it is of moderate extent, only the ridgepole, with the

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principal rafters extending to the outer edge of the eaves. Over the principal rafters are the purlines, and then above these and under the roof-tiles come the common rafters, extending so far that the walls are covered by their projection"(IV,2,1). In this model, that the carpenters would have provided, every part and detail has a place and a name. Thus, the detailed description of the components of the wooden structure is in fact a description of the first architectural form or model, which was then copied into stone by the artist-architect of the Greek temple: "In accordance with these details, and starting from carpenter's work, artists in building temples of stone and marble imitated those arrangements in their sculptures, believing that they must follow those inventions"(IV,2,2). And to demonstrate the validity of his theory, Vitruvius gives his well-known example of the origins of metopes and triglyphs, which according to him, were first the end sections of the tie-beams of a wood construction: "Hence it was in imitation of the arrangement of the tie-beams that men began to employ, in Doric buildings, the device of triglyphs and the metopes between beams"(IV,2,2).

The distinction between two kinds of architectural form, one the structural skeleton of the wooden model, the other the sculptural forms of the orders, is implicit in the account of the origins of the forms of the Greek temple furnished by Vitruvius in the previous passages. Vitruvius attributes to the structural form an ontological priority over the orders, in the sense that structural form is first and ornamental forms, that is the orders, comes later. Such a distinction between structure and ornament would have been unnecessary if Vitruvius would have explicitly recognized that the true origin of architecture was the Greek temple rather than the primitive constructions that preceded it. In this case, no distinction between structure and ornament would be necessary: in the Greek temple there is only one kind of architectural form which is *simultaneously* structural and ornamental.

Vitruvius' theory of transformation of the wood construction into the stone temple can be subjected to two kinds of interpretation: historical-archaeological and theoretical-speculative. From the historical point of view, Vitruvius considers that the stone temple was the result of a process of development that started with some wooden constructions and that, after continuous improvement in building techniques, resulted in a more refined wooden hut which was then built into stone.⁵ From a strictly theoretical point of view, Vitruvius is saying -implicitly rather than explicitly- that the forms of the wood construction provided the Greek artist with the idea or model -a materialistic one, i.e. the wooden skeleton- of which the temple would have been an imitation.⁶

⁵A third interpretation is still possible, one that is both historical and theoretical. This would be the case if we consider Vitruvius' description of the origins of architecture as a testimony of what has been referred as 'the inertia of form', meaning that there is a natural tendency for certain forms to remain valid long after the original reasons that gave rise to them have disappeared.

⁶In this regard, Indra Kagis McEwen has suggested that Vitruvius could have been recreating with his theory of the origins of architectural orders the lost link that once existed in pre-Socratic

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Each interpretation of the theory of the origins of architecture proposed by Vitruvius, the historical and the theoretical, conveys a different concept of architectural form. From a historical perspective, the form of the wooden house should be taken as building form, that is to say, as structural form in the physical sense.⁷ But, if the wood construction is taken as a theoretical premise, as opposed to historical fact, then the skeleton of the wooden prototypes has to be taken as a structural form in the conceptual sense, rather than in the physical sense. In this case, the wooden prototype of Vitruvius comes closer to what later Rudolf Arnheim, in his application of Gestalt psychology to art theory, has called the 'structural theme or skeleton' of a design.⁸ Perhaps, Vitruvius, by invoking the primitive construction, wanted simply to give expression to this conceptual scheme or Gestalt that the Greek artist needed to have in his mind in order to construct the temple. If this is so, then the structural form that served as the model for the stone temple, should be taken in the conceptual sense, as opposed to the strict physical or sensible one, that is to say, as abstract form or idea.

philosophy between *epistēmē* as skill that could not be separated from the craftsmen, and *epistēmē* as objective and eternal knowledge that arises from Plato's theory: "If Vitruvius and his successors are read with patience, the traces of this concurrence can still be found. It becomes clear, for example, why the legitimacy of the Doric order was claimed to have rested on its resemblance to carpentry. The importance was not to preserve the memory of wood construction as such, but, with the building of each Doric temple, to bind with the chains of recollection into an *epistēmē* as seeing the *doxa*, the right opinion, that cutting, assembly, and the perfect adjustment of parts were essential in the realm of *epistēmē* as skill in allowing *kosmos* to appear." I. Kagis McEwen, *Socrates' ancestor. An essay on architectural beginnings*, 1993, pp. 128-129.

⁷Some research work on typology carried out in the last decades has adopted this archaeological approach. In contrast to the purely speculative theories about the origins of architecture, like the theory of transformation of Vitruvius, some researchers have restricted the theories on the primitive house to the evidence provided by facts, that is to say, by the remains of buildings of past civilizations as well as the habitat of existing primitive peoples. These facts, according to Heinrich Klotz, suffice to reject past speculative theories on the origins of building forms: "*Alle diese legendenhaften Vorstellungen sind durch die Fülle von Entdeckungen und Ausgrabungsergebnissen der jüngst vergangenen Jahrzehnte außer Kraft gesetzt geworden.*" H. Klotz, *Von der Urhütte zum Wolkenkratzer*, 1991, p. 17. In a similar line, Nold Egenter rejects all previous speculations on the origins of the primitive house and contends that this issue can only be addressed scientifically within the realm of anthropology: "*Con questo legame antropologico-culturale tra l'architettura e la scrittura siamo molto più vicini alle origini della costruzione di quanto lo fossero Soeder con la geometria, Rykwert con le numerose idee della capanna originaria o Read con il duomo primitivo sopra la fossa-abitazione.*" N. Egenter, 'Il primitivo storico ed il primitivo nell'antropologia culturale', 1988, pp. 68-69. Nevertheless, this archaeological-historical approach does not overcome either the opposition construction-architecture, as Egenter admits: "*Ma soprattutto l'architettura sembra aver radici molto profonde, al di là della funzione di proteggere il corpo umano.*" *Ibid.*, p. 69. Klotz, however, does propound the elimination of the dichotomy construction vs. architecture, as he contends that "*jedes vom Menschen hergestellte Konstruktionsgebilde, das dem Wetterschutz dient, ist Architektur.*" Klotz, *op. cit.*, p. 18.

⁸For Arnheim the structural theme or skeleton is "which the viewer must grasp if he is to understand the design as a whole", and also "the idea that guides the architect in developing his design." R. Arnheim, *The Dynamics of Architectural Form*, 1977, p. 270.

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3.2.4 Architectural forms versus natural forms

The application of the doctrine of imitation to architecture, that Vitruvius pursued, is not confined to the imitation of the wooden prototype. Vitruvius thinks also that the orders of the Greek temple are an imitation of some natural forms. He realizes that there are certain forms in the orders, like the capitals of the Ionic or Corinthian columns, that cannot be explained as embellishments of a pre-determined wooden skeleton. For these sorts of architectural form, Vitruvius appeals to direct comparisons with other forms, like human bodies and plants. In this regard, the Doric column "exhibits the proportions, strength, and beauty of the body of a man" (IV,1,6); the base of an Ionic column corresponds to the shoe of a woman, and "in the capital they placed volutes, hanging down at the right and left like curly ringlets" (IV,1,7); and the Corinthian order "is an imitation of the slenderness of a maiden" (IV,1,8), while its capital was created by the sculptor Callimachus after the model of an acanthus plant.

In the previous passages, Vitruvius uses different kinds of analogy to relate architectural and natural forms, in a way reminiscent of Plato's distinction between different kinds of imitation discussed in the previous chapter. First, there is a comparison between architectural forms and the human body which is based on the notion of 'abstract imitation' to which we have referred with regard to Plato's doctrine of imitation. Vitruvius is not saying that a Doric column is like the body of a man, but that it has the same proportions that the body of a man. Columns and human bodies are comparable in so far as it exists an invisible form -the proportions- which underlies both architectural objects and natural beings. There is a second sort of analogy, that has to do with the symbolism of the form, in the sense that a Doric column denotes the strength of man, or a Ionic column denotes the slenderness of women. This sort of comparison between architectural forms and the human body implies the personification of certain human attributes (strength of man, slenderness of woman) in the architectural forms. Lastly, Vitruvius establishes a third sort of analogy -that would correspond to Plato's direct imitation- which implies a direct comparison between sensible or external forms like, between the Ionic capital and the hair of a woman, or between the Corinthian capital and the acanthus plant.⁹

⁹There is still another comparison between column and tree, whose origin can be traced to Vitruvius, although, as Wolfgang Herrmann contends, the association of column and tree was due to a misreading of Vitruvius' text by seventeenth century writers: "The idea that the column had been originally modelled after the shape of the tree, the most common example of the imitative function of architecture, owed its wide diffusion not least to the belief that Vitruvius had proposed it. In actual fact he does not mention it. At the most appropriate occasions -when treating of the columns in general and of the origin of the Orders- he never refers to the tree as the model for the column nor does he talk about it when demonstrating how some ornaments of the Doric Order developed from wooden buildings. In a completely different context, when trying to prove that it is only natural for the diameter of a super-imposed Order to be smaller than the lower one, he points to the shape of certain trees like fir, cypress, and pine, which are thick at the roots and taper off towards the top. However when writers on architectural theory in the seventeenth century found that Vitruvius alluded in one

3.2.5 The natures of architectural form

In the course of the preceding discussion on the theory of the origins of architecture proposed by Vitruvius, we have identified different kinds of architectural form. First, by contending that the wood house provided the model for the stone temple, Vitruvius suggested that architectural form is, in its inception, structural form. Second, when Vitruvius drew a comparison between architectural forms and natural forms, he was acknowledging the sculptural nature of architectural form. This sculptural or ornamental form has the capability to evoke different images of the natural world and thus act as a unifying symbol that brings together architecture with the other realms that constitute the spiritual world of man. Finally, there is a third kind of form whose nature is geometric, in the perceptual and conceptual sense, that in the theory of Vitruvius corresponds to the abstract form represented by proportions (Figure 3.3).

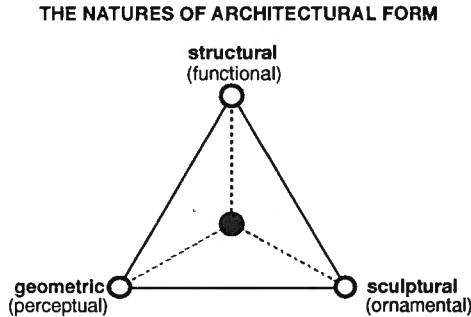


Figure 3.3. The three natures of architectural form.

Extrapolating from Vitruvius' treatise, we will contend that these three kinds of form, that we have referred as *structural-sculptural-geometric*, exist in architectural works of all times.¹⁰ Therefore, we should not see these different

and the same paragraph to columns and trees, they probably genuinely misunderstood him and believed that he was propounding a theory which fulfilled in such a perfect form their need of proof that architecture qualified as an imitative art, and they gladly accepted him as their authority for this view." W. Herrmann, *Laugier and eighteenth century French theory*, 1962, p. 46. Bramante, Palladio and Philibert Delorme had believed in this analogy, and two of them, Bramante and de Delorme, even made illustrations of it. Hegel also thought of the column as being originally a tree that developed later into more abstract forms: "Die schöne Säule geht von der Naturform aus, die sodann zum Pfosten, zur Regelmäßigkeit und Verständigkeit der Form umgestaltet wird." G. W. F. Hegel, *Aesthetik*, [1955], p. 615.

¹⁰These three natures of architectural form can overlap with the Vitruvian triad *firmitas-utilitas-venustas*. Structural, that includes any form that fulfils some functional demands, could correspond to *firmitas* and *utilitas*; while geometric and sculptural form could be equally associated with *venustas*. The difference, however, is that the classification that we are proposing focuses on the specific issue of architectural form while the three Vitruvian categories are supposed to be general properties of architecture. Moreover, Vitruvius' categories refer mainly to qualities of the built work, particularly

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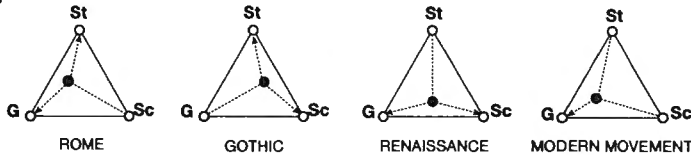
forms as one being the precedent of the other, as Vitruvius did in the theory of the imitation of the wood house into the stone temple. Nor should we see them, in a Hegelian fashion, as stages in the evolution of architecture. Rather, we should see these three kinds of form, *structural-sculptural-geometric*, as immanent natures of every architectural form. As such, these three kinds of form exist, simultaneously, in every architectural work, regardless of time and epoch.¹¹

3.3 The general forms of the temple

Vitruvius refers also to other kinds of form that do not have to do with the individual parts (columns, metopes, triglyphs) but with the overall form of the temple. In Book III, in the chapter dedicated to the 'Classification of Temples', he

the first two, while our three natures are meant to be abstract qualities of architectural form rather than tangible properties of buildings. Carl Watzinger suggested a connection between, on the one hand, *symmetria, eurhythmia, decor* and, on the other, *firmitas, utilitas, venustas*. C. Watzinger, 'Vitruvstudien', 1909; pp. 203-223; quoted in Pollitt, op. cit., pp. 165-167. In much the same way as the distinction between *opus* and *ratiocinatio* implies a distinction between practice and theory, Watzinger thought that the first group of terms would stand for the effects produced respectively by the terms of the second group. The classification of the three natures of architectural form proposed here provides an additional support for Watzinger's thesis. When a parallelism is drawn between the three natures of architectural form *structural-sculptural-geometric* and the three Vitruvian terms *symmetria-decor-eurhythmia*, then these can also be equated with a corresponding nature of architectural form.

¹¹In this regard, it can be contended that the difference between buildings of different periods could be established with regard to the position that architectural form occupies in the diagram we are proposing.



In Roman architecture, for example, the geometric and structural natures of architectural form were more relevant than the sculptural one. In the Gothic, the structural and sculptural natures acquired more importance than the geometric, understood in the perceptual sense. In the Renaissance, the sculptural and the geometric or perceptual natures of architectural form come to the fore. And in the Modern Movement, the geometric nature of architectural form is the most relevant. It should be noticed, however, the eminently elusive character of this classification, and the difficulty of drawing a clear line between a form which is purely structural, sculptural or geometric. Effectively, a structural form, like a timber frame, can be reduced to a pure geometric form. In the Greek temple, some of the forms were sculptural and structural at the same time, like for example the columns; while others were geometrical and structural, like the rectangular forms of the abacus in the Doric capital, or the slabs that make the crepidoma. In the Gothic church, simple geometric diagrams underlie the naturalistic forms. To assign one of these categories to a particular architectural form is even more difficult in cases like the Roman architecture. In the triumphal arch or in the facade of the Coliseum, structural form (the massive wall) and sculptural form (the Greek orders, devoid of structural meaning) have been blended to create a new kind of form.

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writes that "there are certain elementary forms on which the general aspect of a temple depends"(III,2,1). He classifies temples as *in antis*, prostyle, amphiprostyle, peripteral, dipteral and hypaethral. The basis for the classification is the general form of the plan, and the criteria to distinguish between different classes of temple is based on the number of columns and their arrangement with regard to the cella.

A second classification of temples takes the intercolumniation as a taxon. Accordingly, "there are five classes of temples, designated as follows: pycnostyle, with the columns close together, systyle, with the intercolumniations a little wider; diastyle, more open still; araeostyle, farther apart than they ought to be; eustyle, with the intervals apportioned just right"(III,3,1). The intercolumniation is a function of the diameter of the foot of the column. Thus, for the pycnostyle the intercolumniation is one and a half diameters, two for the systyle, three for the diastyle, four for the araeostyle, and the eustyle has two different intercolumniations, of three and two and one quarter diameters. Then Vitruvius discusses the practical consequences of adopting one or another dimension for the intercolumniation. For example, he rejects both the pycnostyle and the systyle on the basis that they are not functional because "the matrons[...]cannot pass through the intercolumniations with their arms about one another"(III,3,3); and he dismisses the diastyle and araeostyle because the excessive distance between columns would oblige to use wood beams instead of stone architraves. The ideal solution is, according to Vitruvius, the eustyle, which has a larger span in the central intercolumniation to facilitate the access, and smaller intercolumniations on the sides, that can be spanned with stone architraves.

Vitruvius considers two different methods to determine the module from which other dimensions are derived (Figure 3.4). With the first method, the module is obtained from the division of the width of the front of the temple into parts, and for the second method the input is the height of the column. The first procedure applies to temples which have four, six or eight columns in their front. The width of the front of the temple is divided into a certain number of parts. For tetrastyle temples, the width is divided into eleven and a half parts; for the hexastyle, in eighteen parts; and for octastyle in twenty-four parts. One part corresponds then to the module, that is to say, the diameter of the column. This module is used to calculate the intercolumniation and the height of the columns. Then, Vitruvius concludes that "as a result of this division, the intercolumniations and the heights of the columns will be in due proportion"(III,3,7), meaning that they are multiple of the same module.

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procedure 1	procedure 2
module is calculated by dividing the width of the temple into equal parts.	module is calculated by dividing the height of the column into equal parts.
input: width of temple	input: height of column
output: intercolumnation height of column	output: width of temple

Figure 3.4. The two procedures to determine the dimensions of the portico.

For the second method, the input to the procedure is the height of the column. The height is divided into a certain number of parts, depending of the class of temple. In the systyle and eustyle, the height is divided into nine and a half parts; and in the pycnostyle in ten parts. The resulting dimension is the module or diameter of the column. Although Vitruvius does not say it explicitly, it can be assumed that the width of the temple front can be determined from the same module, since it is known beforehand that every class of temple yields a particular proportion for the intercolumniation (for instance three diameters for the systyle).¹²

It should be noticed that the system of proportions that Vitruvius describes is associated with a vocabulary of architectural forms which *is not produced by the proportions*. When Vitruvius recommends certain proportions for the column, for example, it should be kept in mind that he is grounding the system of proportions on a form -the column- whose component parts are already defined and systematized: capital, shaft, abacus, cymatium, echinus, annulets and necking. Similarly, when he speaks of the dimensions of intercolumniations is because a generic form called 'temple' consisting of the columns around a central core or cella already exists. We should not confuse, therefore, the geometric description of some architectural forms, which can be represented by means of geometric figures and numbers, with the architectural form itself. The geometric description

¹²The procedures which Vitruvius describes to determine the dimensions of columns and intercolumniums, would be amenable to being represented in a computer as parametric shapes. The idea of parametric shape is based on the association between geometric figure and number that is at the core of analytical geometry. A given geometric figure, for example a rectangle, can be described in function of the parameters corresponding to width and height. By giving certain values to the parameters, a particular rectangle is created. Thus, every possible rectangle can be an instance of the generic type. The parameters can be described as functions of other parameters, so the procedures described by Vitruvius would fit naturally to the capabilities of computers. Moreover, it could even be suggested that the generic description of the form in the computer could be taken as the expression of the Platonic Idea, that is to say, the invisible, abstract model independent from the sensible manifestations. There are some dangers, however, in stretching too far this parallelism between the system of proportions of Vitruvius and computer-based representation techniques. The first kind of danger, is to 'functionalize' what is a purely speculative account of the nature of architectural form, as Vitruvius theory of proportions is. The second one, is to identify architectural form with geometric shape; something that is an inadmissible simplification of architectural form.

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involves mathematical entities (distances, diameters, numbers, ratios) and geometric figures (rectangles, circles, spirals). This invisible envelope, made up of geometric entities, is amenable to mathematical description. But, architectural form, in the context of Vitruvius discussion, means capitals, shafts, triglyphs and metopes. These are architectural forms that have symbolic, geometric and structural meaning -all at once- and as such, they cannot be simply reduced to geometric figure. In general, with regard to the meaning of a system of proportions in architecture, it should be remembered that architectural forms are not created by proportions but rather, that the reverse is true: a system of proportions can only be created after a given formal vocabulary.¹³

Considering proportions only as a method to dimension an existing repertoire of architectural forms would distort the meaning that proportions had for Vitruvius. This is because proportions, for Vitruvius, have to do not only with giving 'measure to the members of a work considered separately, and symmetrical agreement to the proportions of the whole' (i.e. *ordinatio*) but also with the perception of the form of the building (i.e. *eurhythmia*). From the point of view of *ordinatio*, proportions provide a practical method by means of which some measures can be derived from others. From the point of view of form perception, proportions fulfil several roles: first, the module provides the beholder with a measure that he can relate to its own body and, consequently, become aware of the scale of the building; second, proportions, by controlling the relationship between the parts and the whole, are a source of beauty (if we attend to the Greek conception of the *canon*); and third, proportions, considered as the invisible geometric framework that underlies all kind of forms, provides a nexus between natural and architectural forms, between the beauty of the universe and the beauty of the building.

3.4 Abstract forms and models: *symmetria*, *eurhythmia* and *proportio*

In Vitruvius' theory, the primitive wooden house is the model after which architecture is created. The ultimate purpose of the theory of the first model is to show that architecture, like the arts of sculpture and painting, is also an imitative art. The first model proposed by Vitruvius -the wooden construction- accounted for a rough outline or sketch of the later temple. But, Vitruvius neglects the fact that the first house was already endowed with some particularly pleasant proportions, as later theorists like Quatremère de Quincy would have maintained. The issue of the proportions of the first architectural model is raised only with

¹³Also Le Corbusier's Modulor could only make sense after a certain formal language had been devised; a language that, in the case of Le Corbusier, might consist of *brise-soleils*, *fenêtres-à-longueur*, *pilotis*, double-height spaces, and so on. Without the previous existence of this formal repertoire, no building could have been created with the mere application of the system of proportions of the Modulor.

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regard to the architectural orders: i.e. when Vitruvius appeals to the previous theories developed by the Greeks, borrowing from their artistic vocabulary concepts like *symmetria* and *eurhythmia*.¹⁴

Symmetria

In his books, Vitruvius left the word *symmetria* in the original Greek, presumably because, as Pliny had commented, there was no equivalent Latin word for the Greek *symmetria*.¹⁵ In the original Greek, *symmetria* designated "harmony, rhythm, balance, equipoise, stability, good proportions, and evenness of structure."¹⁶ All of these meanings of *symmetria* have been summarized by Pollitt in one expression: 'commensurability of parts.'¹⁷ Latin authors replaced the Greek word *symmetria* with words like '*com-modus, com-moditas, com-modulatio*'; or equivalent words, like '*constantia, convenientia, commensus, proportio*' and '*ratio*.'¹⁸

Vitruvius' conception of *symmetria* conforms to the Greek notion of the term. In Book I, he defines *symmetria* in the following terms: "Symmetry is a proper agreement between the members of the work itself, and relation between the different parts and the whole general scheme, in accordance with a certain part selected as standard" (I,2,4). The influence of Greek thought is even more evident in another passage in Book III, in the chapter dedicated to symmetry, the temples and the human body. Here, the influence of the *canon* of Polyclitus, as well as of Pythagoras theory of numbers, is evident in the passage in which Vitruvius recalls that the ancient Greek artists "derived the fundamental ideas of the measures which are obviously necessary in all works, as the finger, palm, foot, and cubit. These they appportioned so as to form the 'perfect number', called in Greek *teleon*, and as the perfect number the ancients fixed upon ten" (III,1,5). These measures are to be applied also to building, particularly temples, so that "in perfect buildings the different members must be in exact symmetrical relations to the whole general scheme" (III,1,4). For Vitruvius, as for the Greeks, *symmetria* stands for the supreme idea governing the composition of all kinds of form, natural and man-made. Hitherto, it would seem as if Vitruvius was simply borrowing the concept of *symmetria* from the Greeks, and applying it to the particular domain of

¹⁴The concept of an abstract form is not limited to these two terms. Two other terms that Vitruvius lists as fundamental elements of architecture, *ordinatio* (Greek *taxis*) and *dispositio* (Greek *diathesis*), also convey the notion of an abstract form in the sense of 'correct arrangement or disposition of parts'. W. Tatarkiewicz, 'Form in the History of Aesthetics', in *Dictionary of the History of Ideas*, vol. 2, p. 217.

¹⁵"*Non habet Latinum nomen symmetria.*" Pliny, *Natural History*, Book 34, Ch. 65; Loeb edition, vol. 9, 174/76.

¹⁶Bochner, 'Symmetry and Asymmetry', in *Dictionary of the History of Ideas*, vol 4, p. 346.

¹⁷Pollitt, *op. cit.*, p. 257.

¹⁸Silvio Ferri, in the Italian translation of Vitruvius *De architectura libri decem*, Palombi, Roma, 1960, pp. 53-57.

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architecture. However, things become less clear at the moment that Vitruvius mixes the Greek *symmetria* with the Latin *proportio*.

Symmetria and proportio

At the beginning of Book III, Vitruvius gives a new definition of *symmetria* in which he mentions the term *proportio*: "The design of a temple depends on symmetry, the principles of which must be most carefully observed by the architect. They are due to proportion, in Greek *analogia*. Proportion is a correspondence among the measures of the members of an entire work, and of the whole to a certain part selected as standard. From this results the principles of symmetry. Without symmetry and proportion there can be no principles in the design of any temple; that is, if there is no precise relation between its members, as in the case of the those of a well shaped man"(III,1,1).

The interpretation of the correspondence between *symmetria* and *proportio* has puzzled almost every commentator of Vitruvius. To the intrinsic difficulty of the notions that Vitruvius attempted to convey it must be added that the original meaning of the words has shifted in the course of history. The most significant change occurred during the Renaissance, when the original meaning of symmetry as the correspondence of the parts to the whole became subsumed under the word proportion, whereas symmetry began to denote bilateral symmetry, that is to say, 'the correspondence in size, form, and arrangement of parts on opposite sides of a plane, line, or point'. By the middle of the seventeenth century, when Claude Perrault translated Vitruvius into French, the shift of meanings between the two words had been consummated in most languages, so Perrault decided to render *symmetria* with the French 'proportion.'¹⁹

Nevertheless, this identification of *symmetria* with *proportio* has not been universally accepted. More recent interpretations of these two Vitruvian concepts have stressed the specificity of each term. For example, Erwin Panofsky has suggested that "Symmetria[....]is what may be called the aesthetic principle: the reciprocal relation between the members and the consonance between the parts and the whole. Proportio, on the other hand[....]is the technical method by means of which these harmonious relations are, to use Durer's words, 'put into practice'." Moreover, Panofsky argued that "proportio, then, is not something that

¹⁹Perrault's translation of the previous passage, where *symmetria* and *proportio* appeared together, is the following: "L'ordonnance d'un édifice consiste dans la proportion qui doit être soigneusement observée par les architectes. Or, la proportion dépend du rapport que les Grecs appellent *analogie*; et, par rapport, il faut entendre la subordination des mesures au module, dans tout l'ensemble de l'ouvrage, ce par quoi toutes les proportions sont réglées; car jamais un bâtiment ne pourra être bien ordonné s'il n'a cette proportion et ce rapport, et si toutes les parties ne sont, les unes par rapport aux autres, comme le sont celles du corps d'un homme bien formé." C. Perrault, *Vitruve, Les dix livres d'architecture*, 1965, p. 56.

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determines beauty, but only ensures its practical realization.”²⁰ According to Panofsky then, *proportio* should be distinguished from *symmetria* in the sense that the first is not an aesthetic principle while the second is it.²¹ In other words, while *symmetria* was thought of as an intrinsic characteristic of all productions of nature, *proportio* could have meant for Vitruvius the artificial system of ratios which the architect applies to the composition of the building.

With regard to this distinction proposed by Panofsky, we would like to add that *proportio* for Vitruvius could not mean *only* a system of ratios in the sense of a technical method. *Proportio* refers also to the invisible form that acts as a nexus between the natural forms and the architectural forms. In Vitruvius’ system, this nexus between natural and architectural forms is necessary to assert that architecture is an imitative art. Vitruvius thought that architectural form, e.g. the orders, could imitate the natural forms through the mediation of an invisible form susceptible of being described through numerical relations, that is the proportions. It is therefore this abstract form or proportions, what makes it possible to compare a human body with a temple, and to deduce from the human body a system of ratios that can be applied to the composition of the architectural forms.

Symmetria and eurhythmia

As with the pair *symmetria-proportio*, the distinction between *symmetria* and *eurhythmia* in Vitruvius’ theory has also been the object of controversy. In this case, however, most scholars seem to agree on the fact that each term conveys a specific meaning. Thus, it is widely accepted that *symmetria* refers to an intrinsic characteristic of the object, while *eurhythmia* takes into account the participation of the beholder in the perception of the form.²² Such a distinction was already established by the Greeks in the fourth century B.C., as they became increasingly concerned with the subjective aspects of beauty and perception. In a text attributed to ‘Damianos’, it is said that “the architect is to make his work *eurhythmos*, and in

²⁰E. Panofsky, *Meaning in the Visual Arts*, 1955, pp. 96-97, note 19. Incidentally, and with regard to the above discussion on the relationship between proportion and architectural form, a paraphrase of Panofsky’s statement in which ‘symmetry’ is replaced by ‘architectural form’ would be equally valid: ‘proportio, then, is not something that determines *architectural form*, but only ensures its practical realization.’

²¹In this regard Hanno-Walter Kruft, contends that proportion is not an aesthetic concept in Vitruvius because it is not listed as a fundamental principle: “*Obwohl die Proportion die Voraussetzung für ordinatio, eurhythmia und symmetria ist, wird sie anlässlich der Einführung dieser Begriffe nicht definiert; sie ist bei Vitruv kein ästhetischer Grundbegriff. Proportion ist für Vitruv das reine Zahlenverhältnis, nicht die durch die Anwendung entstehende Wirkung.*” H. W. Kruft, *Geschichte der Architekturtheorie*, 1991, p. 28.

²²In this regard, Pollitt contends that “it is clear that to Vitruvius *eurhythmia* in art was a pleasing quality which arose from the alteration and adjustment of concrete forms, and that it was something which had to be understood subjectively rather than demonstrated objectively.” Pollitt, *op. cit.*, p. 174.

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order to produce this appearance he is obliged to make compensations for optical distortion, aiming at *eurhythmia* and equality not in reality but in appearance."²³

In his references to *eurhythmia*, Vitruvius invokes the notion of *symmetria* as well, which has given rise to speculations about the correspondence that might exist between these two terms.²⁴ In Book I, Chapter 2, he describes *eurhythmia* as follows: "Eurythmy is beauty and fitness in the adjustments of the members. This is found when the members of a work are of a height suited to their breadth, of a breadth suited to their length, and, in a word, when they all correspond symmetrically."²⁵ According to this, *eurhythmia* would be the consequence of *symmetria*, meaning that it is a 'pleasant appearance' that results when the parts of the building have been arranged with accordance to *symmetria*.²⁶ In Book VI, Chapter 2, Vitruvius refers again to *eurhythmia* when he addresses the question of the refinement of proportions to compensate for perspective foreshortening. After

²³Pollitt, op. cit., p. 29. The exact name and date of this reference on *eurhythmia* is uncertain. See p. 96, note 44.

²⁴For example, as Werner Oechslin recalls, in the interpretation that the Renaissance humanist Daniele Barbaro made of Vitruvius in 1556, the pair *symmetria-eurhythmia* corresponds to the pair *quantitas-qualitas*. In accordance to this view, Barbaro associated *symmetria* with *ordinatio* and *eurhythmia* with *dispositio*, and concluded that "just as symmetry is the beauty of order, so eurythmy is that of effective combination (*dispositio*)."²⁵ See W. Oechslin, 'Symmetry-Eurythmy or: Is Symmetry Beautiful?', 1985.

²⁵Although the interpretations of the term *eurhythmia* made in the course of history vary, most authors seem to agree on the fact that the term appeals to the subjective perception of form. Regarding the distinction between symmetry and eurythmy, Francesco Milizia, in *Principi di Architettura Civile*, 1781, Parte I, Libri II-III, writes that "*la simmetria è una proporzionata quantità di misura, che le parti debbono avere fra loro, e col tutto*" and that "*la parola euritmia è quasi fuori d'uso, e il suo significato si è impropriamente unito alla voce simmetria, la quale già si è veduto che cosa è.*" Quatremère de Quincy, in his *Encyclopédie Méthodique*, 1825, discussed the differences between symmetry and eurhythmia in the article '*Symétrie*'. He considers the meaning of symmetry to be more clear than the one of eurhythmia. Symmetry is based on the imitation of the proportions of the human body, and therefore, "*la symétrie[...]trouve dans la nature un type positif*", while in the case of eurythmy, "*n'a point, dans la nature, de type aussi positivement applicable à l'ordre qu'elle doit suivre.*" Quatremère rejects Perrault's assumption that symmetry and eurythmy are equivalent terms. He considers the two definitions given by Vitruvius to be "*vague et abstraite.*" For Erwin Panofsky, eurythmy has to do with "the appropriate application of those 'optical refinements' which, by increasing or diminishing the objectively correct dimensions, neutralize the subjective distortions of the work of art." Panofsky, op. cit., pp. 96-97, note 19. Tatarkiewicz thinks that the distinction between symmetry and eurhythmia is the result of the controversy between the objective and subjective interpretation of beauty that originated in Greece. As a result of the debate, symmetry came to determine the objective beauty, while eurhythmia did not require the existence of objectively good proportions providing that it gave rise to a pleasant feeling in the beholder. W. Tatarkiewicz, 'La bellezza: la disputa entre el objetivismo y el subjetivismo', in *Historia de seis ideas*, p. 235. J. J. Pollitt, after examining different interpretations, concludes that *eurhythmia* derives from *rhythmos*, which originally meant 'shape' or 'form', and therefore means "the quality of being well shaped or well formed." Pollitt, op. cit., p. 180. Kruff, assigns the condition of principle to another Vitruvian term, *ordinatio*, instead of assigning this to *symmetria*: "*Die Begriffe ordinatio, eurhythmia und symmetria sind verschiedene Aspekte des gleichen ästhetischen Phänomens, wobei man ordinatio als das Prinzip, symmetria als das Ergebnis und eurhythmia als die Wirkung bezeichnen könnte.*" Kruff, op. cit., p. 26.

²⁶This is the interpretation provided by Pollitt, op. cit., p. 174.

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recommending the modification of proportions, so that the appearance of the building conforms to the ideal form, Vitruvius writes: "Hence, the first thing to settle is the standard of symmetry[...]Then, lay out the ground lines of the length and breadth of the work proposed, and when once we have determined its size, let the construction follow this with due regard to beauty of proportion, so that the beholder may feel no doubt of the eurythmy of its effect." This explicit reference to the beholder, makes it clear that *eurhythmia*, unlike *symmetria*, takes into consideration the subjectivity inherent to the act of perception.²⁷

Abstract forms as models

For the Greek conception of art, the notion of *symmetria* constituted a fundamental tenet of the doctrine that considered art as imitation. As we have seen in the previous chapter, Plato considered *symmetria* as an intermediate form between Ideas and sensible things which was susceptible to become an object of artistic imitation. Vitruvius applied a similar concept in his theory, by considering that *symmetria* was the principle on which the beauty of a building was to be based.

Vitruvius, however, had to confront some issues that were specific to architecture and for which neither the doctrine of imitation of Plato nor the system of proportions of Polyclitus' *canon* could be directly applied. In the case of sculpture, the notion of *symmetria* alone sufficed to demonstrate the imitative character of this art because the object that sculpture imitates, the human body, being a product of nature, is already endowed with *symmetria*. But the object of imitation of architecture is not a sensible form endowed with certain natural beauty, as in the case of the human body. Therefore, *symmetria* alone cannot be enough to justify the imitative nature of architecture. Besides *symmetria* it is necessary other sort of model; a model that comprises the constituent parts of a building and the relationship of the parts to the whole. In Vitruvius' theory, the true model of imitation is, implicitly rather than explicitly, the Greek temple. In effect, the temple gives expression to the abstract notion of *symmetria* in much the same way as the human body might be expression of it. But, as we have already seen, Vitruvius does not attribute to the Greek temple the character of 'natural' creation; he attributes that character to the primitive construction that preceded the temple.

²⁷Pollitt summarizes the Vitruvian notion of *eurhythmia* in the following terms: "It is clear that to Vitruvius *eurhythmia* in art was a pleasing quality which arose from the alteration and adjustment of concrete forms, and that it was something which had to be understood subjectively rather than demonstrated objectively." Pollitt, *op. cit.*, p. 174.

3.5 The Idea and its representation: *dispositio*

There is still another kind of form which is considered by Vitruvius: the forms of representation. In his definition of *dispositio* (in Greek *diathesis*), usually translated as 'arrangement', Vitruvius mentioned that this is composed of three kinds of representation (*species dispositionis*) that the architect uses in the design of a building: these are *ichnographia*, *orthographia* and *scaenographia*, which he considered to be the result of reflection (*cogitatione*) and invention (*inventione*). Vitruvius' definition of *dispositio* is the following: "Arrangement includes the putting of things in their proper places and the elegance of effect which is due to adjustments appropriate to the character of the work. Its forms of expression (in Greek *ideai*), are these: groundplan, elevation, and perspective. A groundplan is made by the proper successive use of compasses and rule, through which we get outlines for the plane surfaces of buildings. An elevation is a picture of the front of a building, set upright and properly drawn in the proportions of the contemplated work. Perspective is the method of sketching a front with the sides withdrawing in to the background, the lines all meeting in the centre of a circle. All three come from reflection and invention. Reflection is careful and laborious thought, and watchful attention directed to the agreeable effect of one's plan. Invention, on the other hand, is the solving of intricate problems and the discovery of new principles by means of brilliancy and versatility. These are the departments belonging under Arrangement" (I,2,2).

The exemplars of Vitruvius books that had been preserved until the Renaissance, contained no illustrations, so these three kinds of representation have been subjected to a multiplicity of interpretations. Maria Teresa Bartoli has made a comparative study of the translations of *dispositio* as rendered by Cesariano, Barbaro, Perrault and Galiani, among others.²⁸ As might be expected,

²⁸In a comparative study of different translations of the Vitruvian *dispositio*, Maria Teresa Bartoli has emphasized the fact that each author projected onto Vitruvius the concept of representation that was prevalent in his own time. M. T. Bartoli, 'Orthographia, Ichnographia, Scaenographia', in *Studi e documenti di Architettura*, 1978, pp. 197-208. The first Italian translation of Vitruvius made by Cesariano in 1521, understands the three modes of representations as three stages in the process of constructing the building. According to this, he interprets the plan as the layout of the figure on the site by means of posts and lines. A few decades later, the Renaissance humanist Barbaro thinks that conception and representation are two distinctive tasks, and his interpretation of Vitruvius *dispositio* reflects just this: "Nel disporre e collocare le parti lo Architetto forma nel suo pensiero, e poi disegna tre maniere, ovvero idee delle opere...." D. Barbaro, *I dieci libri dell'Architettura di M. Vitruvio tradotti e comentati da Monsig. Daniel Barbaro*, 1584, p. 30; quoted in Bartoli, op. cit., p. 201. Even more eloquent is that, in accordance with the Renaissance tenet that architecture is represented by means of *pianta*, *levato* and *profilo*, Barbaro reads the Vitruvian *scaenographia* as *sciografia* or profile. Perrault -Bartoli claims- considers that the three forms of representation have an instrumental value: they make the idea visible. Bartoli, op. cit., p. 203. In his translation of Vitruvius to French, Perrault wrote that "la disposition est l'arrangement convenable de toutes les parties, de manière qu'elles soient placées selon la qualité de chacune; les représentations ou, pour parler comme les Grecs, les idées de la disposition se font de trois manières, savoir: par l'ichnographie, l'orthographie et la scénographie." Perrault, op. cit., p. 24. The scientific spirit of

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each interpretation casts more light on the way of thinking current at time of translation than on the original meaning of Vitruvius' definition. At the core of the different interpretations that have been made, lies the question of the relationship between conception and representation. Some commentators have understood the three representations of Vitruvius as means to visualize an abstract idea which the architect would have had first in the mind. For example, Bartoli appeals to the reference that Vitruvius makes to *cogitatione* and *inventione*, to contend that the three modes of representation should be interpreted as ways of *thinking* about the building and not only of *depicting* it.

A traditional difficulty in the interpretation of the Vitruvian *ichnographia*, *orthographia* and *scaenographia*, stems from the fact that they are thought of as 'projections' of three dimensional objects onto a plane, according to our modern working methods. But as Peter J. Booker has correctly remarked, the idea of 'projection' is a relatively modern one: "Plans and elevations are indeed very old in principle. We must not, however, look at these in terms of our present knowledge otherwise we get a peculiar distorted picture. Seeing history backwards is rather different from following it forwards. Far too many persons equate plans and elevations with orthographic projection, whereas it seems unlikely that the ancients thought of their plans as projections at all"²⁹, even though "the idea of plans and elevations being not just true shape drawings, but projections onto planes, was finally systematized and promulgated by Gaspard Monge in 1795."³⁰

Taking into consideration Booker's comments, a less prejudiced interpretation of the Vitruvian modes of representation would attend to the comparison between the abstract form of a building as depicted on a two-dimensional surface and its sensible form as projected in the eye. In other words, what we are suggesting is to consider the three Vitruvian forms of representation as a mixture between sensible perception and abstract representation. In this light, every representation mentioned by Vitruvius has a different level of abstraction, depending on the greater or lesser distance between the abstract form and the sensible form. The most abstract representation is the ground plan, which for Vitruvius probably meant the footprint of a building on the site where is going to be erected. This ground plan cannot be observed through the senses with the exception of those situations in which the footprint of a building can be seen from a high elevation.

Perrault is better revealed in his translation of *cogitatione* and *inventione*: "*La méditation est l'effort que l'esprit fait, invitée par le plaisir qu'il a de réussir dans la recherche de quelque chose; l'invention est l'effet de cet effort d'esprit qui donne une explication nouvelle aux choses les plus obscures.*" Ibid. Finally, the interpretation of Galiani is, according to Bartoli, similar to Perrault in so far as he thinks that the representations are used to visualize the idea: "*quelle rappresentazioni, quelle figure, disegni, o per dir meglio caratteri, dei quali fanno uso gli Architetti per far note le loro idee.*" B. Galiani, *Dell' Architettura Libri Dieci di M. Vitruvio Pollione tradotti e commentati dal Marchese Berardo Galiani*, 1854, p. 154; quoted in Bartoli, p. 203.

²⁹P. J. Booker, *A History of Engineering Drawing*, 1963, p. 38.

³⁰Ibid., p. 47.

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Second in level of abstraction is the elevation. An elevation conforms better than the plan to the image of the building perceived by the eye under normal conditions. The third mode of representation mentioned by Vitruvius -the perspective- is the less abstract: it is the one that better conforms to what is seen by the eye, i.e. the retinal image. From the three of them, the plan is the one that better approximates the true shape of the building, that is, the idea of the building.³¹ At the other extreme, the *scaenographia*, understood in the sense of a *perspectiva naturalis*, would be the less adequate form of representing the idea of the building.³²

In our time, we are more predisposed to see in the Vitruvian *dispositio* an indication of the identity between conception and representation, as Bartoli has claimed. We have become increasingly aware of the fact that thinking and representing are two manifestations of the same phenomenon and that they cannot be separated. However, as with any other interpretation of Vitruvius made in past times, it would probably not be correct to assume that Vitruvius was advocating a similar connection between conception and representation in line with contemporary preoccupations. By assuming that, we would be acting as previous commentators of Vitruvius who projected onto Vitruvius' text their own preconceptions. In our view, it seems more accordant with the spirit of Vitruvius' theory to understand *dispositio* as a mixture between abstract and sensible representations, rather than to attribute to Vitruvius an awareness of the intellectual mechanisms of creation which is only peculiar to our times.

³¹That the plan contains the essence of the design is something which has been many times acknowledged. These two testimonies from Wright and Le Corbusier might suffice to make the point. Wright spoke of the plan in these terms: "Scientifically, artistically to foresee all is 'to plan'. There is more beauty in a fine ground plan than in almost any of its ultimate consequences. In itself it will have the rhythms, masses and proportions of a good decoration if it is the organic plan for an organic building with individual style -consistent with materials. All is there seen -purpose, materials, method, character, style. The plan? The prophetic soul of the building -a building that can live only because of the prophecy that is the plan." F. LL. Wright, *In the Cause of Architecture. Essays by F. LL. Wright for Architectural Record, 1908-1952*. Also Le Corbusier praised the plan: "*Le plan est le générateur[...]Le plan nécessite la plus active imagination. Il nécessite aussi la plus sévère discipline. Le plan est la détermination du tout; il est le moment décisif. Un plan n'est pas joli à dessiner comme le visage d'une madone; c'est une austère abstraction; ce n'est qu'une algébrisation aride au regard. Le travail du mathématicien rest tout de même un des plus hautes activités de l'esprit humain.*" Le Corbusier, *Vers une architecture*, 1923, pp. 35-36.

³²In this regard, Pollitt has suggested that "when Vitruvius says that 'the lines correspond by a natural law' to 'the sight of the eyes and the extension of the rays', he means that drawn lines converging on a central vanishing point in a painting are analogous to the rays of vision which converge at the apex of the Euclidean visual cone." Pollitt, *op. cit.* p. 241.

3.6 Conclusions

Vitruvius' theory of the origins of architecture can be seen as part of a way of thinking which considered that human creations were first imitations of natural phenomena before they became artificial or intellectual creations. It is the same kind of explanation as that of the origin of painting in which Diboutades drew the shadow of her departing lover or to the one that considered that language originated first as onomatopoeia, before it became an abstract system of signs. Even though these sorts of interpretation might contain an element of truth, we no longer take them as valid explanations of the origins of human creations. By the same token, it cannot be contended that with this theory of the imitation of the wood construction into the Greek temple Vitruvius has actually *explained* the origins of architectural form. Furthermore, we would argue that to attempt a rational explanation of the origins of the Greek temple might not even be a reasonable goal to pursue. At his point, Noam Chomsky's distinction between 'problems' and 'mysteries' comes to mind. Concerning the study of language, Chomsky contends that "we can distinguish in principle between 'problems', which lie within these limits and can be approached by human science with some hope of success, and what we might call 'mysteries', questions that simply lie beyond the reach of our minds, structured and organized as they are, either absolutely beyond those limits or at so far a remove from anything that we can comprehend with requisite facility that they will never be incorporated within explanatory theories intelligible to humans." We would argue that the question of the origins of the Greek temple, as the question of the origins of language, falls within what Chomsky calls 'mysteries': we simply cannot explain how or why they came to existence.

If the inquiry into the origins of architecture has any meaning for us, it is because it contributes to a better understanding of the nature of architectural form. From our study of Vitruvius' books, we have derived these three natures of architectural form: structural, sculptural and geometric. We have argued that these three kinds of form should not be seen as stages in a historical development but as potentialities which have been present in all architectural forms, from the very beginning.

The first architectural model, the primitive form or Type, was the embodiment of these three natures of architectural form. It has been our contention, that the first model was not the wooden construction that Vitruvius imagined but the Greek temple itself. In effect, the theory of Vitruvius is based on the implicit assumption that architecture began with the Greek temple. Starting from it, Vitruvius proceeded backwards to find other forms that might have served as a model of the temple: the wooden structural skeleton of the primitive house, the natural forms of human bodies and plants. Neither of these forms, considered separately, could have served as a proper model for architecture. They did not

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have the properties of being simultaneously structural, sculptural and geometric. In the context of the history of Western architecture, the Greek temple was the first to give expression to the three natures of architectural form.

Apart from the question of the origins, we have addressed other issues regarding architectural form, present in Vitruvius' texts, which re-emerge in subsequent architectural theory. For example, the issue of the classification of temples, was later commonplace in the architectural treatises, from the Renaissance on; the different kinds of *dispositio*, plan, elevation and perspective, that Renaissance theorists would later redefine; the question of perception of architectural form -*eurhythmia*- which would become the driving force in the transformation of architectural form from the seventeenth century onwards. Each one of these issues -structural form, classification, representation, perception- will reappear in the course of the discussion on the meaning of Type in architecture in the subsequent chapters.

Chapter 4

Renaissance *disegno*: Idea and Representation

4.1 Introduction

In the Renaissance, the notion of Idea acquired its own peculiar connotations that distinguished it from the Platonic Idea. According to Panofsky, the Renaissance Idea was an idea in the mind, as opposed to the transcendent Platonic essence, that the artist derived from the direct confrontation with nature.

It is in the Renaissance when design, understood as the individual creation of the artist, emerges for the first time in Western culture. Drawings and models acquired a meaning they did not have before: they became the conceptual tools with which the artist could conceive his work. The notion of *disegno* epitomizes a distinctive aspect of the Renaissance Idea: the identity of conception and representation. The sketches of Leonardo are the best expression of this aspect of Renaissance *disegno*. His sketches demonstrate the need that the artist has to set up some limits to the artistic exploration; limits that can be identified with the idea or theme of the design. Similarly, Palladio's villas are the expression of a creative process based on the creation of variations on a theme. Graphic representation was important not only as a conceptual tool but as a systematizing tool. Serlio and particularly Palladio used drawing to bring across, graphically, some fundamental principles of architecture.

An awareness of the perceptual and symbolic meaning of architectural form characterizes Renaissance architecture. The Renaissance architect was already concerned about the greater or lesser ease with which a beholder could grasp the form of the buildings he designed. At the same time, architects were willing to attribute a symbolic meaning to buildings, which they considered to be the

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expression of the inherent harmony of the universe and, in some cases, religious symbols.

4.2 The Renaissance conception of Idea

4.2.1 Idea and nature

It has been contended that the revival of Plato and the Neoplatonists during fifteenth century Italy was one of the driving forces of Renaissance culture. According to this view, Platonism would have affected every intellectual creation, including architecture. In his *Architectural Principles in the Age of Humanism*, Rudolf Wittkower argued in favor of the influence of Platonism in the architecture of the Renaissance, particularly, with regard to the central plan churches. Wittkower contended that "the Renaissance conception of the perfect church is rooted in Plato's cosmology"¹, and to support his thesis, he referred to a comment made by Palladio in the preface of Book IV of the *Quattro Libri*, where the Renaissance architect affirmed that "we cannot doubt, that the little temples we make, ought to resemble this very great one, which, by His immense goodness, was perfectly completed with one word of His."² This 'very great one', that Palladio was referring to, could be interpreted as the Platonic Idea in its Christianized form. According to Wittkower, Palladio's predilection for round forms could be traced back to the passages of the *Timaeus* in which Plato had assigned to the universe the form of a sphere. Wittkower concluded that the forms of the centralized churches fulfilled a symbolic meaning in the Renaissance: they expressed the link between man's microcosm and God's macrocosm. In other words, central plan churches were, according to Wittkower, "the man-made echo or image of God's universe."³

This influence of Platonism in Renaissance culture, however, is not universally shared. Erwin Panofsky had argued that Platonism or Neoplatonism did not have any influence in the creation of fifteenth century artistic theory. In his book *Idea*, Panofsky wrote that "the discipline of art theory, newly arisen in the fifteenth century, was at first almost completely independent of the revival of Neoplatonic philosophy taking place at the same time and within the same Florentine cultural circle...[Platonic revival] could not be of any essential value for a practical and rationalistically oriented theory for art such as the Early Renaissance required and devised."⁴

¹R. Wittkower, *Architectural Principles in the Age of Humanism*, 1973, p. 32.

²Ibid.

³Wittkower, op. cit., p. 32.

⁴E. Panofsky, *Idea. A Concept in Art Theory*, 1968, pp. 52-53.

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In the same book, Panofsky vindicated the existence of a new concept of Idea that is peculiar to Renaissance culture; an Idea which is neither the Platonic eternal essence nor the medieval concept of Idea in the mind of the artist.⁵ According to Panofsky, this Renaissance Idea aroused from the direct confrontation between individual mind and nature. It was an idea that did not exist a priori, as the Platonic Idea, but originated in experience: "The Idea not just presupposes but actually originates in experience; not only can the idea be readily combined with observation of reality, it is observation of reality, only clarified and made more universally valid by the mental act of choosing the individual from the many and then combining the individual choices into a new whole."⁶ Then, following Panofsky, the Renaissance Idea would not be strictly Platonic but also Aristotelian.⁷

4.2.2 Nature and art

The notion that art is basically imitation of nature constitutes one of the basic tenets of Renaissance artistic theory. In *De re aedificatoria*, Leon Battista Alberti had contended that art should imitate nature and that in constructing a vault "we should imitate Nature throughout, that is, bind together the bones and interweave flesh with nerves running along every possible section: in length, breadth, and depth, and also obliquely across. When laying the stones to the vault, we should, in my opinion copy the ingenuity of Nature" (III, 14). Similar views, defending the idea that art was imitation of the procedures of nature, had been expressed before by Democritus and Vitruvius, but Alberti's notion of imitation was not exactly the same as the one held by those ancient authors. To imitate nature means for Alberti to discover the natural laws and in a second step, to apply them in the artistic production. Thus, after acknowledging that nature, being the "perfect generator of forms" constituted the model for "our ancestors", Alberti goes on contending that the ancients "searched out the rules that she [Nature] employed in producing things, and translated them into methods of building" (IX,5). In Alberti's interpretation of the doctrine of imitation, there is an awareness of the intellectual

⁵It is significant that while Wittkower stresses the influence of Platonism in the Renaissance, Panofsky minimizes its influence, particularly in the early Renaissance. Panofsky maintains that "early Renaissance art theory in Italy was hardly affected by revival of Neoplatonism. Art theorists were able to gain access to Euclid, Vitruvius and Alhazen, on the one side, and to Quintilian and Cicero, on the other; but they could not gain access to Plotinus or Plato, whom Alberti still referred to only as a painter." Panofsky, *op. cit.*, p. 55.

⁶Panofsky, *op. cit.*, p. 62. Panofsky has identified two distinct meanings of 'idea' in the sixteenth century: 1. as the mental image of a beauty that surpasses nature 2. as an image conceived in the artist's mind, like *pensiero* and *concetto*. The first meaning was adopted by Alberti and Raphael, the second by Vasari. Panofsky acknowledges, nevertheless, that both meanings were not always clearly separated. Panofsky, *op. cit.*, p. 66.

⁷Wittkower draws the attention on a commentary by Daniele Barbaro in which the Renaissance humanist says that art is born out of experience (*'nasce ogni arte da isperienza'*); a statement that, according to Wittkower, is a repetition of a maxim given by Aristotle in the *Metaphysics* 981a. See Wittkower, *op. cit.*, p. 65.

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role of the artist which was absent in the theories of the ancients. In effect, he is assuming that men, by means of their intellectual capacities, were able to abstract from nature some rules that they applied later to the artistic productions.

Alberti considered ancient buildings as facts upon which artistic or scientific theories could be formulated. Alberti's own experience seems to confirm this belief: "No building of the ancients that had attracted praise, wherever it might be, but I immediately examined it carefully, to see what I could learn from it. Therefore I never stopped exploring, considering, and measuring everything, and comparing the information through line drawings, until I had grasped and understood fully what each had to contribute in terms of ingenuity or skill" (VI, 1). Through the direct study of Roman buildings, Alberti could arrive at the 'idea' that Panofsky refers to: an idea that stands for some universal laws of architecture.⁸

Therefore, ancient buildings were for Alberti the same as natural facts were for the scientist: they constituted the basic material from which the architect and the scientist, respectively, derived their knowledge.⁹ Furthermore, the concept of nature held by Alberti entailed not only the productions of nature but also the artistic works of the ancients. This equation of ancient buildings with nature allows Alberti to maintain that architecture is an imitative art. He believed that by imitating the orders, the modern architect was indirectly imitating nature, since the orders had been created by the ancients "following Nature's own example" (IX,5). This is the theoretical justification by which Alberti is able to raise the Greco-Roman formal vocabulary to the level of a fundamental principle of architecture.¹⁰

⁸This idea, that the artist derives from nature (a nature that for the Renaissance theorist includes the works of the ancients), is at the core of the creation of new buildings, like Bramante's *tempietto*. Incidentally, John Summerson, commenting on Bramante's *tempietto* asks: "Now, is this a literal reconstruction of a Roman temple or is it not? Clearly not. It is an extension of an idea borrowed from the Romans. The plinth and the vertical penetration of the central cylinder up and through to a hemispherical dome are Bramante's inventions and highly successful ones to judge by the number of times they have been imitated." J. Summerson, *The Classical Language of Architecture*, 1980, p. 41.

⁹In the Renaissance, scientific spirit co-existed with religious mysticism. As Wittkower has stressed: "the conviction that architecture is a science, and that each part of a building, inside as well as outside, has to be integrated into one and the same system of mathematical ratios, may be called the basic axiom of Renaissance architects. We have already seen that the architect is by no means free to apply to a building a system of ratios of his own choosing, that the ratios have to comply with conceptions of a higher order and that a building should mirror the proportions of the human body; a demand which became universally accepted on Vitruvius' authority. As man is the image of God and the proportions of his body are produced by divine will, so the proportions in architecture have to embrace and express the cosmic order. But what are the laws of this cosmic order, what are the mathematical ratios that determine the harmony in macrocosm and microcosm? They had been revealed by Pythagoras and Plato, whose ideas in this field had always remained alive but gained new prominence from the late fifteenth century onwards." Wittkower, *op.cit.*, p. 104. Then Wittkower relates Renaissance science with the mysticism of the Pythagorean proportions. But, for Alberti science had to do mainly with the direct study of natural phenomena.

¹⁰John Summerson has criticized this aspect of Alberti's theory. Summerson sees as a contradiction the fact that, on the one hand, Alberti strives to establish some fundamental principles for

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This notion of Idea, understood as a concept that the artist derives from a reality that embraces both the natural world as well as artistic creations, is also implicit in the definition of *disegno* given later by Vasari: “Perchè il disegno, padre delle tre arti nostre....cava di molte cose un giudizio universale, simile a una forma ovvero idea di tutte le cose della natura, la quale è singolarissima nelle sue misure-di qui è, che non solo nei corpi umani e degli animali, ma nelle piante ancora e nelle fabbriche e sculture e pitture conosce la proporzione, che ha il tutto con le parti e che hanno le parti infra loro e col tutto insieme; e perchè da questa cognizione nasce un certo giudizio, che si forma nella mente quella tal cosa, che poi espressa con le mani si chiama disegno, wi può conchiudere, che esse disegno altro non sia, che una apparente espressione e dichiarazione del concetto, che si ha nell'animo, e di quello, che altri si è nella mente imaginato e fabbricato nell'idea.”¹¹ Thus, according to Vasari, *disegno* is potentially present in human and animal bodies, as well in buildings, sculptures and paintings. He is assuming, therefore, that both the productions of nature as well as works of art are constituent parts of the same reality.

4.2.3 Idea and beauty

In the previous chapter, we have seen that with the term *eurhythmia* Vitruvius acknowledged the participation of the beholder in the perception of form. Apart from his reference to *eurhythmia*, Vitruvius did not ascribe much importance to the role of the beholder in the aesthetic experience. The main concept of his critical vocabulary, *symmetria*, referred to a quality that impregnates all creations of nature and, as such, independent from the beholder's perception.

When we come to the Renaissance, particularly to Alberti's *De re aedificatoria*, references to the participation of the beholder in the perception of beauty (i.e. form) become more abundant and explicit. In Book IX, Alberti writes: “When you make judgements on beauty, you do not follow mere fancy, but the workings of a reasoning faculty that is inborn in the mind”(IX,5). Alberti deliberately avoided to

architecture as a discipline while, on the other hand, he assigns the highest value to the orders. By doing so, Summerson contends, Alberti identified orders with absolute principles: “Now, these orders -these dialects, forms of usage- are liable to cut mercilessly across any theoretical consideration of classical architecture as an affair of absolutes. Either they must be accepted as language is accepted by a poet, clothed with their own historic colours, or they must be utterly banished from any theory claiming to be fundamental. But Alberti in his philosophy, although he is straining all the time at fundamentals, does neither the one nor the other. Or, rather, he accepts the orders for the brief and insufficient reason that, ‘from an imitation of Nature’ the ancients ‘invented three manners of adorning a building and gave them names drawn from their first inventors’. In other words, the orders are sanctioned by Nature, upon the ultimate principle (in Alberti's scheme) of Congruity, though the credit for their discovery must lie with the architects of the classical world.” J. Summerson, *Heavenly Mansions, and other Essays in Architecture*, 1963, pp. 39-40.

¹¹G. Vasari, *Vite de' più eccellenti architetti, pittori et scultori italiani*, 1568. Quoted in Panofsky, *Idea*, p. 61.

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use the Vitruvian *symmetria* and *eurhythmia*, introducing instead a new concept of his own: *concinnitas*. The reasons for not adopting Vitruvius' terms might have been either the difficulty to understand what Vitruvius meant with them¹² or, alternatively, the need to introduce new terms to express concepts which were peculiar to Renaissance thought.¹³ The second possibility seems more plausible, since Alberti used *concinnitas* to refer to the participation of the mind in the perception of form and beauty, an issue to which Vitruvius had not conceded a particular importance.¹⁴

It has been sometimes assumed that the Albertian *concinnitas* corresponds to some Vitruvian terms, like *symmetria* or *proportio*.¹⁵ There is, however, a fundamental difference between *concinnitas* and other Vitruvian categories; a difference that stem from the importance that Alberti assigns to the beholder in

¹²There seems to have been a direct correspondance between the Greek *eurhythmia* and the Latin *concinnitas*. Pollitt contends, that the Latin *concinnus* (well-adjusted, skillfully put together) served as translation of the Greek *eurhythmos*. J. J. Pollitt, *The Ancient View of Greek Art*, 1974, p. 334.

¹³At the beginning of the sixth book, Alberti complains about the lack of intelligibility of Vitruvius' work: "Vitruvius, an author of unquestioned experience, though one whose writings have been so corrupted by time that there are many omissions and many shortcomings. What he handed down was in any case not refined, and his speech such that the Latins might think that he wanted to appear a Greek, while the Greeks would think that he babbled Latin. However, his very text is evidence that he wrote neither Latin nor Greek, so that as far as we are concerned he might just as well not have written at all, rather than write something that we cannot understand"(VI, 1).

¹⁴Some contemporary scholars have emphasized the role of perception in Alberti's theory, Cesare Cancro writes that "*facendo prima un'operazione prettamente filosofica, un po' pitagorica e un po' platonica, scorporire, cioè, nella propria mente quei rapporti eterni che regolano il giudizio e vedrà subito che la 'ratio animi' altro non è che la 'concinnitas'.*" C. Cancro, *Filosofia ed Architettura in Leon Battista Alberti*, 1978, p. 183. Hans-Karl Lücke also contends that the difference between Vitruvius and Alberti lies in the interest of the second for the perception of beauty: "*La regola che tiene insieme le cose della natura nella loro perfezione può far pensare ad Alberti a quella ratio, di cui parla Vitruvio, che si applica alle singole arti ed è contenuta di volta in volta ne suoi oggetti: la ratio symmetriarum. La differenza fondamentale dei punti di vista consiste nel fatto che Alberti riconosce nella concinnitas una facoltà di giudizio innata nell'animus.*" H. K. Lücke, 'Alberti, Vitruvio e Cicerone', 1994, p. 83. Later, he insists on a similar point: "*L'interesse teorico di Alberti non considera l'edificio come è di per sé, ma come è per noi, come esso appare nell'atto percettivo. Sotto l'impulso della riflessione estetica si frantuma l'immagine dell'edificio perfetto che Vitruvio -in maniera così incomprensibile per Alberti- rappresenta nel concetto di eurhythmia.*" Ibid., p. 89. Similarly, Robert Tavernor has also defended the uniqueness of the Albertian *concinnitas* with regard to Vitruvian *symmetria*. See R. Tavernor, 'Concinnitas, of la formulazione della bellezza', 1994, pp. 300-315.

¹⁵Wittkower, for example, has suggested a correspondance between the Vitruvian *proportio* and Alberti's *concinnitas*. In his attempt to demonstrate the strong connection between the classical Antiquity and the Renaissance, Wittkower might have underestimated the differences that exist between Vitruvius and Alberti. Wittkower writes that "beauty is thus, according to Alberti, a harmony inherent in the building, a harmony which, as he subsequently explains, does not result from personal fancy, but from objective reasoning. Its chief characteristic is the classical idea of maintaining a uniform system of proportion throughout all parts of a building. And the key to correct proportion is Pythagoras' system of musical harmony." Wittkower, op. cit., p. 41. Then, he contends that the Vitruvian *proportio* is "covered by Alberti's central conception 'concinnitas'." Ibid., p. 41, note 5.

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the perception of beauty.¹⁶ Vitruvius thinks that all productions of nature are beautiful because they are impregnated with *symmetria*. Like Vitruvius, Alberti also believes that beauty in art can only be achieved by imitating nature. However, Alberti does not think, as Vitruvius does, that everything that nature produces is beautiful. In Book VII, Chapter 5, Alberti writes: "Let us investigate, then, why some bodies that Nature produces may be called beautiful, others less beautiful, and even ugly." For Alberti, therefore, beauty is not only a quality that nature has, but a quality that man learns, with 'experience and practice',¹⁷ to recognize in nature.

This faculty to recognize beauty in nature and art is one of the meanings that Alberti associates to his term *concinntitas*. But, Alberti's multiple references to the term in *De re aedificatoria* do not provide a unique and consistent idea of it.¹⁸ He refers to *concinntitas* as, 1. an intrinsic quality in objects: "These parts are imbued with a refined variety, in accordance with the demands of proportion and *concinntitas*" (II,1) 2. the capacity of the mind to recognize beauty: "That is when the mind is reached by way of sight or sound or any other means, *concinntitas* is instantly recognized" (IX,5); and "that natural sense, innate in the spirit, which allows us, as we have mentioned, to detect *concinntitas*" (IX,7) 3. a power of Nature: "Everything that Nature produces is regulated by the law of *concinntitas*" (IX,5) 4. the cause of beauty: "Beauty is a form of sympathy and consonance of the parts within a body, according to definite number, outline and position, as dictated by *concinntitas*, the absolute and fundamental rule in Nature" (IX,5) and 5. Beauty

¹⁶Emil Kaufmann has expressed a similar thought, as he contended that what distinguishes the architecture of the Renaissance from Vitruvius is that in the Renaissance the qualitative aspects were more important, while for Vitruvius the quantitative aspects were more important: "I want to point out what I consider to be the fundamental difference between the ancient theories as summarized by Vitruvius and those of the Renaissance and the Baroque; or between the compositional ideal of Greco-Roman architecture and that of the centuries following the Middle Ages. Vitruvius' aesthetic categories are obscured chiefly because he himself did not reach a clearly defined concept. However, one thing is certain: all his categories had a quantitative significance. Proportionality, or perfect numerical relations between the parts, was of foremost importance to him. The ideal of quantitative beauty appears in *ordinatio* as well as in *symmetria* and *eurythmia*." E. Kaufmann, *Architecture in the Age of Reason*, 1968, pp. 78-79.

¹⁷As Panofsky has put it, "Alberti believed that the mental ability to perceive beauty could be attained only by experience and practice." Panofsky, op. cit., p. 59.

¹⁸As with the other Vitruvian categories, Alberti's *concinntitas* has also given rise to numerous interpretations and, accordingly, it has been translated in a variety of ways. In the *Cours d'architecture* of François Blondel, 1683, the term *concinntatem* is described as that '*je ne sais quoi*' associated to '*harmonie*', '*symmetrie*', '*grace*', '*gentillesse*' and '*correspondence*' (Livre V, Chap.II, p. 731). Contemporary scholars, like Tatariewicz, have translated *concinntitas* as harmony. W. Tatariewicz, 'La belleza: la disputa entre el objetivismo y el subjetivismo,' en *Historia de seis ideas*, p. 240. Wittkower considers it to be the equivalent to the Vitruvian proportion. See Wittkower, op. cit., p. 41, note 5. John Summerson translates it as Congruity. Summerson, *Heavenly Mansions, and other Essays in Architecture*, pp. 39-40. In the English translation of Alberti's books, by Rykwert and alters, *concinntitas* is translated as harmony and congruency. Robert Tavernor thinks that *concinntitas* brought together the Vitruvian categories *symmetria* and *dispositio*. R. Tavernor, *Palladio and Palladianism*, 1991, p. 38.

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itself: "Beauty is that reasoned harmony (*concinnitas*) of all the parts within a body, so that nothing may be added, taken away, or altered, but for the worse"(VI,2).

In spite of the repeated references to the participation of the subject in the perception of form, it cannot be concluded that Alberti was advocating a subjectivist conception of beauty, something that would only happen later in the seventeenth and eighteenth centuries.¹⁹ His conception of beauty (*pulchritudo*) is mostly objectivist. Thus, he writes that "I believe, that beauty is some inherent property, to be found suffused all through the body of that which may be called beautiful"(VI,2). Moreover, he explicitly rules out any subjectivism in the appreciation of beauty: "Yet some would disagree who maintain that beauty, and indeed every aspect of building, is judged by relative and variable criteria, and that the forms of buildings should vary according to individual taste and must not be bound by any rules of art. A common fault, this, among the ignorant- to deny the existence of anything they do not understand"(VI,2). In Alberti's theory, therefore, the belief in the existence of some universal rules of art coexist with the admittance of the participation of the individual subject in the discovery of those rules; objectivism and subjectivism were not seen yet as mutually exclusive.²⁰

4.2.4 Idea and mind

An incipient awareness of the sphere of the mind characterizes all cultural manifestations of the Renaissance. In the prologue of *De re aedificatoria*, Alberti appeals to the comparison between carpenter and architect to proclaim the superiority of intellectual work over manual work: "The carpenter is but an instrument in the hands of the architect." Immediately after, Alberti gives his definition of the modern architect: "I will call an architect one who, with a sure and marvellous reason and rule, knows first how to divide things with his mind and intelligence, secondly how rightly to put together in the carrying out of the work all those materials which, by the movements of weights and the conjoining and heaping up of bodies, may serve successfully and with dignity the needs of man. An in the carrying out of this task he will have need of the best and most excellent knowledge."

¹⁹Cesare Cancro suggests that in Alberti's theory there is an identification between two kinds of form, the architectural form and the transcendental form: "*Ora, se forma architetonica e forma trascendentale coincidono, se struttura dell'edificio e 'ratio animi' si identificano, ecco che l'architettura albertiana si è fatta filosofia, ecco che estetica ed etica, estetica e conoscenza, coincidono perfettamente.*" Cancro, op. cit., p. 184. According to this interpretation, we could see in Alberti's theory an incipient concern for the epistemological meaning of form; a concern that would become more urgent in the subsequent centuries.

²⁰Panofsky contends that the unique aspect of Alberti's conception of beauty is that "it renounces any metaphysical explanation of the beautiful [loosening] for the first time the ancient bond between the *pulchrum* and the *bonum*." Instead of the metaphysical explanations, Alberti would place the subjective and psychological issues at the core of his theory. Panofsky, op. cit., p. 55.

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After Alberti, architecture is an intellectual work carried out by the architect that precedes the construction of the physical object. In the first chapter of *De re aedificatoria*, Alberti invokes again the duality abstract-physical as he declares that "the whole matter of building is composed of lineaments (*lineamenta*) and structure (*structura*)." He contends that the intellectual work of the architect has to do with *lineamenta*: "All the intent and purpose of lineaments lies in finding the correct, infallible way of joining and fitting together those lines and angles which define and enclose the surfaces of the building." Moreover, he propounds a strict separation of the abstract and physical realms when he asserts that "lineaments have anything to do with material." Lastly, Alberti appeals explicitly to the mind, and writes that "it is quite possible to project whole forms in the mind without any recourse to the material," and concludes with the following words: "Let lineaments be the precise and correct outline, conceived in the mind, made up of lines and angles, and perfected in the learned intellect and imagination"(I,1).

It has been suggested that Alberti's division between *lineamenta* and *structura* parallels the Vitruvian distinction between *rationatio* and *opus*. Even though both pair of terms, the one from Vitruvius and the one from Alberti, imply a separation between abstract and physical realms there is an important difference between both: Alberti's *lineamenta* appeals explicitly to the human mind while Vitruvius *rationatio* refers to a generic 'theory of architecture'.²¹ It is precisely this awareness of the mind -as already mentioned with regard to Alberti's conception of beauty- which separates Alberti from Vitruvius, regardless the parallelisms that can be drawn between their respective treatises.²²

The emphasis that Alberti places on the intellectual realm, both in the perception of beauty (i.e. form) and in the conception of buildings, does not imply that in the Renaissance a split between the sensible and intellectual spheres had already been consummated. In the culture of the Renaissance, the incipient awareness of an artificial world made by concepts as well as artifacts was not yet incompatible with the a unifying view of nature prevalent in the time. Both

²¹With regard to this parallelism between Vitruvius and Alberti, Rykwert and others have written: "The fundamental distinction that Alberti draws between *lineamenta* and *structura* in book I -of design and construction- may be compared to that which Vitruvius draws between *rationatio* and *opus*, in I. I. 15. As Vitruvius writes: 'The arts are each composed of two things, the actual work and the theory of it. One of these, the doing of the work, is proper to men trained in the individual subject, while the other, the theory, is common to all scholars...' For Alberti and the art of building, design necessarily precedes construction, yet *lineamenta* and *structura* are interdependent." J. Rykwert, N. Leach, R. Tavernor, *On the Art of Building in Ten Books*, p. 422.

²²The following commentary made by Daniele Barbaro in his translation of Vitruvius indicates that the awareness of the creative capability of the mind was not exclusive of Alberti but a characteristic of Renaissance culture. Commenting on Vitruvius' account of the skills an architect should possess, Barbaro contends that 'the artist works first in the intellect and conceives in the mind and symbolizes then the exterior matter after the interior image, particularly in architecture'. From D. Barbaro, *I dieci libri dell'Architettura di M. Vitruvio tradutti et commentati da Monsignor Barbaro*, 1556. Quoted and translated in Wittkower, op. cit., p. 65.

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sensible and abstract realms were part of a unique reality represented by nature.²³ This identity between the world of nature and the world of man, between sensible and abstract realms, is present in the following passage of Filarete's *Trattato di architettura*, 1458-1464, in which the author draws an analogy between the engenderment of a child in the mother's body and the conception of the building in the mind of the architect. He contends that in the same way that the mother needs seven to nine months to gestate the child also the architect needs of a similar period of time to conceive (*fantasticare e pensare*) the building. After this process of gestation, during which the architect has considered in his mind many alternatives for the design of the building, the architect has 'to give birth to the building' (*partorirlo*), meaning that he makes "*a disegno piccolo rilevate di legname, misurato e proporzionato come che ha a essere fatto poi, e mostrarlo al padre.*"

4.2.5 Idea and representation

Alberti's *lineamenta* is the direct antecedent of a term that epitomizes the artistic conception of the Renaissance: *disegno*.²⁴ Filarete, in his *Trattato di architettura*, rendered the Latin *lineamenta* with the Italian vernacular *disegno*, a term he used both in the sense of an intellectual 'idea' in the mind and the sensible lines or outlines of a figure.²⁵ In Book VI of his *Trattato*, Filarete spoke of this double meaning of *disegno*, sensible and intellectual: "*Sì che none stimi nessuno il disegno essere poco, ché non è cosa niuna che di mano si faccia che non consista nel disegno, o per uno modo o per un altro; e non è senza grande ingegno d'intelletto, a chi lo vuole intendere come richiede essere inteso.*"²⁶ On other occasions, Filarete found it necessary to distinguish more clearly between the different meanings associated with *disegno*, and for that reason he used expressions such as '*disegno rilevato*', for a wood model in three dimensions; '*disegno lineato*' or '*liniamento*' for schematic design; '*disegno proporzionato*' for

²³Filarete, *Trattato di architettura*, edited by Anna Maria Finoli and Liliانا Grassi, 1972, vol. 1, p. 40.

²⁴*Design* is still a common way to translate *lineamenta* into English, as in the English version of Alberti's *De re aedificatoria* by Rykwert and alters. But, as these authors explained in the glossary of the book, the word *lineamenta* has been translated in many different ways, like drawings and designs, form, definitions, plan, schematic outlines, and measured ground plan. Rykwert, op. cit., pp. 422-423.

²⁵This dual meaning of design - as a concept and as a drawing- has pervaded up to our times. This is particularly evident in the translations of *disegno* into other languages, like French or English. As an example, this is an English translation of Vasari's definition of *disegno* in which this has been translated as 'drawing': "Proceeding from the intellect it extracts from many things a universal judgement, like a form or idea of all the things in nature...From this knowledge there proceeds a certain idea or judgement, which is formed in the mind, and this idea to which expression is given by the hands is called drawing. It can therefore be concluded, that this drawing is simply a visible expression and manifestation of the idea which exists in our mind, and which others have formed in their mind and created in their imagination." A. Blunt, *Artistic theory in Italy*, 1962, p. 100.

²⁶Filarete, op. cit., vol. 1, p. 158.

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scaled drawings made after a module; and 'congetto', 'poco disegno' or 'disegno in digrosso' for sketches.²⁷

For Alberti, the purpose of a drawing or a model was to be the expression of the idea that the artist had in the mind. In a passage in *De re aedificatoria*, Alberti describes his experience as designer, and he writes that "I have often conceived of projects in the mind that seemed quite commendable at the time; but when I translated them into drawings, I found several errors in the very parts that delighted me most, and quite serious ones; again, when I return to drawings, and measure the dimensions, I recognize and lament my carelessness; finally, when I pass from the drawings to the model, I sometimes notice further mistakes in the individual parts, even over the numbers"(IX,10). Alberti assumes, as Vasari did later with in his definition of *disegno* (e.g. 'un certo giudizio, che si forma nella mente quella tal cosa, che poi espressa con le mani') that the idea is first created in the mind of the artist, and then is translated into the drawings. Afterwards begins a process of mutual adjustment between the 'sensible idea', that is contained or expressed in drawings and models, and the 'conceptual idea' that lies in the mind of the architect.²⁸

For the model to be the visual expression of the idea, Alberti thinks that accidental traits need to be removed from it.²⁹ In the second Book of his architectural treatise, he writes that "the presentation of models that have been colored and lewdly dressed with the allurements of painting is the mark of no

²⁷Filarete, op. cit., vol. 1, p. 40, note 1. With regard to the use of the term 'disegno' by Filarete, A. M. Finoli and L. Grassi contend that "il Filarete los usa in due sensi, come 'progettazione' o momento intellettuale ('idea', 'teorica', cioè un disegno 'interno', categoria del conoscere formatrice di immagini), e come disegno 'esterno', contorno lineare che si realizza con la pratica quale guida al processo realizzativo." Filarete, op. cit., p. 11, note 1. Frommel contends, however, that *disegno* and *lineamenta* are equivalent terms: "With the expression 'disegno' Filarete intended the same concept as Alberti's *lineamenta*, meaning development of ideas and not its graphic expression: the graphic technique defined by Alberti with the word *pictura*." C. L. Frommel, 'Reflections on the Early Renaissance Drawings', 1994, p.106.

²⁸Federico Zuccari, in *L'Idea de' pittori, scultori ed architetti*, 1607, introduced a distinction between these two notions of idea that were originally embraced by *disegno*. He called *disegno interno*, or *idea*, "a concept formed in our mind, that enables us explicitly and clearly to recognize any thing, whatever it may be, and to operate practically in conformance with the thing intended", while *disegno esterno* was "the actual artistic representation, be it pictorial, plastic or architectural." Quoted in Panofsky, op. cit., p. 85.

²⁹With regard to the value that models had for Alberti, Henry Millon writes: "But for Alberti models have another important function. An idea, or *disegno*, in architecture could only be realized through a model. The idea, as formed in the mind, was imperfect and could only be given its consequent form through examination, exercise of judgement, and modification of the idea through drawings. Further, the drawings were to be studied, assessed, and improved through models, thereby ultimately approaching an embodiment of the idea[...]The model, then, for Alberti, was not a vehicle to present an idea to a client, but a means to study and realize an idea. For Brunelleschi and later for Michelangelo (1474-1564), on the contrary, the model was apparently the representation of an idea already formed in the mind to serve as a guide for workmen in construction." H. A. Millon, 'Models in Renaissance Architecture', 1994, pp. 23-24.

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architect intent on conveying the facts; rather it is that of a conceited one, striving to attract and seduce the eye of the beholder, and to divert his attention from a proper examination of the parts to be considered, toward admiration of himself. Better then that the models are not accurately finished, refined, and highly decorated, but plain and simple, so that they demonstrate the ingenuity of him who conceived the idea, and not the skill of the one who fabricated the model"(II, 1). The same preoccupation about the unity of the idea of the building and its representation is present in another comment of Alberti, where he distinguishes between the means of representation of the painter and the architect: "The difference between the drawings of the painter and those of the architect is this: the former takes pains to emphasize the relief of objects in paintings with shading and diminishing lines and angles; the architect rejects shading, but takes his projections from the ground plan and, without altering the lines and by maintaining the true angles, reveals the extent and shape of each elevation and side-he is one who desires his work to be judged not by deceptive appearances but according to certain calculated standards"(II, 1). Then, according to Alberti, the purpose of the means of representation, models or drawings, is to give expression to the true form or idea of the building, in the Platonic sense.³⁰

In this connection, it must be noticed that this distinction between essential form and appearance, made with regard to models and drawings, parallels another distinction between *pulchritudo* and *ornamentum*. In effect, for Alberti *pulchritudo* is "the reasoned harmony of all the parts within a body" whereas *ornamentum* is something additional, "a form of auxiliary light and complement to beauty." And he continues: "The work ought to be constructed naked, and clothed later; let the ornament come last; only then will you have the occasion and opportunity to do it conveniently without any form of hindrance"(IX,8). There is therefore a possible correspondence to be established between the pure idea with which the architect conceives a building, and the beauty that is perceived by the beholder. In both cases, in the conception of the building by the architect and in the perception of the building by the beholder, the essential thing is to capture the idea or form of the building. But, in spite of this parallelism, it should not be concluded that Alberti thought that *pulchritudo* was the same as the idea in the artist's mind. For Alberti, there was still a difference between the concept in the mind of the artist and the perception of that concept by the beholder.

Alberti's preoccupation with the concord of idea and representation had a continuation in the letter of Raphael to Leon X, in which the artist proposed to replace the Vitruvian *scaenographia* (and its Renaissance counterpart, perspective) by the section as one of the forms of architectural representation. By the time of Raphael, it was clear to Renaissance architects that perspective, either the

³⁰At this point, Plato's rejection of the imitative arts comes to mind. In fact, we can see in Alberti's words a similar motivation that the one led Plato to reject imitative arts: the goal of the architect, which Plato wanted to make extensive to every art, is to create true forms as opposed to appearances.

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perspectiva naturalis of Vitruvius or the *perspectiva artificialis* of the Renaissance, could not represent the true dimensions of a building (i.e. true form or idea) as the combined use of plan, elevation and section could do.³¹

4.3 The systematic component of artistic creation

4.3.1 Leonardo's sketches for central plan churches

In the Renaissance, drawings and models were the conceptual tools with which the artist and the scientist studied nature. Leonardo's drawings epitomize the double purpose, artistic and scientific, of Renaissance representation. Some of his sketches of human bodies, for instance, are analytical studies made with the intention to understand the human anatomy. Other sketches, like those corresponding to the centrally planned churches, are the expression of an artistic idea. But, in the case of Leonardo, it is difficult to distinguish between drawings that are purely analytic, or scientific, and drawings that are synthetic or artistic. The drawings of the human anatomy are a point in case. Through these drawings, Leonardo acquired a knowledge about the human body which would have a direct repercussion in his work as painter. Conversely, those sketches that are supposed to be the expression of an idea (designs for buildings, machines) have also an analytical value, since they serve to *understand* the artifact that is being designed. Leonardo moved without discontinuity from scientific study of nature to artistic creation of form, and his drawings just reflect this smooth transition from one pole to another.³²

Representation and scientific knowledge

Leonardo's sketches were part of a comprehensive process of representation which encompassed not only drawings but also physical models. The sketches corresponding to his anatomical studies, for example, were not taken directly from human bodies but from physical models of the bodies. Before drawing the

³¹The preoccupation with matching idea and representation, as expressed by Alberti, is fundamental to the conception of Renaissance architecture. The development of architecture run parallel to the discovery of new representation techniques, particularly, the section in orthographic projection. This parallel evolution of the architectural conception of Renaissance architecture and the representation techniques has been traced by Wolfgang Lotz. Initially, the representation of interior space in architecture was based on the use of perspective projection, much like in painting. But, step-by-step, and following a purely empirical process, architects came up with the section in orthographic projection, first used by Antonio da Sangallo the Younger in a drawing for St. Peters project. See W. Lotz, 'The Rendering of the Interior in Architectural Drawings of the Renaissance', in *Studies in Italian Renaissance Architecture*, 1977, p. 31.

³²In this regard, Cesare Luporini, contends that for Leonardo "il disegno è dunque puramente strumento di una ricerca scientifica (anatomia, botanica, cartografia, scienza delle machine ecc.) che ha altrove la sua metodologia e la sua logica." C. Luporini, *La mente di Leonardo*, 1953, p. 121.

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sketches, Leonardo made model reconstructions of bodies to understand the internal composition of the different organs and members. As he observed: "You will never cause anything but confusion in the demonstration of muscles, their positions, origins and insertions, unless you first make a demonstration of the fine muscles by using rows of threads."³³

As Veltman has contended, these models acted "as go-between, linking the concrete organic world of nature with the abstract world of geometry."³⁴ They were both 'physical models' or artifacts and 'abstract models' in the sense of abstract representation of the natural phenomena. As Veltman contends: "If we reflect on this nexus of perspective/model-making/schema/geometry, it becomes evident that the only way to approach what is usually termed 'copying' nature was to reconstruct it and reduce its infinite detail to workable models at once abstract and artificial."³⁵ Models, therefore, considered both as artifacts and as abstractions, were constituent parts of an artificial world that began to be forged in the Renaissance.

The foundation on which this artificial world was built was, of course, geometry. In order to be represented in abstract/sensible models, nature had to be 'geometrized'. The most characteristic form of representation of the Renaissance-linear perspective- exemplifies the process of geometrization to which nature was subjected in the Renaissance. As has been noticed, the development of perspective in the fourteenth century went parallel to the discovery of new techniques to create geometric representations of natural forms.³⁶ The perspective method propounded by Piero della Francesca in *De Prospectiva pingendi* is a point in case. The method demanded all kinds of forms, artificial and natural, to be represented in plan and elevation -the views that depict the true dimensions of the form. From these views, some points were projected onto the picture plane through the

³³Quoted in K. Veltman, *Studies on Leonardo da Vinci I. Linear Perspective and the Visual Dimensions of Science and Art*, 1986, p. 212. Veltman contends that in the Renaissance started to be necessary to distinguish between two kinds of drawings: drawings as 'visual records' (scientific or technical drawings) and drawings as 'visual hypothesis' (artistic drawings). Moreover, he claims that this distinction "gradually polarized into an opposition between technical drawing on the one hand and fine art on the other." Veltman, *op. cit.*, p. 13. In the case of Leonardo, Veltman thinks that there is a link between technical and artistic drawings that "makes possible the meeting points of art and science: the ideals of scientific verification and artistic veracity can go hand in hand." *Ibid.*, p. 226.

³⁴*Ibid.*, p. 217. Veltman also claims that "models, in turn, have peculiar advantages. Because they reduce the complexity of the organic world to essential lines they can readily be translated into purely geometrical figures. On the other hand, as models of the originals, they are obviously linked with the objects on which they are based. This median position which they hold between abstract geometry and concrete nature enables models to serve as go-betweens linking the ideal and the actual." Veltman, *op. cit.*, pp. 15-16.

³⁵*Ibid.*, p. 218.

³⁶Veltman, for example, points out that "it is noteworthy how closely the rapid developments in proto-technical drawing run in parallel to developments in linear perspective. In both cases the revolution begins circa 1420, comes into swing by 1435 and culminates in Leonardo by 1500." Veltman, *op. cit.*, pp. 13-14.

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application of the perspective transformation.³⁷ In this light, linear perspective, was more than a mere technique to achieve a faithful imitation of the three-dimensional world on a two dimensional surface. It was more like a 'scientific model' of the perceptual laws that relate subject and object.

Some authors have attributed to Renaissance humanists an awareness of the mediating role of representation, in line with the ideas postulated by the philosophy of science of this century (Popper, Kuhn). Thus, Veltman sees Renaissance perspective as a sort of scientific hypothesis in Popperian terms whose validity has to be constantly corroborated by the facts,³⁸ and André Chastel asks himself whether Leonardo's sketches can be considered a 'symbolic form' or 'model', in the language of twentieth-century epistemology, concluding that "judging by his use of it, Leonardo seems to be very conscious of the nature and role of this type of representation. It allows him to manoeuvre in the confusion of the real world and to provide convincing support for speculation and invention."³⁹ The difficulty to accept this sort of interpretation regarding the meaning of representation in Renaissance culture, is that they are based on the application of a paradigm generated in contemporary culture to a culture of the past. Against this sort of interpretation, it can be argued that, in the Renaissance, representation had not been yet been attributed with the same status of absolute reality that has attributed to it in contemporary philosophical systems. What distinguishes Renaissance representation from later periods is the indivisible unity of abstract and sensible realms that it conveys.

³⁷M. Kemp, *The Science of Art. Optical themes in western art from Brunelleschi to Seurat*, 1990, pp. 32-35.

³⁸On the comparison between visual representation and scientific hypothesis, Veltman writes that "the more we reflect upon this link between models and representation, the more deeply we appreciate the enduring significance of the problems which Leonardo was attempting to resolve. Once a model has been built it may prove convincing and yet not correspond to the original. Indeed it may readily reflect the hypothetical theories of its model-makers, rather than serve a strictly descriptive function. Leonardo's diagrams of the spinal cord illustrate this danger beautifully. These drawings show visual hypotheses rather than visual records." And he continues: "Once the description occurs in terms of a visual hypothesis, however, it can immediately be tested and the degree it corresponds or does not correspond to the original can be measured. The visual hypothesis thus brings into focus the true/false criterion. Whence we see that the approach of trial and error, now associated with the pillars of scientific method, is actually a consequence of the visualization process introduced by the nexus of reconstruction/representation/model-making and perspective. Curiously enough Popper, who has devoted so much attention to the criterion of falsification in science has effectively overlooked the basic role of visualization, probably because modern science is thought to be based on non-visual algebra rather than visual geometry." Veltman, *op. cit.*, p. 226.

³⁹A. Chastel, 'The Problem of Leonardo's Architecture in the Context of his Scientific Theories', in *Leonardo da Vinci. Engineer and Architect*, 1987, p. 205.

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Individual creation and representation: Leonardo's sketches of central plan churches

As we have seen, Alberti, in *De re aedificatoria*, had stressed the connection between idea and representation. Alberti, however, has not left us with a legacy of sketches, drawings and models that corroborate his theories on this issue. It is only in the architectural sketches of Leonardo, particularly those for the design of central plan churches, where the connection between the *idea in the mind* and the *representation of the idea* through drawings that Alberti had advocated is achieved.⁴⁰ In effect, Leonardo, as no other artist had done before, gave expression with his sketches to the very process of artistic invention (Figures 4.1, 4.2).

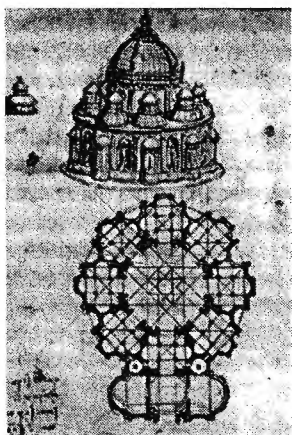


Figure 4.1. Leonardo. Church, view and plan. Ashburnham MS 2037, f. 5v.

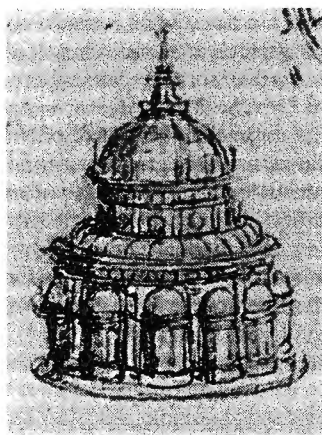


Figure 4.2. Leonardo. Church with twelve apses. Paris MS. B, f 56v.

The emergence of sketches like the ones of Leonardo is concomitant with the emergence of *disegno* as an intellectual activity independent from tradition and from established building practices. The need to explore on paper formal

⁴⁰The identity between idea and representation can still be subjected to a dual interpretation, depending whether we consider idea as concept in the mind of the architect or as a universal transcending the mind of the individual artist. Luigi Vagnetti has proposed to restrict the term *disegno* for the case in which a drawing reflects the personality of the author, and *grafico* for more impersonal forms of representation. He writes then that "*potremo considerare Disegno, anche se in proiezioni ortogonale, una rotazione che mantenga Piero significato espressivo e sia prodotta da una precisa personalità* [Borromini, Michelangelo, Juvara, Piranesi, Wright, Gaudi]. *Dovremo invece considerare Grafico, anche se in proiezione centrale, qualunque notazione che tenda ad annullare i valori espressivi, per acquistare caratteri di estrema e convenzionale chiarezza.* [Percier, Schinkel, Le Corbusier]. L. Vagnetti, *Disegno e architettura*, 1958, pp. 22-26. Also, Alberto Carlo Carpiceci contends that after Leonardo's drawings "*possiamo conoscere la grammatica e la sintassi compositiva e rilevarne anche il lessico architettonico.*" A. C. Carpiceci, *L'Architettura de Leonardo. Indageni e ipotesi su tutta l'opera di Leonardo architetto*, 1978, p. 25.

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variations of a particular artistic theme could only have emerged after the rise of the artist-intellectual in the Renaissance. It is only in the Renaissance when art becomes invention and the artist begins to be seen as a privileged person having creative talent. Furthermore, in the Renaissance, architecture no longer had to be the result of a slow process of transformation of a particular building type, as it was in the past. Now, an artist like Leonardo is free to explore, in the realm of abstraction, all the formal possibilities inherent within a particular building type.

In past periods, especially in classic Greece, artists, and particularly architects, developed their activity within the limits marked by tradition. Therefore, there was no need for a Greek architect-sculptor to carry out a systematic exploration of a particular building type or theme, as Leonardo did in his sketches of centralized churches. To build a temple, all what the Greek artist needed was a few schematic drawings containing the key measures of the temple, together with some mock-up models of some single elements, like capitals. To be sure, the possibility to sketch on a piece of paper must have existed for artists in classic Greece. But it is difficult for us to imagine a Greek artist sketching on a piece of paper variations of an Ionic temple in the same way as Leonardo was making variations of the centralized church. Design, understood as a process of individual creation carried out in an abstract media, began in the Renaissance.

Similar contentions can be made with regard to the medieval constructions of the Gothic period. The design and construction of a Gothic cathedral was not so confined to a building type as was the case with the Greek temple. Gothic builders had more freedom to explore new formal solutions within the theme 'cathedral'. The medieval masons used different representation techniques that allowed them to 'design' the basic form of a particular component, like a pinnacle for example, before this was built. Nevertheless, no comparable drawings to the ones that Leonardo did for the centralized churches could be found in the Gothic either. The notebooks of Villard de Honnecourt contain sketches, like the one of '*la maison d'une horloge*' (Figure 4.3), which shows a tower in perspective view.⁴¹ But, a closer view to the drawing reveals that the spatial relations of the three-dimensional structure are not properly depicted. The intersections of roofs with the polygonal shaft of the tower have not been resolved; columns and arcades look more two-dimensional than three-dimensional. In the sketches of Leonardo, on the other hand, the same building is seen in plan, section and perspective (Figure 4.4). This combination of different views is necessary to understand the proper relationship between the constituent parts of the design.

⁴¹It is not clear though if this '*maison d'une horloge*' is a depiction of a building or a piece of sculpture like the '*horloges*' seen in the interiors of some churches. See R. Bechmann, *Villard de Honnecourt*, 1991, p. 114.



Figure 4.3. Villard de Honnecourt. Sketch of 'La maison d'une horloge'. From manuscript f 6V -pl. 12.

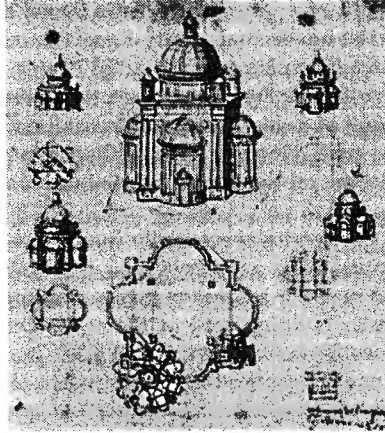


Figure 4.4. Leonardo. Church with cross-shaped plan. Ashburnham MS 2037, f.3v.

Unlike the sketch of Villard, the drawings of Leonardo came straight from his imagination. They are not just an attempt to depict an existing three-dimensional object, but rather, the visible expression of a formal structure that Leonardo has recreated in his mind. Unlike Villard, Leonardo has succeeded in reproducing in his mind the three-dimensional relations of the elements of a building, and his drawings reveal that understanding.

The sources of the central plan churches

In choosing the central plan church as a theme, Leonardo was influenced by the work of fifteenth century architects and theorists as well as by some existing centralized buildings that he got to know first hand. Thus, it has been contended that Leonardo would have been influenced by the treatises of Alberti, Francesco di Giorgio and Filarete, and some scholars have even suggested that the sketches of churches could be illustrations of the principles presented in Alberti's treatise.⁴² Others authors have suggested that the drawings could be part of an architectural treatise that Leonardo had planned to produce.⁴³ Leonardo might have been also influenced by existing centralized buildings, particularly, by Brunelleschi's unfinished church of Santa Maria degli Angeli.⁴⁴ Other centralized buildings from

⁴²P. C. Marani, 'Leonardo e Leon Battista Alberti', in *Leon Battista Alberti*, op. cit., pp. 358-365.

⁴³L. H. Heydenreich, *Die Sakralbau-Studien Leonardo da Vinci's*, 1971, pp. 77-84. Quoted by Jean Guillaume, op. cit.

⁴⁴Paul Frankl claims that "Sta. Maria degli Angeli in Florence, begun by Brunelleschi in 1434[...]attracted Leonardo's attention and he drew a plan of it with slight variations." P. Frankl, *Die Entwicklungsphasen der neueren Baukunst*, 1914. English translation as *Principles of Architectural History. The Four Phases of Architectural Style, 1420-1900*, 1968, p.6.

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which Leonardo might have had direct knowledge were the church of the Annunziata, the Baptistery, and the chorus of the Duomo in Florence; the church of San Lorenzo in Milan; and Santa Maria in Portica, in Pavia.

With regard to the relationship between precedents and invention, it should be born in mind that, for Leonardo, *disegno* was not restricted to a faithful reproduction of nature -as was perhaps the case for Alberti. For Leonardo the essential value of *disegno* lay in the fact that nature could be surpassed by means of the *ingegno umano*. Thus, he wrote that "design [*disegno*] is of such excellence that it not only studies the works of nature but is more infinite than those made by nature[...]and, on account of this, we conclude that it is not only a science but a divine power to be accorded a worthy title. It surpasses nature because the basic forms of nature are finite and the works that the eye demands of the hands are infinite."⁴⁵ Nature means, in the particular case of the studies of centralized churches, the existing centralized buildings that Leonardo came to know from a variety of sources. As we have seen, this equation between nature and ancient buildings had already been established, at the theoretical level, by Alberti. Therefore, for Leonardo the creation of formal variations from a particular theme means going beyond the limits established by nature, or what is the same, beyond the architectural works of the past. In effect, Leonardo's designs are not mere imitations of previous cases but novel variations born directly from the original idea-type that the artist has derived from the free confrontation with nature, in this case, with the architectural tradition.

Whatever the sources of Leonardo's central churches might have been, he was capable, as perhaps nobody else before him, to grasp the formula or pattern of a particular building -the centralized church, but also campaniles, private houses and other building types- and explore systematically some of the formal possibilities inherent within a particular type. Thus, Leonardo was able to transcend the problematic of the particular building to grasp the general 'idea' of the design. Then, he submitted this idea to a process of investigation, out of which different formal possibilities were created. This process of abstraction and subsequent formal exploration is what makes of the sketches of central plan churches a unique moment in the history of architectural design.

Type and plan representation

Much of the systematic process of exploration carried out by Leonardo, aims at discovering all the emergent shapes contained in a particular geometric pattern, as it appears in plan view. In Leonardo's design process, the determination of the

⁴⁵Quoted in M. Kemp, 'The Inventions of Nature and the Nature of Invention', 1987. These comments were made to praise painting, but according to Kemp, they could equally be applied to any sphere of his activity as inventor.

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plan is tantamount to the election of a particular type.⁴⁶ The plan, as Arnheim has later contended, corresponds to the mental image that the designer has in mind during the design process.⁴⁷ (Figure 4.5).⁴⁸

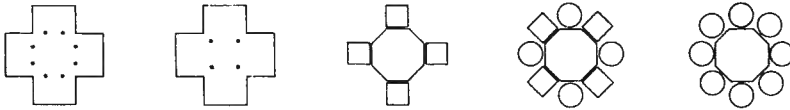


Figure 4.5. The five types of centralized plan of Leonardo, according to Jean Guillaume.

The importance of the plan representation notwithstanding, the design process carried out by Leonardo did not necessarily have to begin with the selection of a particular scheme in plan view. There are other drawings in which the plan and the section appear to be the result of cutting a three-dimensional model (Figure 4.6). In this case, the plan is the by-product of the three-dimensional form, rather than the other way around.

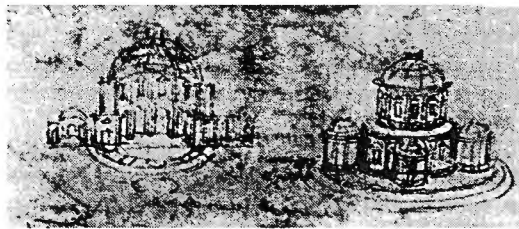


Figure 4.6. Leonardo. Section, plan and aerial view of centralized building.

⁴⁶Rudolf Arnheim has distinguished two basic modes of design, which he calls 'from above' and 'from below'. In the approach 'from above', "the overall pattern of plan and elevation, once decided upon, governs the formation of components" (e.g. the Greek temple). In the one from below, there is no predetermined pattern, symmetry is lacking and "the weight and importance of each element derives from a sort of power play, with the aspirations of every individual unit confronting those of its neighbors" (e.g. a design for a house by Rietveld). Leonardo's design method would fit to what Arnheim calls a method of design determined 'from above'. It is based on the adoption of a particular type, exemplified by the plan. See R. Arnheim, *The Dynamics of Architectural Form*, 1977, p. 195.

⁴⁷Arnheim sees the plan, or mental image, as the link between conception and perception: "It seems remarkable that the true nature of a building should be revealed by its plan, that is, by a view not available to anybody once the building is standing. Only when it is demolished, burned to the ground, or revealed in its foundations by archaeologists can a comprehensive glimpse of it be obtained from a helicopter. But when we walk through the intact building, its plan is distorted by perspective and broken up by partitions, and the simultaneity of the overall pattern is replaced by a sequence of vistas. Yet almost inevitable do we try to reconstruct mentally the plan of the whole from the partial glimpses we receive. When we succeed, the flash of insight is a genuine Aha-experience, as psychologists call it. And only after this has happened do we feel confident that we know where we are." Arnheim, *op. cit.*, p. 54.

⁴⁸Jean Guillaume has classified the designs of churches from Leonardo in five basic types: two cross-shaped and three radiating. See J. Guillaume, 'Leonardo and Architecture', 1987.

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The scientific component of the design process in architecture

Regarding the scientific experiments he made to study natural phenomena, Leonardo once declared: "I have four degrees of force and four of weight as well as four degrees of movement of four of time. I want to use these degrees and augment or reduce them according to necessity in my imagination, in order to discover the will of the laws of nature."⁴⁹

It can be argued, that this systematic generation of variants made with the purpose of understanding the working of nature, is essentially of the same kind as the one that Leonardo applied in the design of the centralized churches. Indeed, this has been the contention made by Paul Frankl, who in his *Die Entwicklungsphasen der neueren Baukunst*, 1914, stressed the scientific side of Leonardo's creative process. Frankl contended that "*Leonardo hat sich die Frage, welche Formen man einem Zentralbau geben könne, ganz allgemein gestellt und sie systematisch zu beantworten versucht; er überlegte, daß, wenn man von den einfachsten regelmäßigen Raumformen: Quadrat, Achteck, Zwölfeck, Kreis ausgeht, man durch Anfügen von Nebenräumen in den Haupt- und Nebenachsen dieser Figuren durch mechanisches Kombinieren, ohne große Phantasieanstrengung auf alle überhaupt denkbaren Zentralbauten kommen müsse. Als Nebenräume benutzte er außer dem Rechteck-, Quadrat-, Achteck- und Kreisraum noch die Halbkreisnische. Geht man also z.B. davon aus, an einen quadratischen Hauptraum in den vier Achsen vier quadratische Arme anzugliedern (griechisches Kreuz), so lassen sich aus diesem Schema eine ganze Reihe anderer Zentralbauten entwickeln, indem man entweder das Quadrat des Hauptraumes durch das Achteck, den Kreis, das Zwölfeck, oder die Quadrate der Nebenräume durch Rechteck, Achteck, Kreis, Zwölfeck, Halbkreisnische ersetzt. Die Phantasie ist also darauf beschränkt, solche Grundschemas zu bilden, und diese selbst sind größtenteils auch durch geometrische Überlegungen zu finden, so daß die Erfindung der Raumformen eine Angelegenheit wissenschaftlichen Kombinierens wird.*"⁵⁰

⁴⁹Madrid MS. I, f. 152 r. Quoted and translated in Chastel, op. cit., p. 199.

⁵⁰Frankl, op. cit., p. 23. English translation in *Principles of Art History*, pp. 5-6: "Leonardo wanted to know in a general way what forms he could give to the central-plan church, and set out systematically to find the answer. He realized that if he began with the simplest spatial forms (square, octagon, circle, or dodecagon), he would arrive at every conceivable central-plan church, without taxing his imagination, by the mechanical addition of circular, semicircular, square, rectangular, or octagonal ancillary spaces to the principal and cross axes of his basic figures. A complete series of related central-plan churches could be developed from a basic-schema. For example, he could begin with a Greek cross (four square arms added to the sides of a central square), and then either replace the square place by an octagon, a circle, or a dodecagon, or replace the square arms with rectangles, octagons, circles, semicircles, or dodecagons. The imagination is limited in the formation of such basic schemes, which are found by geometric means, so that the creation of spatial forms becomes a matter of scientific combination."

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When the theme of the central church is understood as a geometric problem, as Frankl seems to understand it, then the creation of formal variants can be thought as combinatorial process amenable to mathematical formulation. Frankl emphasized the geometric nature of the central church theme (geometric figures, like square, octagon) as well as of the logico-mathematical nature of the transformations (substitution, grouping, recursion) that gave rise to the variations. As Frankl put it, it seems as if Leonardo would have come up with a series of rules out of which he, or for that matter any other artist applying the same rules, would be able to create an infinite number of variations on the theme 'central plan church'. As we will see in Chapter 11, Frankl's interpretation of Leonardo's creative process caught the imagination of researchers who believed that the design process could be formalized and even executed by a computer.

In his attempt to stress the scientific side of Leonardo's artistic process, Frankl certainly underestimated its artistic side. It is true, that operations like grouping, repetition and recursion, suggest the possibility of a systematization of a design process that transcends the individual creativity of Leonardo. But it is also true, than even though the formal variations of a central plan might be amenable to systematization, Leonardo's mind and, especially, his talent for graphic expression, was necessary to create the designs of the centralized churches.

Leonardo was well aware that the systematic component alone could not encompass the whole process of artistic creation. Apart from systematic thinking, the particular talent of the artist was necessary. Speaking about artistic creation in his *Trattato della pittura*, he contended that *"le scienze che sono imitabili sono in tal modo, che con quelle il discepolo si fa eguale all'autore, e similmente fa il suo frutto; queste sono utili all'imitatore, ma non sono di tanta eccellenza, quanto sono quelle che si possono lasciare per eredità, come le altre sostanze. Infra le quali la pittura è la prima; questa no s'insegna a chi natura nol concede, come fan le matematiche, delle quali tanto ne piglia il discepolo, quanto il maestro gliene legge"*(I,4). This comment that Leonardo made with regard to painting, can be extrapolated to his architectural designs. The systematic generation of formal variants from a geometric pattern alone does not exhaust the creative process. Besides, the participation of the individual mind of the artist is necessary to reveal the formal variants that are implicit in the geometric pattern. Because, even though the different formal variants are embedded in a particular geometric scheme, these formal variants will not emerge until they are discovered by the artist.

Finally, one further argument can be brought to guard against a one-sided interpretation of the systematic approach of Leonardo's sketches. In his interpretation, Frankl focused on the geometric pattern that underlies Leonardo's designs. There is -in Frankl's interpretation- an evident risk of confusing *geometric shape* with *architectural form*. However, it should be kept in mind that

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Leonardo was not simply generating geometric figures, but creating representations of three-dimensional structures in plan, section and perspective views. Therefore, more important than the geometric pattern that underlies the plan are some eminently architectural issues like, for example, the connection between plan and exterior massing, the spatial concept of the plan, and the understanding of the whole building as a complete organism.

The relation between type and variations

Besides Frankl, there have been other authors who have also stressed the systematic side of Leonardo's designs. Most of these authors have consistently assumed that Leonardo began with a given pattern-type or formula and that the variations were the result of modifying the initial pattern. Thus, Peter Murray writes that "Leonardo takes a number of centrally planned forms and evolves more and more complex forms from the first simple shape."⁵¹ Similarly, Kim Veltman contends that "Leonardo arrives at new shapes, namely, through minor alterations in a standard shape that he has learned to render three-dimensionally." However, this relation of dependency of the variations from the type, often taken for granted, is not at all self-evident. It is by no means clear that the grasping of the formula-type precedes the generation of the variations. In fact, the opposite can be perfectly true: it is the generation of variations what reveals the existence of the type. A similar dilemma is present in the designs of the villas made by Palladio.

4.3.2 The villas of Palladio

There are certain common characteristics between Leonardo's designs for central plan churches and the villas built by Palladio. In both cases, we are confronting a systematic process of artistic creation based on the elaboration of variations on a theme. In the case of Leonardo, the theme is the centralized church; for Palladio, the traditional country villa. There is a fundamental difference, however, between the work carried out by the two great Renaissance masters. Palladio first built his villas. Then he submitted them to a process of regularization and systematization with the intention to publish them in the *Quattro Libri*. Therefore, the systematic side of Palladio's is mainly done a posteriori, while in the case of the sketches of Leonardo what we are witnessing is the systematic side of the creative process at the very moment in which this is taking place.

Sources of the Palladian villa

The sources of Palladio's villas, like the sources of Leonardo's central plan designs, can be traced back to the immediate past. In the case of Palladio, the traditional country villa, a building type that had persisted in Italy since the late times of the

⁵¹P. Murray, *The Architecture of the Italian Renaissance*, 1986, p. 112.

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Roman empire, was the most direct source of inspiration. There were other possible sources though. Prior to Palladio, other Renaissance architects, had been confronted with the task of bringing up to date the traditional villa. Giuliano da Sangallo, in the Villa Poggio, attached a temple front to the main facade of an existing villa, a formal solution which later became the hallmark of the Palladian villa. The villa that Trissino -Palladio's mentor- designed and built at Cricoli exerted a notable influence on Palladio (Figures 4.7, 4.8). According to Wittkower, many of the features that would later characterize the Palladian villa were already present in the villa Trissino: "At Cricoli Trissino anticipated Palladio's plans; everything later undertaken by Palladio is a development of this archetype."⁵²

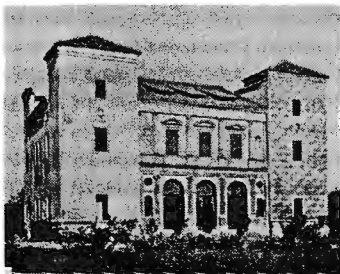


Figure 4.7. G. Trissino. Villa Trissino, Cricoli.

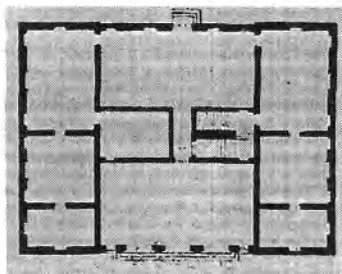


Figure 4.8. G. Trissino. Villa Trissino, Cricoli. Ground plan.

As Wittkower has contended, "it is the systematization of the ground-plan which became the distinguishing feature of Palladio's palaces and villas."⁵³ For Wittkower, this systematization of the interior space was the direct consequence of the system of proportions which, he believed, Palladio applied to the design of his villas and churches. Other authors have minimized the importance that Wittkower attributed to proportions.⁵⁴ Paul Holberton, for example, has contended that the systematic nature of the interior spaces of a Palladian villa is due to what he calls the 'sequentiality' or 'spatial variety', meaning basically that Palladio "operated a system of large, medium-sized and small rooms, so that as one went from room to room the light and sense of enclosure was constantly modified."⁵⁵

⁵²Wittkower, op. cit., p. 67.

⁵³Ibid.

⁵⁴Holberton has criticized Wittkower's emphasis on proportional systems: "However, Palladio does not make so much of proportions as is often assumed. They had for him no symbolic force (except what they might take on in the special context of a church), and it was not important to him what exactly the proportions of a building were, so long as it had proportions, or seemed to have them.... When it comes to ratios of height to length and breadth, Palladio in the *Quattro Libri* (I, xxiii) gives several different figures, and does not say that any one is intrinsically preferable to any other: instead, he refers to the architect's 'eye', his judgement, and to necessity." P. Holberton, *Palladio's Villas. Life in the Renaissance Countryside*, 1990, p. 209.

⁵⁵Holberton, op. cit., pp. 208-209.

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Other sort of precedents that might have influenced Palladio need to be found not in the most immediate antecedents but rather in the architecture of Rome. As almost every celebrated Renaissance architect before him, Palladio went to Rome to get a first-hand knowledge of the ancient buildings. It has often been claimed that some Roman structures, like the baths or the Pantheon exerted a particular influence on Palladio's conception architecture; formally as well as spatially.⁵⁶ In particular, the comparison between the Pantheon and the Palladian villas has often been raised with regard to the villa Trissino and the villa Rotonda, the only two villas that have a central circular space topped with a dome, like the Pantheon. Paul Holberton, for example, has compared both buildings, villa Rotonda and Pantheon, in terms of their visible forms, as he contends that "the villa does not echo the Pantheon at all closely on the outside, since the dome is shallow and the mass and proportions of the villa quite different; but on the inside the imitation of the effect of standing beneath the dome of the Pantheon is real and striking."⁵⁷

But, it is the abstract schema, as opposed to the visible forms, which a Palladian villa has in common with the Pantheon. The villas, like the Pantheon, consist of a geometric solid with a temple front attached to it.⁵⁸ This combination of an eminently geometric form (the cylinder and the semi-sphere) together with an sculptural form (the temple portico), as exemplified by the Pantheon, provided the basic schema for the Palladian villa. In this regard, Boucher accurately contends that "the Pantheon is the ancient structure that Palladio felt the least necessity to adapt to his system, not only because it remained relatively intact but also because it embodied and architectural ideal that he employed whenever possible."⁵⁹

⁵⁶J. Ackerman, *Palladio*, 1966, p. 43. According to Ackerman, "the Imperial baths came closest to Palladio's ideal." *Ibid.*, p. 171. Also Paul Holberton claims that the Roman baths were a source of inspiration for Palladio's villas, particularly with regard to the internal sequence of connected spaces: "The baths, with their enfilades of numerous great rooms of different design, were the main inspiration for the spatial variety and 'sequentiality' of Palladio's architecture; Palladio also believed that the serliana window (or Palladian windows as it is known in English) which is a recurrent motif of these early villas had been widely employed in them. Again, Palladio's large central rooms rising up above the stanza beside them, in the way he had already tried in the villa Godi, were inspired in general by the domed spaces of the baths and were lit in particular by the same kind of semicircular aperture as the baths, the 'thermal' window. Even his handling of the villas' roof gables closely corresponds to what his reconstruction drawings show him to have believed to have been originally the scheme used in the baths (notably in the much ruined baths of Agrippa by the Pantheon). Last but not least, in so far as Palladio sought grandeur, he was influenced by the baths." Holberton, *op. cit.*, p. 212.

⁵⁷Holberton, *op. cit.*, p. 225.

⁵⁸To justify the attachment of the temple portico to a domestic building, Palladio appealed to the origins of the temple, which according to him was nothing else than a magnified house. He thought that, by attaching a temple portico to the house, he was in fact bringing domestic architecture to its authentic origins. Palladio, however, did not make much of the fact that the formal prototype for his solution could be found in a concrete building, the Pantheon.

⁵⁹B. Boucher, *Andrea Palladio. The Architect in his time*, 1994, p. 260.

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In summary, it can be said that there are two distinct origins for the Palladian villa: one, the traditional villa and the interpretations of it provided by previous Renaissance architects; the other, the Roman buildings. Among these, it was the Pantheon the building that provided the conceptual prototype for the Palladian villa.

The individual villas: variations from a formula

As we have seen in the previous discussion of Leonardo's designs for central plan churches, Frankl suggested that Leonardo started with geometric figures and then explored all possible variations of 'spatial forms' by making combinations of geometric shapes in a 'mechanical' or 'scientific' way. Wittkower made a similar contention with regard to Palladio's villas. He thought that "an analysis of a few typical plans ranging over a period of about fifteen years will prove that they are derived from a single geometric formula."⁶⁰ Basically the formula or pattern⁶¹ that Wittkower proposes is a tartan grid drawn on a square (Figure 4.9).

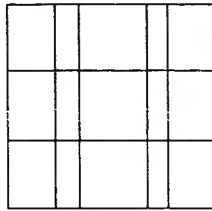


Figure 4.9. Underlying scheme of the different Palladian villas, according to Wittkower.

Some of the remaining sketches made by Palladio give support to Wittkower's contention that the key to the design of the villas lies in the plan (Figures 4.10, 4.11). The sketches have in fact an abstract character reminiscent of a mathematical formula, as Wittkower contends. They consist of a few lines, typically representing the walls (in a single or double line) the position of openings, columns and stairs. What is most relevant, however, is that despite the economy of graphic means the sketches already possess the characteristic unity of Palladio's designs.

⁶⁰Wittkower, *op. cit.*, p. 68.

⁶¹Wittkower used a variety of terms to refer to this underlying grid of the Palladian villa, like pattern, theme, formula, class, type and geometrical skeleton.

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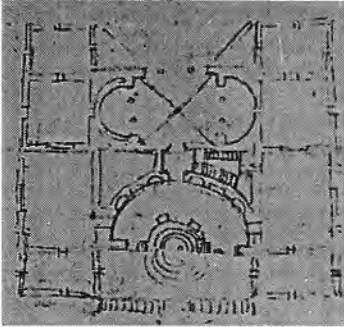


Figure 4.10. Palladio. Sketch related to the design of the Villa Pisani at Bagnolo. Vigardolo sheet XVII/2.

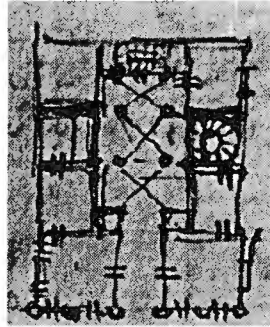


Figure 4.11. Palladio. Sketch, presumably related with the planning of Palazzo Porto. RIBA XI/22 verso.

Wittkower contends that Palladio started his designs with a formula or archetype (the tartan grid that he proposes): "Once he had found the basic geometric pattern for the problem 'villa', he adapted it as clearly and as simply as possible to the special requirements of each commission."⁶² He thought that, adopting a certain pattern, Palladio was following the ancients, who always created their designs from a few rules. The 'rules' that Palladio adopted in the design of his villas are "a hall in the central axis and absolute symmetry of the lesser rooms at both sides;"⁶³ rules that are exemplified in the pattern or grid that Wittkower proposes.⁶⁴

Furthermore, this formula, grid or pattern is, for Wittkower, a sort of Platonic Idea that exists a priori; an Idea that Palladio did not have to invent but only to

⁶²Ibid., p. 68.

⁶³Wittkower, op. cit., p. 67. Ackerman, on the other hand, has defined Palladio's architectural principles as being characterized by "1. Hierarchy, or the systematic built-up from dependent parts to a focal core. 2. The integration by proportionality, in three dimensions, of part to part and part to whole. 3. The co-ordination of exterior and interior design by representing the interior organization on the facades and by consistency in the proportional system." Ackerman, *Palladio*, p. 182.

⁶⁴With regard to the facades, Wittkower makes a similar contention as he does for the plans. Thus, he writes that "one should not lose sight of the fact that they [the facades of the villas] are all generated from the same basic pattern." The pattern to which Wittkower refers now is not the same geometric pattern as in the case of the plans. In fact, Wittkower does not propose in this case a geometric grid or the like as being the pattern underlying the facades. Rather, the pattern that Wittkower refers to is the one exemplified by the Pantheon: a solid block with a portico attached to it. On the other hand, Colin Rowe, in his article 'The Mathematics of the Ideal Villa', points out to the Malcontenta, he writes that "the plan may be seen as an exhibition of 'natural' beauty, as the pure thing, abstract and uncomplicated; but the facades are, of necessity, adulterated (though scarcely to their detriment) by an intrusion of 'customary' material. The facades become complicated, their strict Platonic rationale may be ultimately vitiated by the traditional presence, in this case, of the Ionic order which possesses its own rationale and which inevitably introduces an alternative system of measurement." C. Rowe, *The Mathematics of the Ideal Villa and Other Essays*, 1976, p. 9.

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discover. The pattern is not only the expression of the *idea of the villa*, but also of *the ideal villa*. According to this, the different villas of Palladio would approximate with greater or lesser success the ideal form that the grid exemplifies. From the different villas, it was the villa Rotonda which, according to Wittkower, came closest to the ideal represented by the grid: "The plan of the Villa Rotonda is the most perfect realization of the fundamental geometric skeleton."

Idea and proportions

The formula, pattern or grid that Wittkower proposes is more than an operative device to create variations of the theme villa. It also has a symbolic meaning associated to the use of certain harmonic proportions. According to the Pythagorean tradition, the universe or macrocosm would be governed by an harmonic system of ratios. Wittkower believed that "Palladio took the greatest care in employing harmonic ratios not only inside each single room, but also in the relation of the rooms to each other, and it is this demand for the right ratio which is at the centre of Palladio's conception of architecture."⁶⁵ This way, Palladio, according to Wittkower, would have pursued with his architecture to "materialize in space the 'certain truth' of mathematics."⁶⁶

At this point, it must be noticed that Wittkower attributed to the grid or pattern a variety of meanings, not necessarily compatible among them. The grid stands for the formula from which the different designs were created; it is the embodiment of certain design rules; the ideal form to which the designs try to approximate, and the symbol or link between macrocosm and microcosm. But the identification of proportions and rules with the idea, that Wittkower postulates, cannot be uncritically accepted. By assuming that a system of proportions based on some harmonic ratios is the equivalent to the Platonic Idea, Wittkower might be charged with confusing *quantitas* with *qualitas*. Indeed, a system of proportions, regardless of the symbolic meaning that Wittkower is willing to assign to it, cannot be, in principle, the substitute of the idea that guides the artistic creation of the architect.

Furthermore, it can be argued that the pattern or formula that Wittkower proposes as the quintessence of the Palladian villa, is far from having the universal value he is keen to bestow upon it. In effect, that pattern is a personal interpretation that Wittkower makes of the plans of the villas designed by Palladio. Therefore, any pretension to endow the pattern with an absolute value -as expression of a Platonic essence- has to be taken with reservation, since there can be other patterns, proposed by other authors, which can be as legitimate as the one that Wittkower suggests.

⁶⁵Wittkower, op. cit, p. 68.

⁶⁶Wittkower, op. cit, p. 66.

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Wittkower and Ackerman: two alternative views of the Palladian villas

Wittkower's interpretation of the origins of the Palladian villa, according to which this would have derived from an ideal archetype that existed a priori, contrasts with another view proposed by James Ackerman. Ackerman contended that "the perfected Palladian style with its mathematical and structural integration of parts did not emerge at once. Early works show the concept in embryo."⁶⁷ Thus, for Ackerman the first villas that Palladio designed, for example the villa Godi, would represent an incomplete expression of the idea. Later, and after following a process of refinement and evolution, Palladio would have been able to achieve a more perfect expression of the ideal villa.

In contrast to Ackerman's interpretation, Wittkower thought that there is no distinction between a rough idea and ideal form: there is only one idea (e.g. pattern or grid) and this is embedded in *every* design. Also, while Wittkower considers that the villa Rotonda is the one that comes closest to the ideal form of the villa, Ackerman rejects the possibility that any particular villa can be identified with the ideal one. Thus, according to Ackerman, "no Palladian villa is really typical in the sense of being representative of the rest, and that is part of what makes them, all together, uniquely attractive." Moreover, Ackerman explicitly rejects the possibility, considered by Wittkower, that Palladio would have created the villas from a unique formula. Instead, Ackerman thinks that "Palladio was so extraordinarily fertile that in designing nearly twenty surviving country seats, and some that appear among this remaining drawings, he never settled upon a characteristic solution, though he tried two or three versions of a basic idea before leaping to something quite different."⁶⁸

Behind the two opposing views of Wittkower and Ackerman lie two different conceptions of form: one that considers the idea-type of the villa as a sort of Platonic essence; another, for which the idea-type was only a principle that only the skill of Palladio was able to unfold and transform into the designs of villas. Of the two interpretations, Ackerman's assigns more relevance to the role played by the individual artist in the creation of the villas. Wittkower's interpretation, on the other hand, minimizes the role played by Palladio while it stresses the supra-individual aspects involved in the design of the villas: harmonic proportions, grid.

The relation between type and variations

The same observation we have made before regarding the relation between theme and variations in Leonardo's designs, is applicable to Palladio's villas. In effect, it cannot be uncritically assumed that the existence of a formula or pattern has to

⁶⁷ Ackerman, *Palladio*, p. 164.

⁶⁸ J. Ackerman, *Palladio's villas*, 1967, p. 1.

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precede the generation of the individual designs, as Wittkower pretends. The assumption that Palladio's villas derived from a unique formula reflects an a posteriori judgement, made by the critic who sees the villas as a coherent body of architectural work. Wittkower wrongly assumed that the pattern that he has discovered in Palladio's villas was also in Palladio's mind when he created his designs. At this point, Wittkower was probably giving expression to a notion of form that became prevalent after the nineteenth century, when type was thought as a link between analysis and synthesis. However, such a notion of form-type must be considered alien to the spirit of the Renaissance Idea.

4.4 The illustrated architectural treatise: representation and systematization of architectural knowledge

4.4.1 Filarete's *Tratatto*: the visualization of architectural theory

Among the first illustrated treatises of the Renaissance, Filarete's *Trattato di architettura*, 1458-1464, stands out. With this treatise, Filarete attempted to demonstrate some of the principles contained in Vitruvius' treatise by means of reasons and figures ('*per ragioni e figure*'). Following Vitruvius, he believed that "*la forma dello edificio è derivata dalla forma e misura de l'uomo, e così da' suoi membri*" and that this form was found "*per necessità e bisogno de l'uomo.*"⁶⁹ And to demonstrate that the form of the first buildings derived from the form of the human body, he shows an image of Adam protecting himself from the rain with the two hands making the characteristic form of the gabled roof (Figure 4.12). This is the visual prove that the form of the roof had its origin in the human body.

Filarete also attempted to demonstrate with an image that the primitive hut did originate in nature, as Vitruvius had contended. In this case, the illustration shows a hut made up of four posts connected by beams (Figure 4.13). This is the first recorded depiction of a primitive hut by an architectural theorist, which would be then followed by others like the ones shown in the texts of Blondel or Laugier.⁷⁰ The posts are in fact chopped trees, with the upper part having a hairpin form ready to receive the beams. Basically, the illustration demonstrates the way, in which the ingenuity of man could transform some natural forms (the trees) into the form of the hut.

⁶⁹Filarete, op. cit., vol. 1, p. 25.

⁷⁰H. W. Kruft, *Geschichte der Architekturtheorie*, 1991, p. 57.

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Figure 4.12. Filarete. Adam protecting himself from the rain with his hands.

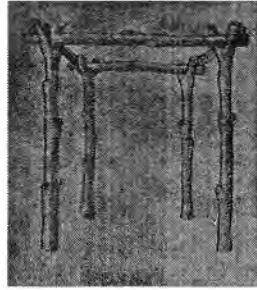


Figure 4.13. Filarete. Primitive hut.

The interpretation that Filarete makes of the theory of the origins of architecture previously formulated by Vitruvius gives us a clue to understand some fundamental tenets of the early Renaissance architectural theory. Like Vitruvius, Filarete also contends that architecture has its origins in nature, that the first buildings were the result of necessity and that man was the model for architecture: *"lo edificio sia dirivato da l'uomo, come l'uomo sia in forma e in membri e in misura."*⁷¹ But some fundamental differences exist between the theory of Vitruvius and the interpretation that Filarete makes of it. First, Filarete, aiming at a reconciliation of the ancient and Christian cultures, transforms the well-proportioned man of Vitruvius into the biblical figure of Adam. Second, for Filarete the primitive construction is mostly a product of man, while for Vitruvius, as we have seen, the primitive construction was mostly a product of nature (Figure 4.14). In this regard, Filarete explicitly declares that *"non è dubbio che lo edificare fu trovato da l'uomo."*⁷² Third, there is one more difference to be noticed between Filarete and Vitruvius. Filarete considered that the form of the roof created after the form of the hands, was already endowed with certain proportions, that derived from the dimensions of the human head, which as Filarete contends, is *"il più degno membro e 'l più bello."*⁷³ Unlike Filarete's primitive hut, the primitive constructions of Vitruvius were not supposed to have any specific proportions.⁷⁴ Rather, Vitruvius' hut represented the outline or figure which served as model for architecture. The proportions, however, were not derived from the primitive hut but from the human body by means of analogy (*symmetria*).

⁷¹Filarete, op. cit., vol. 1, p. 25.

⁷²Ibid., p. 23.

⁷³Ibid., p. 18.

⁷⁴As Kruft contends, Filarete's primitive hut is not simply the beginning of architecture, but implicitly contains the proportions and the orders: *"Sie ist nicht nur ihr Beginn, sondern sie enthält bereits Proportion und Säulenordnung."* Kruft, op. cit., p. 57.

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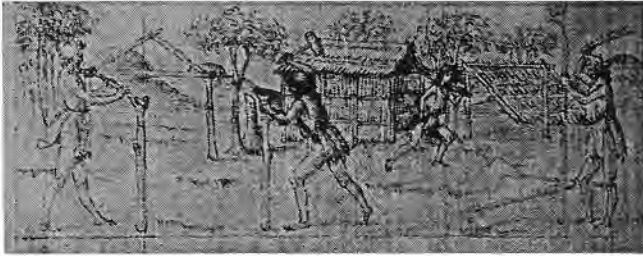


Figure 4.14. Filarete. Men constructing the primitive huts.

The tradition of the illustrated treatise continued after Filarete, particularly in the works of Francesco di Giorgio, Serlio and Palladio. The illustrations of Serlio's books still have something in common with the ones of Filarete's treatise: they are not so much abstractions of reality but an extension of reality itself. In the *Quattro Libri* of Palladio, however, illustrations were not so much an analogue of the sensible world. Rather, drawing was used as a systematizing tool to give expression to the abstract qualities of architecture.

4.4.2 Serlio's *Sette Libri*: classification and systematization

Serlio's books, collected under the name of *Tutti l'opere d'architettura*, 1537-1575, were conceived as a textbook for practising architects. The overall orientation of the work was more pragmatic than theoretical. Much of the great success of the books was due to the illustrations, which indeed became more influential than the text itself.

The abstract and physical realms

The *Primo Libro* of Serlio, which is dedicated to Geometry, represents the continuation of a tradition, already existing in the Gothic, according to which the knowledge of geometry was considered the fundament of the architect's craft.⁷⁵ In this first book, Serlio introduces some rules to draw basic geometric figures, like lines, triangles, circles and ellipses. Some of these geometric constructions have a practical utility, like calculating the area of a property, while others have a design purpose as, for example, to use ellipses to design a vessel.

From the illustrations of Serlio's books, it can be inferred that for Serlio there was no clear-cut distinction between the real and physical building and the

⁷⁵For example, in the book *Geometria Deutsch*, of Matthäus Roriczer, a series of geometric procedures are described to design pinnacles. Similar procedures are described in the *Büchlein von der Fialen Gerechtigkeit*, from Hans Schmuttermayer. A study of both texts is found in L. R. Shelby, *Gothic Design Techniques*, 1977.

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building as represented by means of drawings, particularly, perspective drawings.⁷⁶ In the *Secondo Libro*, for example, Serlio illustrates the rules of perspective through a sequence of views. This sequence of views not only introduces the different procedures for perspective construction but, moreover, reproduces the construction of the building from the foundations to the roof (Figures 4.15, 4.16).

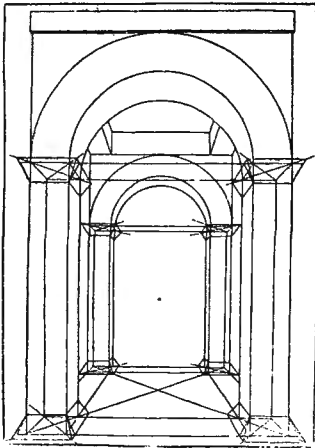


Figure 4.15. Serlio. *Secondo Libro*: On perspective.

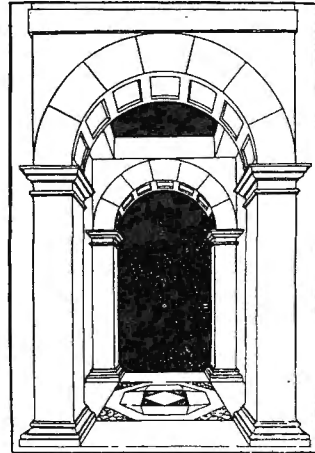


Figure 4.16. Serlio. *Secondo Libro*: On perspective.

The identification of the abstract with the physical is particularly manifest in the way buildings are depicted in the different plates of the following books. In the drawings of the third book, sections are not the abstract drawings that result from cutting the building through imaginary planes like, for example, in the sectioned drawings that Antonio da Sangallo had done for St. Peter's project. The representation technique employed by Serlio is more rudimentary: it is based on tearing off part of the building, as if this would have been physically destroyed to allow a view of the inside (Figure 4.17). In other section drawings, the inner elevations are not projected properly; some parts are shown in perspective view while others are deformed according to the principles of parallel projection (Figure

⁷⁶At the theoretical level, this mixture of sensible and abstract realms can be observed also in Alberti's writings. In *De Pictura*, Alberti took pains to give a definition of the Euclidean elements that suited the purposes of painting. Thus, he put the emphasis on the sensible attributes of lines and points, rather than in the most abstract ones. He said that "a point is a sign one might say is not divisible into parts. I call a sign anything which exists on a surface so that it is visible to the eye[...]. Points joined together continuously in a row constitute a line. So for us a line will be a sign whose length can be divided into parts, but it will be so slender in width that it can not be split[...]. If many lines are joined closely together like threads in a cloth, they will create a surface. A surface is the outer limit of a body which is recognized not by depth but by width and length, and also by its properties." Leon Battista Alberti, *On Painting*, [1991], pp. 36-37.

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4.18). In this regard, Serlio's drawing technique appears to be less developed than the one of some contemporary architects.

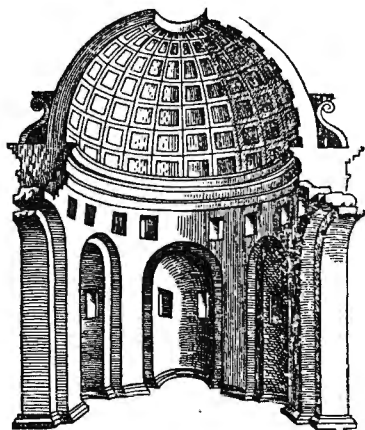


Figure 4.17. Serlio. Third Book: Antique monuments.

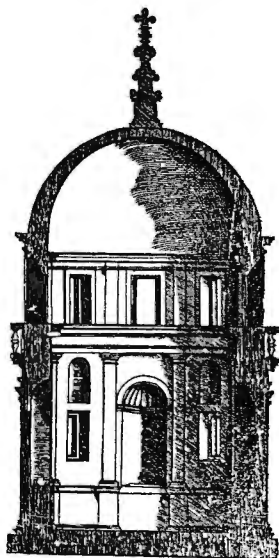


Figure 4.18. Serlio. Third Book: Antique monuments. Cross-section of Bramante's tempietto.

Typology of ancient buildings

In the *Terzo Libro*, Serlio provided a visual record of some of the most remarkable buildings of the antiquity, as well as some contemporary works by Bramante, Peruzzi and Raphael. Serlio considered these Renaissance architects to be the true followers of the antiquity and, for that reason, he showed their work together with the work of the ancients.

The exposition of ancient works begins with the Roman Pantheon, which Serlio considered 'the perfectest piece of work that ever I saw.' He praised the Pantheon saying that it 'has so many members, which are all correspondent one to the other'; a classical definition of beauty that can be traced back to Alberti. After the Pantheon, it comes a series of temples located in and outside Rome, ending up with temples designed by Bramante and Peruzzi. In his account of ancient architecture, Serlio included other building types, apart from temples: theaters, columns, obelisks, amphitheatres, palaces, thermae, bridges and triumphal arches (Figures 4.19, 4.20).

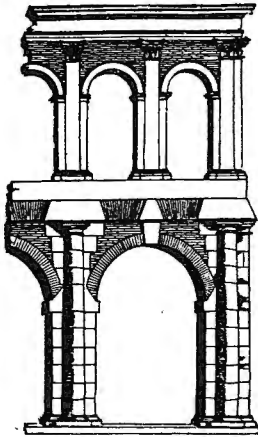


Figure 4.19. Serlio. Third Book: Antique monuments.

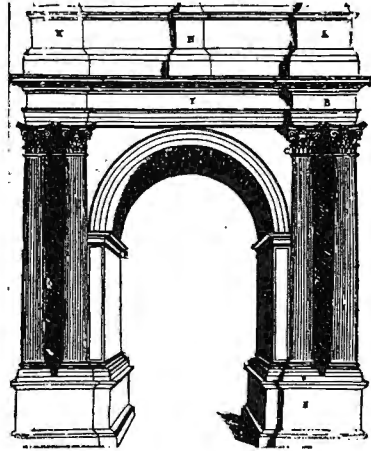


Figure 4.20. Serlio. Third Book: Antique monuments.

The content of this third book can be understood as the work of an archaeologist who collects the remaining fragments of antique buildings, as well as the work of a theoretician who tries to classify and organize the works of the past, and to represent them systematically. A view to the illustrations convey this double intention of Serlio's undertaking: together with the more abstract and systematic representation of ancient buildings in *ichnographia*, *orthographia* and *sciographia*, there are perspective drawings that show fragments of Roman ruins as they *actually* were.

Serlio must have assumed that the illustrations of buildings had the same status of objective reality as the actual buildings. But the existence of errors in some illustrations, notably in the drawings of the Pantheon and of Bramante's *tempietto*, raises some questions about Serlio's assumption. If we compare, for example, the plan of the Pantheon that is shown in Serlio's book (Figure 4.21) with a more recent plan (Figure 4.22), we can see first, that the width of the portico is smaller in Serlio's plan; second, that in Serlio's drawing the intercolumniation of the two central columns appears to be larger than the intercolumniation of the adjacent columns while, as a matter of fact, all the columns are evenly spaced in the actual building; and third, that the staircase on the right side is bounded by two curved surfaces arranged symmetrically, while in the actual building one of the surfaces is straight. Furthermore, even though Serlio's plan has been drawn to scale, it can be observed that, in general, the proportions of openings and niches, and the distances between columns and pilasters in the inner wall do not conform to the most recent plan.

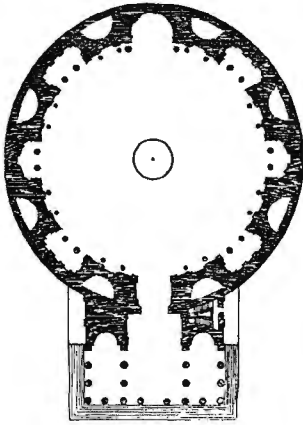


Figure 4.21. Serlio. Third Book: Plan of the Pantheon.

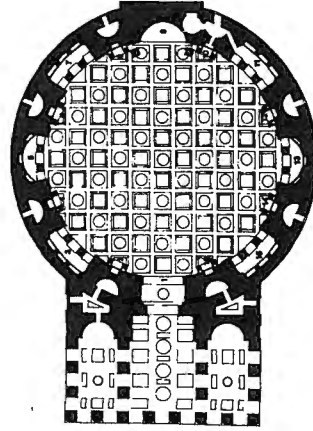


Figure 4.22. Plan of the Pantheon. From W. MacDonald, *The Pantheon*, 1976.

When we compare the two plans of the Pantheon, the one of Serlio and the most recent one, the question of which representation depicts more faithfully the reality of the building is unavoidable. But in the time of Serlio this doubt probably did not arise. It is only in our times that we have become more suspicious of a direct correspondence between representation and reality. We can assume then that, in spite of its inaccuracies, Serlio had considered that the plan of the Pantheon that he included in his book was a representation of the *real* Pantheon.

Variations on a theme: the design for temples

In the *Quinto Libro*, published in 1547, seven years after the third one, the classificatory work undertaken in the third and fourth books adopts a different character. While the classification in the third book was based on building types (theaters, temples, amphitheaters), the classification in the fifth book has a more morphological character. In the fifth book, Serlio concentrated on a building type, the church, showing different formal variations of it. The design of every temple is based on some elemental geometric figures, starting with the circle (the most perfect form) and continuing with ellipse, pentagon, hexagon, octagon and square. More complex plans are the result of the combination of the simple ones; for example, plans which are combinations of square and circles, and combinations of Latin and central plan schemes (see Table 4.1).

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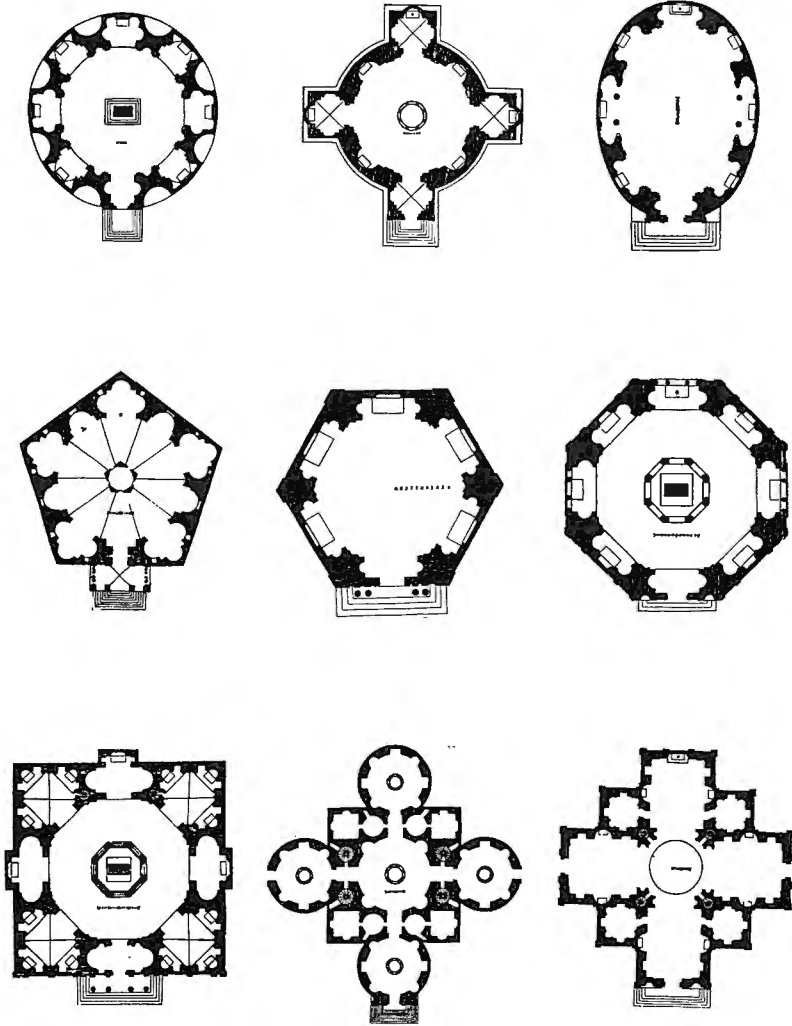


Table 4.1. Serlio, Fifth Book: designs for temples.

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As they appear in plan view, Serlio's designs for temples are the result of transforming a geometric figure into an architectural representation. Circles, ellipses and rectangles are transformed into circular plans, elliptical plans and rectangular plans. In this transformation from geometry to architectural representation, the wall plays a crucial role. In fact, all the architectural meaning of those schematic plans concentrates on the thick wall. In the first design, corresponding to a circular temple, the wall is carved out inside as well as outside with a series of niches. The entrance is a niche whose back wall has been removed. The same pattern is maintained in the following designs. The plan is essentially symmetric and it can be easily reduced to a geometric figure. Invariably, the entrance is placed at one of the axes of symmetry.

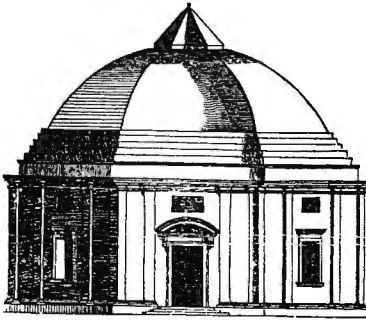


Figure 4.23. Serlio. Fifth Book: Elevation of a centralized church.



Figure 4.24. Serlio. Fifth Book: Elevation of a centralized church.

In the elevations, the variations are created by means of substituting individual components, like gates or lanterns (Figures 4.23, 4.24). Different kinds of gate are used to mark the entrance. Some consist only of a framed door topped by a pediment. In other cases, the door becomes a triumphal arch which is attached to the volume. In every design, a few steps are part of the entrance, so that the church remains elevated from the surroundings, as Alberti had postulated. Similarly, different kinds of lanterns are used. Some consist of a solid volume like a pyramid, in others the volume is pierced with openings.

The Pantheon, with its inner wall carved with niches and its single space covered by a dome, provided the prototype from which Serlio's temples ultimately derive. However, Serlio's designs are smaller than the Pantheon, so that they can be built fast -he says- and 'with small cost'. The designs reflect this change of scale with regard to their original prototype. For example, in the circular temple, the complete portico of the Pantheon is replaced by a simpler door (Figure 4.25). Also, in Serlio's design the free-standing columns, that in the Pantheon serve to delimit the space of the niche have been eliminated; presumably, because the smaller niche makes the columns unnecessary.

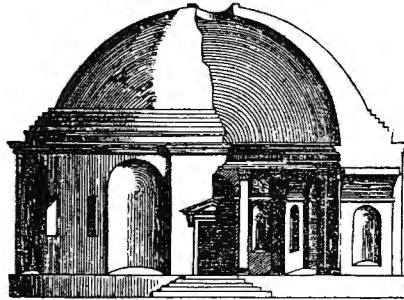


Figure 4.25. Serlio. Fifth Book: Cut-away section of a church with circular plan.

The classificatory work continued in the following books. In the *Sesto Libro*, private houses are ordered according to social classes, and in the *Settimo Libro* different building types are shown together with construction elements. It has been suggested that, seen as a whole, Serlio's books constitute a progression from the most abstract and universal principles -geometry and perspective- to the most concrete and accidental cases -building types and construction.⁷⁷ In any case, Serlio's books represent an early attempt to arrive at a systematization of architectural knowledge by graphical means. Basically, the same purpose that guided Palladio in the publication of the *Quattro Libri*.

4.4.3 Palladio's *Quattro Libri*: representation and systematization

Serlio's books had a direct influence on another celebrated Renaissance treatise: the *Quattro Libri* of Palladio, published in 1570. It has been established that Palladio met Serlio and that he had access to his collection of drawings.⁷⁸ This contact with Serlio's work might have influenced Palladio strongly. The structure of the *Quattro libri*, the interest in classification and systematization, and the profusion of illustrations, are signs of the influence that Serlio exerted on Palladio.

Drawing and systematization

When Palladio made drawings of the Roman monuments, he did more than make visual records of them. Most of the times, it was not possible to get accurate

⁷⁷M. Carpo, 'Ancora su Serlio e Delminio. La teoria architettonica, il metodo e la riforma dell'imitazione', 1987, pp. 111-113.

⁷⁸According to Holberton, "through Trissino or Cornaro Palladio doubtless met the architect Sebastiano Serlio, and at Cornaro's house would have examined not only Serlio's drawings but also an extensive series of drawings of antique buildings by Giovanni Maria Falconetto." Holberton, op. cit., p. 76.

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information from the old Roman buildings, either because they were buried or hidden by other structures, or partially destroyed. For that reason, Palladio had to imagine what those buildings would have looked like, completing the missing parts to capture the grandeur of the original designs. Drawing was for Palladio a tool that allowed him to synthesize and to analyze, to recreate the old buildings and to record the remaining fragments.

This double meaning that drawing had for Palladio is manifested in the reconstruction of the mausoleum of Romulus on the Via Appia (Figure 4.26). The orthogonal projections in plan and elevation enables Palladio to capture the spatial relations of the three-dimensional components of the building. The side elevation shows the cornice of the portico extended around the exterior wall of the cylinder. This extension is the logical consequence of seeing the building in this particular projection and reveals an intention of connecting the two distinct components of the building, the portico and the cylinder.

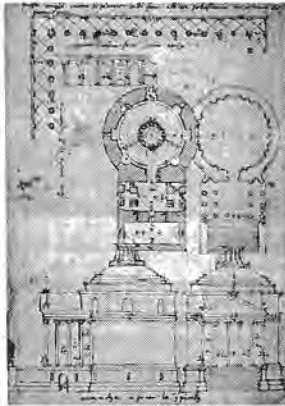


Figure 4.26. Palladio. Reconstruction of the mausoleum of Romulus on the Appian Way.

The image of the Pantheon might have pervaded in Palladio's mind, as he proceeded to recreate, in a drawing, the small temple of Romulus. In the Pantheon -it must be remembered- there is a prismatic block that serves as the connection between the portico and the cylindrical body. This block, however, does not appear in the elevations of Palladio's reconstruction of the Romulus mausoleum. Palladio seems to have overlooked this fact, since the side elevation fails to depict properly the intersection between the roof of the portico and the cylindrical wall.⁷⁹

⁷⁹The necessity for such a connecting block is manifest in the church that Palladio designed at Maser, in which the intermediate body from which two towers emerge acts as a nexus between the portico and the cylindrical volume.

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In effect, the intersection of the two elements should result into a conic curve, whereas the elevations show a straight line instead.

This emphasis on the abstract qualities of drawing, distinguishes Palladio's illustrations from the ones of his immediate predecessor, Serlio. To see the different role that drawing had for each one of them, it is enough to compare the drawings of the Pantheon made by Serlio and Palladio (Figures 4.27, 4.28). In the case of Palladio, the drawing of the plan allows him to discover the spatial relations between the components of the building, particularly between the portico and the cylinder. He regularizes the plan as much as possible, even though this regularization might have nothing to do with the actual building. Furthermore, while Serlio thought of drawing mostly as a depiction of the actual building, Palladio seems to be aware of the power that drawing has to transform the real into the ideal, a question that concerned him particularly in the representation of the villas in the *Quattro Libri*.⁸⁰

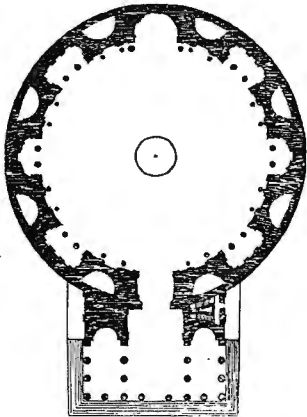


Figure 4.27. Serlio. Third Book: Plan of the Pantheon.

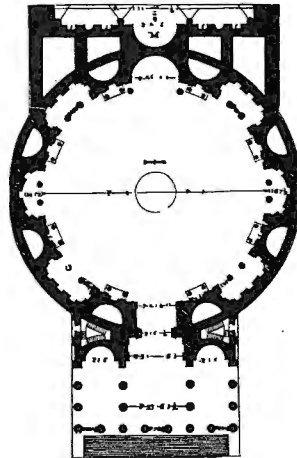


Figure 4.28. Palladio. *Quattro Libri*: Plan of the Pantheon.

The representation of the idea

There is another aspect that separates Palladio's books from Serlio's books, and this has to do with their different approaches regarding the study of building types. At

⁸⁰According to Ackerman, "the success of Palladio's book was in fact made possible by the abstractness of his style; a designer who thinks in terms of proportions in the plane can communicate the essence of his concepts in line. A book of woodcuts of the work of Michelangelo or Bernini would have misrepresented them grossly, and could not have excited a following even among audiences attuned to their expressionist effects." Ackerman, *Palladio*, p. 78.

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first glance, there seems to be not much difference between the typological undertaking of Serlio and the one of Palladio, particularly if we think of the classification of temples by Serlio in the fifth book and the classification of villas in Palladio's second book, where he showed his built (and also unbuilt) projects for palaces and villas. There are, nevertheless, some fundamental differences between the two authors. As Myra Nan Rosenfeld contends, "Palladio's book is a treatise in which the principles of architecture are demonstrated through his own buildings as well as ancient ones which had been actually built or were intended for construction. In contrast Serlio's manual presents for the most part '*invenzioni*' or proposals for future buildings which the architect could transform and adapt to his own purposes."⁸¹ In other words, while Serlio wanted to provide concrete models that could be imitated by architects, Palladio was trying to give expression to a more abstract notion: the *idea* that underlies the designs of his villas.

In effect, through the systematic representation of his own designs, Palladio intended to give expression to some fundamental principles of architecture that transcended his own buildings. This is the reason why he decided to re-draw his projects, eliminating irregularities, updating old designs and, in general, trying to convey a sense of unity to the whole work. The result of this process is that many drawings do not conform to the actual buildings, a fact that has puzzled scholars since at least the seventeenth century, when Bertotti Scamozzi measured Palladio's buildings and realized that there were substantial differences between his measures and the ones provided in the plates of the *Quattro Libri*.

Some authors have attributed this lack of agreement between drawings and buildings to errors in publication.⁸² However, the discrepancies between drawings and buildings has less to do with mistakes than with Palladio's desire to approximate the real to the ideal. It is therefore misleading to think of the drawings of the villas in the *Quattro Libri* as faithful depictions of the actual buildings. Rather, Palladio's drawings should be taken as abstract diagrams that try to convey the *idea* of a building or, more precisely, a class of buildings: the villa. Moreover, with his drawings, Palladio is giving expression to Alberti's concern with the identity between idea and representation. The idea of the villa is best expressed by means of plans in which all accidental traits have been eliminated until they have become a sort of visual abstract formula. The plan contains the minimum information to express the essence of the design: hatched areas representing walls and columns, lines representing interior stairs and exterior entrances, and a few numbers indicating the proportions of the rooms.

⁸¹M. N. Rosenfeld, 'Sebastiano Serlio's Contributions to the Creation of the Modern Illustrated Architectural Manual', 1987, p. 102.

⁸²"The many discrepancies between the plates and the actual buildings were and are usually attributed to careless publication." Wittkower, op. cit., p. 121.

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In their respective treatises, both Serlio and Palladio faced the philosophical question of whether a universal (the Idea) can be expressed by means of a particular (a drawing). Strictly speaking, the idea cannot be visually represented because at the moment that the universal (e.g. the idea) is identified with a particular (e.g. the sensible drawing) it is no longer a universal but a particular.⁸³ A way out to this dilemma is to eliminate accidental traits from the plan and to reduce it to a geometric figure. This way, the circular temple or the cubic villa become the graphic expression of the idea. This is basically what Serlio, and Palladio in particular, did in their respective treatises: they attempted to represent graphically the Idea of the temple and the Idea of the villa. As we will see in Chapter 7, two hundred and fifty years after Serlio and Palladio, Durand would face a similar problem, as he attempted to identify Type (not to be confused with Idea) with geometric figures.

The order of the presentation of the villas

As we have seen, the series of temples presented by Serlio in the fifth book begins with the circular temple, which he considered to be the most perfect one. A similar intention might have guided Palladio as he chose the Palazzo Antonini in Udine as a first example in the second book (Figures 4.29, 4.30). Palladio might have started the book with this project, because, as Boucher has suggested, "the palace gives the best introduction to Palladio's system by virtue of its compact design."⁸⁴ Effectively, the square plan and the clarity of the spatial arrangement suggest that this palace approximates better than any other to the ideal villa. This means that the subsequent examples can be understood as variations on the generic formula that the Palazzo Antonini epitomizes, as Boucher contends: "After showing the 'essential' Palladian palace in this first woodcut, the author proceeded to take his reader through a series of variations in the subsequent pages."⁸⁵ Thus, while Serlio began with the most beautiful form, Palladio started with the most generic design, the one that could represent better the idea of the villa because its form was less conditioned by accidental traits.⁸⁶

⁸³There is another way to convey the universal, without identifying the idea with a concrete image, and this is what Palladio achieves with the systematic presentation of his different designs in the second book of the *Quattro Libri*. By looking at the different designs, it becomes clear that a single idea lies behind them, even though this idea cannot fully identified with any of them. This idea is made 'visible', so to speak, through the presentation of the individual cases, but is not identified with any of them in particular, as Ackerman contended.

⁸⁴Boucher, op. cit., p. 244.

⁸⁵Ibid., p.247.

⁸⁶It has been argued, although it has not been established, that the kitchen room might have been a later addition made by a publisher of Palladio's books.

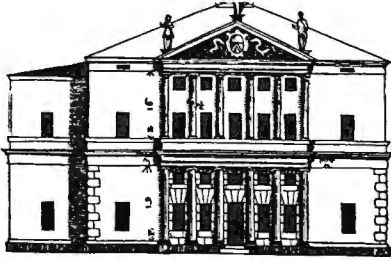


Figure 4.29. Palladio. *Quattro Libri*: Elevation of the Palazzo Antonini.

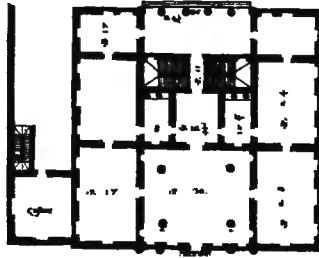


Figure 4.30. Palladio. *Quattro Libri*: Ground plan of the Palazzo Antonini.

It is significant that Palladio placed the Palazzo Antonini, and not the villa Rotonda, at the beginning of the second book (see Table 4.2). The villa Rotonda is placed, rather arbitrarily, among the palaces.⁸⁷ This fact might be puzzling for those scholars who have thought of the villa Rotonda to be the ultimate expression of the Palladian villa. But, with this decision, Palladio might have wanted to avoid associating a particular villa with an ideal type -the counterpart of Serlio's most perfect temple. If this is so, Ackerman's contention that there can be no typical Palladian villa would be confirmed. The idea of the Palladian villa then, could only be manifested through all the different designs considered as a whole.

⁸⁷Palladio was aware of the unique character of the villa Rotonda, and expressed some doubts whether the project should be placed among the palaces or together with the villas. He decided to put it with the palaces because, as he writes in the *Quattro Libri*: "[the Rotonda] non mi è parso mettere tra le fabbriche di Villa per la vicinanza ch'ella ha con la Città, ond si può dire che sia nella Città istessa." Palladio, *Quattro Libri*, II, iii, p.18.

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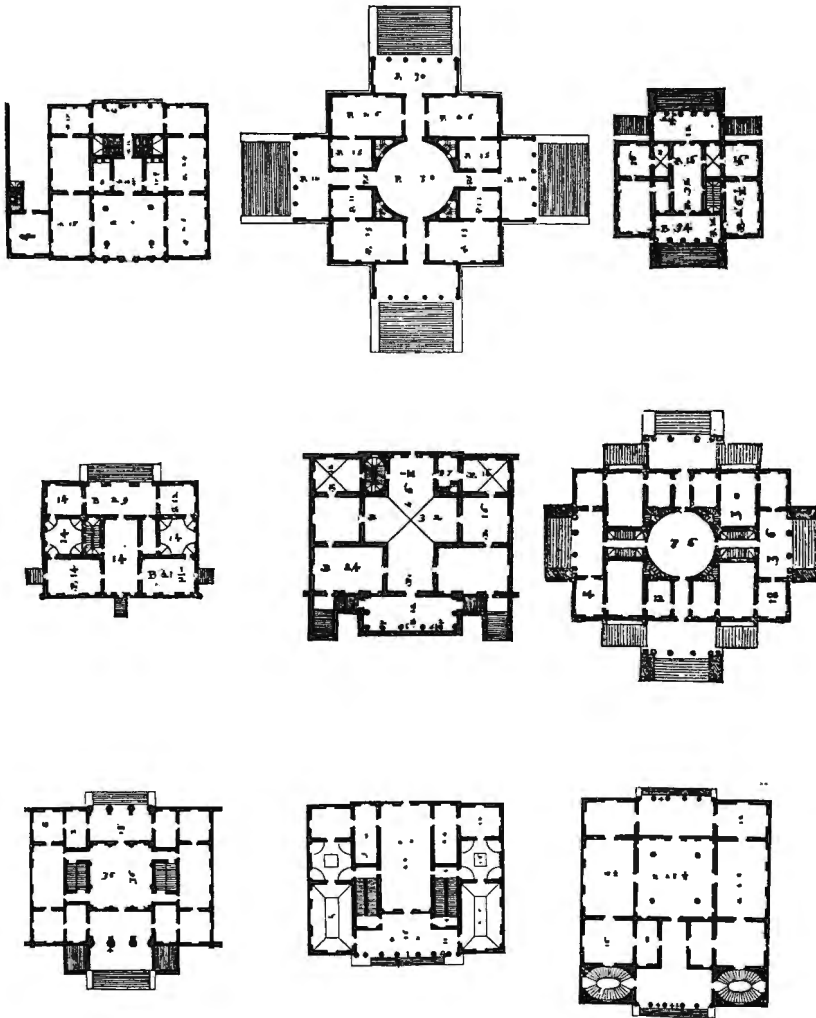


Table 4.2. Some of Palladio's villas, in the same order as shown in the second book of the *Quattro Libri* (from upper left to lower right).

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4.5 The centralized plan and the natures of architectural form

4.5.1 The central plan buildings

Central plan buildings are the most characteristic building type of Renaissance architecture. The centralized building, however, is not a Renaissance invention. The oldest origins of centralized buildings can be traced back to the funerary constructions in Mycenae, like the Agamemnon tomb. Greek architecture made occasional use of central schemes, like in the tholos of Epidaurus. But it was in Roman architecture when the centralized plan gained special relevance. The Roman system of construction, based on the arch and the vault, was better suited to cover large circular spaces than the trabeated system used by the Greeks. Among the most celebrated central plan buildings of the Roman period are Minerva Medica, the temple of Vesta at Tivoli and, especially, the Pantheon. The tradition of centralized buildings continued after Rome. Early Christian buildings like Sta. Constanza, and much of Byzantine religious architecture consist of centralized structures. Also, some Romanesque churches like San Lorenzo in Milan, were central plan buildings.

Therefore, when Brunelleschi decided to use a central plan scheme in the chapel Pazzi and later in the church of Santa Maria degli Angeli, he was simply continuing with a tradition of centralized buildings which had always existed in architecture, with the only exception perhaps of the Gothic period.

Brunelleschi did not seem to have thought much about his choice of a centralized plan.⁸⁸ Other Renaissance theorists and architects, however, found it necessary to justify their choice of central plans on more speculative grounds. Alberti, for example, appealed to the doctrine of imitation to support the use of central plan for temples because, as he said, "nature delights primarily in the circle"(VII,4). Incidentally, the circle for Alberti meant not only this particular geometric figure but any polygonal figure which could be inscribed in a circle. Later, Palladio maintained that the circle should be used in the design of churches because "it is enclosed by one circumference only, in which is to be found neither beginning nor end, and the one is indistinguishable from the other; its parts correspond to each other and all of them participate in the shape of the whole; and moreover every part being equally distant from the centre such a building

⁸⁸It can be contended that his main reason to use this scheme should be found in his concern with the systematization of interior space. As Argan has contended, "il Brunelleschi è il primo a pensare l'architettura come spazio, cioè come la manifestazione -e la sola possibile- di un'interna legge costruttiva dell'universo, che soltanto all'uomo può rivelarsi perché l'uomo è dotato di ragione e quella legge, ch'è poi la legge divina della creazione (la "divina proporzione"), è per eccellenza razionale." G. C. Argan, *Brunelleschi*, 1978, p. 113.

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demonstrates extremely well the unity, the infinite essence, the uniformity and the justice of God.”⁸⁹

This comment from Palladio gives us a cue to explain the Renaissance predilection for centralized buildings. Palladio’s preference for central plan buildings could obey two distinct reasons. First, to his concern with *perceptual* issues, because, as he says, in the circumference “its parts correspond to each other and all of them participate in the shape of the whole.” Second, to the symbolism of the circle, which he considered to be the expression of “the uniformity and the justice of God.” In the following sections, we will argue that the attraction of Renaissance architects for the central plan is a reflection of their preoccupation with the *perceptual* and *symbolic* dimensions of architectural form.

4.5.2 The perceptual nature of architectural form

Palladio’s concern with perceptual issues is more clearly manifested in the following commentary, in which he answered some clients who asked him to complete the Gothic church of San Petronio. He answered them in the following terms: “I do not know in what German author they have ever read a definition of architecture, which is nothing but a symmetry of the members within a body, each being so well proportioned and so concordant with the others and vice versa that by their harmony they give the impression of majesty and decorum; the Gothic style, however, should be called confusion and not architecture....”⁹⁰ Even more eloquent of Palladio’s preoccupation with perception is the following passage in the preface of Book IV of the *Quattro Libri*, where he writes that churches should be built “in such a manner and with such proportions, that all the parts together may convey a sweet harmony (*una soave armonia*) to the eyes of the beholders.”⁹¹ This correspondence of the parts within the whole, making the building an inextricable unity, is what constitutes for Palladio, as for Alberti before, the essence of beauty. As he writes in the first book of the *Quattro Libri*: “Beauty will result from the form and correspondence of the whole, with respect to the several parts, of the parts with regard to each other, and of these again to the whole; that the structure may appear an entire and complete body, wherein each member agrees with the other, and all necessary to compose what you intend to form”(I,1).

Like Alberti, Palladio also takes into account the participation of the beholder in the perception of beauty and architectural form. He is concerned with the fact that the beholder perceives the *idea* in his buildings; the same *idea* that he as designer has implanted on the building. This preoccupation for the relation

⁸⁹Palladio, preface of Book IV, p. 6, *Delle Forme de Tempii*, in the *Quattro Libri*. Quoted and translated in Wittkower, op. cit., p. 32.

⁹⁰Quoted in E. Panofsky, *Meaning in the Visual Arts*, 1993, p. 240.

⁹¹Quoted in Wittkower, op. cit., p. 110.

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between *idea as perceived* and *idea as conceived* was completely alien to the medieval architect-builder. Unlike the medieval mason, Palladio represents the architect-intellectual who is concerned with the effect that his individual creation will have on the beholder. For a modern architect like Palladio, a building becomes the vehicle of communication of an idea.

The negative opinion that Palladio had of Gothic architecture is perfectly coherent with the architecture he practiced. Palladio's buildings, particularly the villas, are the expression of a coherent structure which appears intelligible to the mind's eye both in the exterior appearance and in the interior spatial configuration.⁹² Conversely, a Gothic cathedral, with the naturalistic character of its forms, the abundance of detail and its enormous size, does not bring about the same sense of intelligibility as the one produced by the geometric, sober forms of the relatively small Palladian villa.⁹³ In contradistinction to the medieval mason, who seemed not to be concerned with the fact that the cathedrals he built had grown beyond the limits of the mind's eye, the attitude of the Renaissance architect represents a return to the notion of beauty that Aristotle had referred to in his *Poetics*; a beauty that depends on the capability of the viewer to perceive the 'unity and wholeness' of the work of art.

This willingness to create architectural forms and spaces which can be apprehended by the beholder was not exclusive of Palladio.⁹⁴ As Paul Frankl contended in his seminal book *Die Entwicklungsphasen der neueren Baukunst*,

⁹²Heath Licklider has referred to Palladio's villas in the following terms: "Even in his most freely composed 'Mannerist' buildings, Palladio's eye demanded a clarity of definition, and a simplicity of relationship between parts, which is not inherent in the proportional system[...]. This simplicity resides in the architect's imagined conception of the design, and it is in fact one of the main traits of character that makes these buildings unmistakably Palladian - noble, poised and serene." H. Licklider, *Architectural Scale*, 1965, pp. 55-56.

⁹³Peter Murray attributes a negative opinion about Gothic architecture to every Renaissance architect: "Nevertheless, no Italian architect would have wished to break the simplicity of the outside line of this church by spiky pinnacles, and the sober classicism which the Italians sought in the exterior of their churches could be maintained, therefore, only by forgoing the structural advantages of the flying-buttresses system." Murray, *op. cit.*, p. 19. After the Renaissance, it became commonplace to consider Gothic architecture as the antithesis of the Classic (Greek and Roman). This antithesis is still present in the work of recent scholars. For example, Robert Branner writes that "there is no fixed set of proportions in the parts, such as can be developed from the diameter of a Greek column, and no standard relationship between solid and void." R. Branner, *Gothic Architecture*, 1961, p.11. Furthermore, he thinks that "the exterior of Amiens is not a simple envelope that seems to transform the volumes into a solid mass, however. It is rather a half-open, half-closed composition of flying buttresses, pinnacles, and pyramidal roofs. If the interior volumes have finite limits, the exterior massing has not distinct beginning or end." *Ibid.*, p.16.

⁹⁴Leonardo da Vinci, for example, commenting about the problems he encountered in designing a dome for the crossing of the cathedral in Milan, writes that "one of the most serious problems in the planning of any dome[...]lies in the difficulty of compensating for the discrepancy between the inner and outer vaulting. If one vaults.. over the inscribed circle, a harmonious relationship can be attained in the interior, but one must then forgo the exterior effectiveness of the dome, which will be too small to assert itself against the mass of the building as a whole." Quoted and translated in W. Lotz, 'Notes on the centralized church of the Renaissance', *op. cit.*, p. 69.

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1914, the willingness to create buildings that are easily apprehensible by the mind's eye constitutes a fundamental characteristic of the Renaissance. A main tenet of Frankl's theory is that a building can never be apprehended in its totality and that the beholder can only build up a 'mental image' (*Vorstellung*) of it after gathering a series of discrete views of the building. According to Frankl, "*Architektur sehen heißt die Reihe von dreidimensional gedeuteten Bildern, die sich im Abschreiten der Innenräume und im Umschreiten der äußeren Schale ergeben, zu einer einzigen Vorstellung zusammen beziehen. Wenn ich vom architektonischen Bilde rede, so meine ich diese eine Vorstellung.*"⁹⁵ As opposed to the buildings of the Baroque, this architectural image is unique in the Renaissance buildings: "*genügen erstaunlich wenig Standpunkte, um die Vollständigkeit des architektonischen Bildes zu erobern; das architektonische Bild ist hier ein einmaliges Bild; von soviel Seiten man es auch ansieht, es ist immer dasselbe, es deckt sich mit der tatsächlichen Gesamtform.*"⁹⁶

As a characteristic example of Renaissance architecture, Frankl mentions Bramante's *tempietto* which he thinks 'looks the same from every side' ("*sieht von allen Seiten gleich aus*") and, therefore, "*ist das Bild -das architektonische Bild- fertig gegeben; nichts lockt uns, um das Gebäude herumzugehen, weil wir sofort sehen, daß es keinerlei Überraschung geben kann.*"⁹⁷ Palladio's villa Rotonda would produce a similar effect: a few glimpses suffice to understand the totality of the building's form.

4.5.3 The symbolic nature of architectural form

The explanation of Renaissance architecture in terms of the ease of apprehension of formal and spatial configurations by the beholder, proposed by Frankl, was later contested by Rudolf Wittkower in his *Architectural Principles in the Age of Humanism*, first published in 1949. While Frankl stressed the geometric-perceptual nature of the Renaissance conception of architectural form, Wittkower

⁹⁵P. Frankl, *Die Entwicklungsphasen der neueren Baukunst*, 1914, pp. 123-124. English translation in *Principles of Art History*, p. 142: "To see architecture means to draw together into a single mental image the series of three-dimensionally interpreted images that are presented to us as we walk through interior spaces and round their exterior shell. When I speak of the *architectural image*, I mean this one *mental image*."

⁹⁶*Ibid.*, p. 127. English translation in *Principles of Art History*, p. 144: "It suffices for us to view a building from surprisingly few points to gain a complete architectural image. The architectural image here is unique; it is always the same no matter whether it is seen from many different angles. It is identical with the actual complete form."

⁹⁷*Ibid.*, p. 127. English translation in *Principles of Art History*, p. 144: "The image -the architectural image- is complete from all viewpoints. There is not temptation for us to walk round the building because we realize at once that it can offer us no surprises."

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contended that the genuine value of Renaissance architecture -especially the centrally planned temples⁹⁸- lay in its symbolism.

In effect, whereas Frankl thinks that the central plan responds to the desire of Renaissance architects to create a unified space that could be easily perceived by the beholder, Wittkower stresses instead the symbolic meaning of central plan buildings. The main premise of Wittkower's argument is contained in the following statement: "We maintain, in other words, that the forms of the Renaissance church have symbolical value or, at least, that they are charged with a particular meaning which the pure forms as such do not contain. Both the theory and the practice of Renaissance architects are unambiguous in this respect."⁹⁹ Moreover, Wittkower criticizes those historians (among them, presumably Frankl) who ignore the symbolical and religious side of Renaissance architecture: "But in spite of the contrary evidence of the architects themselves, in the eyes of architectural historians such plans have become something like a touchstone of Renaissance paganism and worldliness."¹⁰⁰

Wittkower not only stressed the symbolic dimension of architectural form in the Renaissance, but, moreover, used this as an argument against those theories that stressed the importance of perceptual issues. At some point, Wittkower seems to be targeting Frankl's theory of the mental image when he explicitly denies that issues of perception play any role in the choice of the centrally planned church: "It is obvious that such mathematical relations between plan and section cannot be correctly perceived when one walks about in a building. Alberti knew that, of course, quite well as we do. We must therefore conclude that the harmonic perfection of the geometrical scheme represents an absolute value, independent of our subjective and transitory perception."¹⁰¹ In summary, for Wittkower the ultimate reason for the Renaissance predilection for the centralized church has to do with the symbolism inherent to the form, rather than with perception: "In such centralized plans the geometrical pattern will appear absolute, immutable, static and entirely lucid. Without that organic geometrical equilibrium where all the parts are harmonically related like the members of a body, divinity cannot reveal itself."¹⁰²

⁹⁸In the event of buildings other than temples, Wittkower is more willing to admit that issues of perception had its share in the Renaissance conception of architectural form. For example, with regard to Palladio's villas he contends that "Italian monumental architecture is conceived, whenever feasible, in terms of a solid three-dimensional block. Italian architects strove for an easily perceptible relation between length, height and depth of a building, and Palladio's villas exhibit this quality most lucidly." Wittkower, *op. cit.*, p. 70.

⁹⁹Wittkower, *op. cit.*, p. 15.

¹⁰⁰*Ibid.*, p. 15, note 2.

¹⁰¹*Ibid.*, p. 18.

¹⁰²*Ibid.*, p. 18.

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Wittkower's book has helped to reveal the connection that exists between the architecture of a particular period and the cultural forces of the time. This notwithstanding, his interpretation of the symbolic nature of the centralized church has since been contested. Wolfgang Lotz for example, has argued that central plan churches with a polygonal or Greek cross plan had been built before the Renaissance, and that those churches had in their times the same symbolic value as the circular church had in the Renaissance. Lotz concludes then that "the centralized plan must have had other inherent qualities that were responsible for its frequent appearance during the Renaissance." The arguments he brings forward agree with both Frankl and Wittkower. First, Lotz seems to agree with Frankl as he writes that "centralized churches of the Renaissance have certain features that medieval sacral buildings lack, even when they are built on a centralized plan. As a rule the Renaissance churches are freestanding, and look virtually identical, or at least very similar, on all sides." At the same time, he also agrees with Wittkower when he acknowledges that Renaissance churches had a symbolic meaning, even though he gives his own interpretation of this symbolism. He notices that most of the centralized churches built *ex novo* were dedicated to Santa Maria and contends that the symbolism of the centralized church in the Renaissance has to do with the cult of the Virgin, rather than with the harmony of the universe, as Wittkower had argued.

By embracing both the symbolic and perceptual meaning of the Renaissance centralized church, Lotz might have stood closer than any other author to the true conception of Renaissance form. In fact, the incompatibility that Wittkower saw between the symbolic and perceptual dimension of architectural form might not exist.¹⁰³ It can be argued that both interpretations of the meaning of architectural

¹⁰³With regard to the opposing views held by Wittkower and Frankl, it can be asserted that their respective emphasis in the perceptual and symbolic dimension of architectural form is the consequence of the application of two different historical methods. Wittkower's method relies on the study of literary sources of the Renaissance. According to Tzonis, the originality of Wittkower's method stems from giving as much importance to the original texts as to the architectural works: "*Il est intéressant de noter que lorsque Wittkower décida de consulter les textes de la renaissance pour chercher les intentions des architectes au lieu de se référer aux édifices eux-mêmes, il y trouva un type de raisonnement qu'il croyait unique dans l'histoire de l'architecture. En effet, les textes révélèrent un discours avec une logique propre, très différente de celle que nous connaissons et de celle qui avait été attribuée a posteriori aux édifices de la renaissance.*" A. Tzonis, *Les systemes conceptuels de l'architecture en France de 1650 à 1800*, 1975, p. 28. Frankl, on the other hand, is applying a conceptual framework that belongs to his own time to the study of the past: the emerging Gestalt psychology. But, in spite of his reference to the original sources, Wittkower's method can be as prejudiced with regard to the historical facts as Frankl's. For example, Wittkower offers this explanation for the absence of central plans in Gothic architecture: "Why then -it may still be asked- did not the builders of the cathedrals try to give visual shape to this conception; why was it not until the fifteenth century that the centralized plan for churches was regarded as the most appropriate expression of the Divine? The answer lies in the new scientific approach to nature which is the glory of Italian fifteenth century artists. It is the artists, headed by Alberti and Leonardo, who had a notable share in consolidating and popularizing the mathematical interpretation of all matter. They found and elaborated correlations between the visible and intelligible world which were as foreign to the mystic theology as to the Aristotelian scholasticism of the Middle Ages. Architecture was regarded

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form are simultaneously true. Moreover, it can be contended that the simultaneous emphasis on these two dimensions of architectural form (perceptual and symbolic) is what distinguishes Renaissance architecture from the architecture of other periods.

4.6 Conclusions

From a contemporary perspective, we might be tempted to see some of the issues discussed in this chapter as anticipations of what later, in the field of architecture and architectural theory, has become known as Type. Such a view would not be exactly correct, because the Renaissance Idea is not yet purely epistemological, as the notion of Type would be, but it has still some metaphysical connotations (religious or mystical) that remained from the Platonic Idea.¹⁰⁴ It was only in the centuries following the Renaissance, when the metaphysical meaning of Idea would be subsumed under the epistemological one and, as a result, the concept of Idea would give place to the concept of Type as the prevalent 'form paradigm.'

Another issue that is likely to be placed under the heading of Type, has to do with artistic creativity and form invention. Both, the designs of centralized churches of Leonardo and the villas of Palladio, are the expression of a creative process based on the creation of variations on a theme. In light of Panofsky's contention that the Renaissance Idea was a concept that the artist derived from the direct confrontation with nature, it could be argued that a Renaissance artist would have derived a theme (the centralized church, the villa) from the systematic study of precedents and then would have used this theme as a formula from which to create new variations. This interpretation would conform to the spirit of the nineteenth and, also the twentieth century, when it was thought that a generic form or type could be derived through the systematic study of precedents, and that this type would become the generative principle for new designs. But this way of

by them as a mathematical science which worked with spatial units: parts of that universal space for the scientific interpretation of which they had discovered the key in the laws of perspective. Thus they were made to believe that they could re-create the universally valid ratios and expose them pure and absolute, as close to abstract geometry as possible. And they were convinced that universal harmony could not reveal itself entirely unless it were realized in space through architecture conceived in the service of religion." Wittkower, op. cit., pp. 38-39. Wittkower is here projecting onto the Gothic period a theoretical premise that belongs to the Renaissance (i.e. that the central plan has a symbolic meaning).

¹⁰⁴Panofsky opposes these two notions of Idea -the Platonic one, and the Renaissance application of Idea to art theory- and contends that both are incompatible: "The more influence the Idea concept had and the closer it approached its inherent (i.e. metaphysical) meaning (which first happened in the so-called 'mannerist' period), the further art theory retreated from its originally practical goals and its originally unproblematical premises. And vice versa, the stronger art theory adhered to these practical goals and unproblematical premises (as was true during the actual Renaissance and then again during the period of 'classicism'), the more the Idea concept forfeited its original metaphysical, or at least *a priori*, validity." Panofsky, op. cit., pp. 55-56.

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thinking was certainly alien to the spirit of the Renaissance. Regardless of the influence that precedent had on Leonardo and Palladio, neither of the two looked at history as a compendium of cases with the intention to study them 'scientifically', as a contemporary advocate of typology would do. For a Renaissance artist, the idea or theme had its origins in nature; considering nature in its original Platonic sense, that is to say, embracing not only the natural creations but the Ideas as well. Therefore, the idea of the central plan and the idea of the villa were still represented by some eternal forms, inhabiting a world that was only accessible to the privileged talent of Leonardo and Palladio.

A similar comment can be made with regard to the illustrated treatises of Serlio and Palladio. There is an inclination to think of these treatises as early manifestations of typology. According to this view, the two Renaissance architects would have attempted to give expression to some fundamental principles of architecture, by submitting individual works to a process of classification. It cannot be denied that both Serlio and Palladio had pursued a certain systematization of architecture. However, to attribute to them the same intentions as the ones that guided the later work of Durand and other advocates of typology in the twentieth century would probably be misleading. In the case of Palladio, he could not pretend to discover the fundamental principle, idea or generic form behind the villas by means of systematic classification because the idea was known a priori: it was the Platonic Idea of the villa. Similarly, Serlio did not have to search for any formula for the temple: there was an ideal form which was known a priori, and this was the circular form.

In conclusion, any attempt to see certain manifestations of Renaissance architecture as antecedents of the notion of Type has to take into consideration that Type is something other than the Renaissance Idea. In this regard, by interpreting the centralized churches of Leonardo as 'mechanical' variations on a theme, as Frankl had contended, we might be projecting onto the Renaissance a conception of form that belongs to our time, but which might not have been part of the intellectual spirit of that epoch.

Chapter 5

The Rise of Perception: Epistemological versus Aesthetic Meaning of Form

5.1 Introduction

As we have seen in Chapter 3, Vitruvius created an inextricable amalgam in which *imitation of nature, proportions, beauty* and *orders* were all blended. The development of architectural theory from the Renaissance onwards can be understood as the process of separation of these four components. In the course of this process, the preoccupation with form in the aesthetic sense, predominant in the Renaissance, would give place to more urgent epistemological concerns. In Alberti's *De re aedificatoria*, questions of form perception were mainly related with beauty. Two centuries later, in Claude Perrault's *Ordonnance des Cinq Espèces de Colonnes*, epistemology begins to take over aesthetics.

Architectural theorists in the seventeenth and eighteenth centuries expressed the predominance of epistemological concern in different ways. By the middle of the seventeenth century, French writers gave expression to it by distinguishing between the apparent and the real solidity of a building. In the beginning of the eighteenth century, some British architects advocated the use of simple geometric forms that could be easily apprehended by the mind. And, in the end of the eighteenth century, Boullée contended that the pleasing effect of a building on the spectator is in direct relation to the ease with which its forms can be apprehended. Behind the geometrization of architectural form that took place in the architecture of the eighteenth century, lies an increasing awareness of the epistemological meaning of form to the detriment of the aesthetic meaning.

5.2 Perrault: the shift from aesthetic form to epistemological form

In *De re aedificatoria*, Alberti, after contending that the judgements of beauty depend on “the workings of a reasoning faculty that is inborn in the mind,” went on to say that “what arouses and provokes such a sensation in the mind we shall not inquire in detail”(IX, 5).¹ Thus, while Alberti ruled out any possibility to understand the reasons why certain forms please more than others, Claude Perrault, in the preface of his *Ordonnance des Cinq Espèces de Colonnes*, 1683, wrote that “or quoy qu’on aime souvent les proportions conformes aux regles de l’Architecture sans sçavoir pourquoy on les aime, il est pourtant vray de dire, qu’il doit y avoir quelque raison de cet amour.”² The comparison between these statements from Alberti and Perrault reveals the extent of the changes that were taking place in the architectural theory of the seventeenth century. Whereas for Alberti form perception is mainly related to beauty (i.e. *concinntitas*), for Perrault form perception has to do mostly with the epistemological, as opposed to the aesthetic, meaning of form. For a seventeenth century theorist like Perrault, it is not enough to know when beauty occurs, it is also necessary to know *why* it occurs.

5.2.1 Art versus science

In the second half of the seventeenth century, the development of scientific knowledge reached a point in which it had to challenge the cultural legacy of the antiquity. Perrault’s emphasis on the epistemological aspect of form needs to be seen in the context of a more general debate, the *Querelle des Anciens et des Modernes*, which dominated the French intellectual circles of the time.

Perrault, taking side with the ‘*Modernes*’, thought that the belief in the authority of the ancients was an obstacle for the progress of knowledge.³ He argued that, in the past, both the arts and the humanities had been hindered by the influence of the works of the ancients. In his view, the veneration of the works of the classics had prevented the different branches of knowledge from advancing in their search for the truth. Thus, the ‘men of letters’ had failed to distinguish between “*le respect deû aux choses saintes, & celuy que meritent celles qui ne le sont pas; lesquelles il nous est permis d’examiner, de critiquer, & de censurer avec modestie, quand il s’agit de connoistre la verité; & dont nous ne considerons point les mysteres, comme estant de la nature de ceux que la Religion nous propose, &*

¹English edition, *On the Art of Building*, translated by Joseph Rykwert, Neil Leach and Robert Tavernor, 1989.

²C. Perrault, *Ordonnance des Cinq Espèces de Colonnes*, 1683, p. vj.

³In his translation of Vitruvius, he wrote: “*Il ne faudroit point chercher de nouveaux moyens pour acquerir les connoissances qui nos manquent, & que nous acquerons tous les jours dans l’Agriculture, dans la Navigation, dans la Medecine, & dans les autres Arts.*” C. Perrault, *Les dix livres d’Architecture de Vitruve*, 1673, pp. 78-79, note 16.

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que nous ne nous étonnons point de trouver incompréhensibles."⁴ Architects, according to Perrault, would be liable of the same mistake committed by the men of letters. Perrault could not understand the veneration that architects had for the classical works and, particularly, he did not share the respect they had for, what he called, the 'mystery of proportions': "*Car il n'est pas concevable jusqu'où va la reverence & la religion que les Architectes ont pour ces ouvrages que l'on appelle l'Antique dans lesquels ils admirent tout, mains principalement le mystere des proportions.*"⁵

In opposition to the sacred veneration of the past, Perrault proposed the empirical scientific method, based on reason rather than belief, which he considered to be the expression of the modern era. Thus, behind his rejection of the 'mystery of proportions' lies the hidden belief that an explanation of the causes of beauty could be achieved through empirical methods.⁶ This explains his rejection of those beliefs, held by previous architectural theorists, which could not be tested empirically. For example, Perrault questioned that the beauty of the Pantheon depends on some specific proportions between the wall thickness and the interior void, as some contemporary architects had postulated. Rather, he argued that such proportions could not be the reason for the beauty of the Pantheon because they were not perceivable (e.g. "*on ne s'apperçoit point, si on ne les mesure*"); and even if they would be perceived "*on ne seroit point assurez qu'elles ne pussent estre autrement sans déplaire.*"⁷

For Perrault, perceptible and imperceptible means whether a fact can be empirically tested or not. In his view, the whole theory of proportions was based on beliefs that could not be *perceived* (i.e. demonstrated). Then, in his alternative explanation of the beauty of the Pantheon, he claims that the beauty of this building depends more on a visible proportion (e.g. *symmetrie*) than on those mysterious relationships between the wall thickness and the interior space that could never be proved.⁸

⁴Perrault, op. cit, p. xix.

⁵Ibid., p. xvij.

⁶Alberto Pérez-Gómez sees in the theory of Perrault the breaking point with the classical notion of architecture as a link between the realms of reason and feeling. Thus, he writes that "in Claude Perrault's theory, architectural proportion lost for the first time, in an explicit way, its character as a transcendental link between microcosm and macrocosm." A. Pérez-Gómez, *Architecture and the Crisis of Modern Science*, 1983, p. 32. As a result, the symbolic aspects of architecture began to be less relevant than the rational ones. In this context, Pérez-Gómez sees Perrault's system of proportions as an early attempt to apply a scientific method to the creation of architectural form: "Claude Perrault was obsessed with the transformation of theory into *ars fabricandi*." Ibid. Furthermore, Pérez-Gómez associates the changes with the shift from 'number as symbol' to 'number as rational instrument'. However, it was not so much number that changed, as architectural form itself that was changing.

⁷Perrault, op. cit., p. v.

⁸With regard to the Pantheon, Perrault thinks that "*dont on ne manque jamais d'appercevoir les deffauts, ainsi qu'il se voit au dedans du Pantheon, où les bandeaux de la voule ne rapportant pas aux fenestres qui sont au dessous, causent une disproportion, & un manque de symmetrie que chacun peut aisement connoitre & qui estant corrigé auroit produit une beauté plus visible que n'est celle de la*

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In effect, as Wolfgang Herrmann concluded in his work on Perrault, this “approached architectural problems from an unconventional point of view.”⁹ The unconventional view was to address artistic questions from the point of view of science. A building was for Perrault a scientific fact, while beauty was a phenomenon that could be investigated empirically. As a matter of fact, he thought that “*l’art de raisonner & de conduire l’esprit[...]est également propre pour toutes les sciences,*” among which he included architecture.¹⁰ It is then understandable that, as Perrault confronted the architectural treatises, like those of Vitruvius, Palladio, Scamozzi and Vignola, he was bound to take them as scientific theories that could be empirically proved. As he realized that the theories -that is, the systems of proportions recommended by the different authors- did not conform to the facts -the actual buildings- he denounced the falsehood of the theories, e.g. the system of proportions proposed by the previous authors. This lack of agreement between ‘theories’ and ‘facts’, provided Perrault with an argument to deny the universal value of any system of proportions and to propose an alternative one based on a more simplified and efficient system of ratios.¹¹

Issues that had been exclusive to architectural theory were criticized by Perrault within the framework of scientific thought. One of these issues was the equivalence of musical and visual proportions. Alberti, following the ancients, had believed that “the very same numbers that cause sounds to have that concinnitas, pleasing to the ears, can also fill the eyes and mind with wondrous delight” (IX,5). Perrault, however, did not believe that visual and musical harmony were the same.¹² Moreover, he argued that whereas an harmonic melody can please without the mind being aware of it, the eye cannot perceive the harmonic relationship of forms without the mind knowing the cause that gives rise to the sense of harmony. In short, Perrault was saying that *seeing* and *knowing* are in fact

proportion qu’il y a entre l’épaisseur des murs comparée à la grandeur du vuide du dedans du Temple, ou aux autres proportions qui se rencontrent dans cet Edifice, telle qu’est celle du Portique qui a de largeur les trois cinquièmes du diamètre de tout le Temple de dehors en dehors.” Ibid., p. vij.

⁹W. Herrmann, *The Theory of Claude Perrault*, 1973, p. 189. According to Herrmann, Perrault failed to recognize that the notion of progress was not necessarily applicable to the arts: “He like most ‘Moderns’, failed to realize that the conception of progress was valid for the scientific, but not for the artistic sphere.” Herrmann, op. cit., p. 48.

¹⁰Perrault, op. cit., p. xvij.

¹¹In his comparative study of the classical treatises, Perrault was disappointed by the lack of correspondence between the ratios recommended by the different authors and the actual works: “All who have written about architecture contradict one another, with the result that in the ruins of ancient buildings and among the great number of architects who have dealt with the proportions of the orders, one can find agreement neither between any two buildings nor between any two authors, since none has followed the same rules.” Perrault, op. cit., p. 48. Perrault’s own explanation for the disagreements between different authors was that later authors had copied wrongly the previous works.

¹²“*Or ce qui fait qu’on ne peut pas dire que les proportions de l’Architecture plaisent à la veuë par une raison inconuë, & qu’elles fassent leur effet par elles-mesmes, ainsi que les accords de la Musique produisent le leur dans l’oreille, nonobstant l’ignorance dans laquelle on est des raisons des consonnances.*” Perrault, op. cit., p. iv.

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the same thing; that, is to say, he was stressing the cognitive and epistemological side of perception.¹³

5.2.3 The *Ordonnance*

In the Preface of the *Ordonnance*, and later in part two, chapter VII, Perrault presented his unorthodox opinions, or *paradoxes* as he called them, which were meant to be a direct attack on two Vitruvian dogmas. Firstly, Perrault denied that proportions, understood as a system of ratios holding the different elements of the building together, were the cause of beauty. Secondly, he contended that changes of proportions for the purpose of optical adjustments were meaningless.

Proportions and beauty

In his 'History of the Theory of Human Proportions', Erwin Panofsky proposed a distinction between two kinds of proportions, which he referred to as 'objective proportions' and 'technical proportions'. The first kind or proportions refer to the actual dimensions of a body; the second, to the system of ratios that the artist uses in the creation of a work of art. Based on this distinction, Panofsky proposed three different goals for a theory of proportions: 1. to establish 'objective proportions' without concern for their relationship to the 'technical' 2. to establish the 'technical' proportions independently of their relationship to the 'objective' 3. to study the correspondence between 'technical' and 'objective' proportions.¹⁴

In the *Ordonnance*, Perrault is mostly concerned with the third aspect of the theory of proportions proposed by Panofsky. Basically, Perrault questioned whether there is a cause-effect relationship between technical and objective proportions; something that, incidentally, Vitruvius took for granted. According to Perrault, if small changes in proportions cannot be detected by the eye, then beauty cannot depend on some specific proportions. To prove his assertion, he proposes to consider a human face for which "*s'il est vray qu'une six-vingtième partie de tout ce visage adjouëtée ou ostée au front, au nez, ou au menton, ne rendra pas un visage ni plus ni moins agreable.*"¹⁵ And he appeals to a similar reasoning to reject the idea that small changes in proportions would affect the beauty of a building: "*la beauté des Edifices ne consiste point dans l'exactitude de ces veritables proportions,*

¹³Perrault's distinction between two different kinds of perception, by the eye and by the ear, anticipated the thoughts of William Hogarth, who had later considered "a strange notion" that because "certain uniform and consonant division upon one string produce harmony to the ear, similar distances in lines belonging to form, would, in like manner, delight the eye." Burke expressed similar criticisms with regard to the equation between the human figure and a building: "And certainly nothing could be more accountably whimsical, than for an architect to model his performance by the human figure, since not two things can have less resemblance or analogy, than a man, and a house or temple." See R. Wittkower, *Architectural Principles in the Age of Humanism*, 1973, pp. 135-136.

¹⁴E. Panofsky, *Meaning in Visual Arts*, 1993, pp. 83-84.

¹⁵Perrault, op. cit., p. xvij.

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puisqu'il est constant qu'on en peut obmettre quelque chose, sans que la beauté de l'ouvrage en soit diminuée."¹⁶

Once the identity between proportion and beauty -established by Vitruvius- has been broken, Perrault is free to introduce his own system of proportion, in which fractional numbers have been eliminated and the determination of dimensions simplified with the use of the *juste milieu*.¹⁷

The mixing of aesthetic and epistemological concerns

Perrault distinguished between two kinds of beauty: positive and arbitrary. Positive beauty is based on "*des raisons convaincantes, celles par lesquelles les ouvrages doivent plaire à tout le monde, parce qu'il est aisé d'en connoître le mérite & la valeur, telles que sont la richesse de la matière, la grandeur & la magnificence de l'Edifice, la justesse & la propreté de l'exécution, & la symétrie que signifie en François l'espece de Proportion qui produit une beauté évidente & remarquable.*"¹⁸ For Perrault *symétrie* means "*le rapport que les parties ou ensemble à cause de l'égalité & de la parité de leur nombre, de leur grandeur, de leur situation, & de leur ordre.*"¹⁹ *Symétrie* is, therefore, "*une chose fort apparente, & dont on ne manque jamais d'apercevoir les défauts.*"²⁰ The second kind of beauty, that he calls 'arbitrary', depends on a kind of proportion which is "*difficile à apercevoir*" and consists of "*le rapport de raison des parties proportionnées, tel qu'est celui que les grandeurs des parties ont les unes aux autres ou avec le tout, comme d'être la septième, la quinzième ou la vingtième partie du tout.*"²¹ This kind of proportion has no intrinsic value in itself, and depends on custom (*accoutumance*), rather than on the positive reasons accessible to everybody.²²

¹⁶Ibid., p. xxij.

¹⁷As a matter of fact, the main purpose of Perrault's *Ordonnance* was to introduce his new system of proportions. As he contended: "*Parceque je n'ay point d'autre dessein dans cet Ouvrage que de faire, que sans choquer l'idée que les Architectes ont des proportions de chaque membre, on les puisse réduire toutes à des mesures facilement commensurables, que j'appelle vrai-semblables.*" Perrault, op. cit., p. xxj.

¹⁸Ibid., pp. vj-vij.

¹⁹Ibid., p. vij.

²⁰Ibid.

²¹Ibid.

²²Perrault's description of the arbitrary beauties runs as follows: "*Or j'oppose à ces sortes de beautez que j'appelle Positives & convaincantes, celles que j'appelle Arbitraires, parce qu'elles dependent de la volonté qu'on a eu de donner une certaine proportion, une forme & une figure certaine aux choses qui pourroient en avoir une autre sans estre difformes, & qui ne sont point renduës agreables par les raisons dont tout le monde est capable, mais seulement l'accoutumance, & par une liaison que l'esprit fait de deux choses de différente nature: car par cette liaison il arrive que l'estime dont l'esprit est prevenu pour les unes dont il connoist la valeur, insinue une estime pour les autres dont la valeur luy est inconnuë, & l'engage insensiblement à les estimer également.*" Ibid., p. vij.

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Indeed, some of the ideas of Perrault foreshadow the theories on form perception developed later by the British empiricists. The distinction that he proposes between positive and arbitrary beauties is, in principle, the same kind of distinction that Locke would draw later between primary and secondary qualities of an object.²³ For Perrault, the properties that belong to the object (e.g. positive beauties) are unequivocally tangible, like richness of materials, the size and magnificence of the building, the precision and cleanness of the execution. Other sort of qualities, among them the proportions on which the arbitrary beauty depends, are attributed to the object by the subject. Furthermore, by contending that 'arbitrary beauty' depends on custom rather than on universal laws, Perrault was in fact anticipating the subjectivist approach to beauty that David Hume would express later in the following terms: "Beauty is no quality in things themselves: it exists merely in the mind which contemplates them; and each mind perceives a different beauty."²⁴

As a matter of fact, Perrault was not so much concerned with beauty itself, that is to say, with the aesthetic experience, as he was with the understanding of the mechanisms by which beauty is perceived and, eventually, created.²⁵ In this regard, he also anticipated Hutcheson, who in the *Enquiry into the Original of Our Ideas of Beauty and Virtue*, 1725, wrote that "the word beauty is taken for the idea raised in us"²⁶ and "a sense of beauty for our power of receiving this idea."²⁷ Hutcheson, like Perrault, identified aesthetics with epistemology: to perceive the beauty of form was tantamount to acquire knowledge about the form. Similarly, what intrigued Perrault was not so much the aesthetic experience of perceiving certain harmony in the building's form, as the understanding of the connection that exists between a particular system of proportions and the effect that this produces on the viewer.

Reality and appearance

The second of the *paradoxes* raised by Perrault in the *Ordonnance* had more metaphysical connotations: the question of the optical corrections.²⁸ Vitruvius recommended making changes in the proportions of the members of the temple to

²³Wolfgang Herrmann has pointed out that Perrault's text contained references to issues that a few decades later would emerge again in the work of those philosophers concerned with the working of the mind, in particular, Locke. This notwithstanding, no influence of Perrault on Locke has been proved. See Herrmann, *op. cit.*, p. 56.

²⁴D. Hume, 'Of the Standard of Taste', in *Essays Moral, Political, and Literary*, I, 266.

²⁵According to Herrmann, Perrault was "the first writer to apply the association of ideas to the aesthetic field." See Herrmann, *op. cit.*, p. 56.

²⁶Quoted in J. Stolnitz, 'Beauty', in *The Encyclopedia of Philosophy*, vol. 1, p. 265.

²⁷Quoted in, H. Dieckmann, 'Beauty to the Mid-Nineteenth Century', in *Dictionary of the History of Ideas*, vol. 1, p. 198.

²⁸In fact, François Blondel, Perrault's rival, thought that the question of visual corrections raised by his opponent was 'too metaphysical' for architects." See F. Blondel, *Cours d'architecture*, 1683, Livre IV, 5e. part, p. 717.

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compensate perspective distortions and other visual effects that prevented the viewer from grasping the real form of a building. Vitruvius, following the precepts of Greek sculptors, thought that "the eye does not always give a true impression, but very often leads the mind to form a false judgement" (VI,2,2). He defended changes in the proportions because "the reality may have a false appearance, and since things are sometimes represented by the eyes as other than they are, I think it certain that diminutions or additions should be made to suit the nature or needs of the site" (VI,2,4). Moreover, Vitruvius gave specific recommendations to carry out those corrections. He advised, for example, that "the columns at the corners should be made thicker than the others by a fiftieth of their own diameter, because they are sharply outlined by the unobstructed air round them, and seem to the beholder more slender than they are. Hence, we must counteract the ocular deception by an adjustment of proportions" (III, 3, 11).

As could be expected from an empiricist like Perrault, the first criticism he made of the theory of visual corrections of Vitruvius was that there were no facts against which the validity of the theory could be proved: "*Je commence l'examen de ces raisons par celle du fait, qui est que je soutiens n'y a avoir point d'exemples de la pratique de cette regle du changement des proportions.*"²⁹ Nevertheless, he presented a series of arguments to refute Vitruvius' theory. He argued, for example, that through experience the eye learns to judge properly the real sizes of objects, and for that reason, there was no need to make changes in the proportions to compensate for visual distortions.³⁰ Indeed, Perrault's subsequent explanation of the mechanisms of visual perception cannot but remind the later theories of the Gestalt psychology, in particular the notion of constancy. After all, Perrault concluded that "*lors qu'on y aura bien pensé, on trouvera qu'il n'y a point de raison de corrompre & de gaster les proportions, pour empescher qu'elles ne paroissent corrompuës, & de rendre une chose defectueuse par l'intention que l'on a de la corriger.*"³¹

Vitruvius, by advocating the use of visual corrections, was implicitly denying that the mind plays any role in restating the relationship between the appearance of the building (its shapes under perspective deformation) and its reality (the true dimensions determined by certain proportions). Vitruvius did not distinguish, therefore, between conceptual and sensible forms, between the ideal world and the

²⁹Perrault, op. cit., p. 98.

³⁰"*Il est tres vraisemblable que les animaux à leur naissance voyent mal, & qu'ils jugent les objets éloignez aussi petits que la peinture faite dans leur oeil les leur represente, & qu'il faut que l'experience leur ayant fait connoistre qu'ils se sont trompez, corrige l'erreur de ce premier jugement, & que dans la suite le jugement s'accoutume tellement & à se servir de tous les moyens qu'il peut y avoir pour se défendre de cette tromperie, qu'enfin il parviene à la perfection, dans laquelle il se trouve lorsqu'on commence à bien voir; & cette perfection est telle qu'il n'y a personne qui croye qu'une tour éloignée qui se couvre avec le doigt mis proche de l'oeil, soit moins grande que le doigt, ny qu'un rond vû obliquement soit une ovale, ou qu'une ovale soit un rond; quoique les images de ces choses soient actuellement telles dans l'oeil.*"Ibid., p. 103.

³¹Ibid., p. 108.

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phenomenal world. In contrast to Vitruvius, Perrault acknowledged the split of the two spheres -conceptual and perceptual. Moreover, he assumed that the mind has the capability to derive the real form from the appearances, that is to say, the idea from the images.

Architectural form and orders

When Perrault claimed that there were no absolute proportions, he was questioning, albeit indirectly, that architecture was an imitation of nature. Furthermore, to deny that architecture is imitation of nature -either of the appearances of nature, like Vitruvius, or the laws of nature, like Alberti- is the first step towards the negation of the orders themselves, since according to the classical theory, as formulated by Vitruvius and Alberti, the architectural orders derived from nature.

Perrault, however, did not take his attack on classical artistic dogmas to the ultimate conclusions, that is to say, he did not question the universality of the orders. When Perrault speaks of proportions, he does not refer so much to an abstract system of proportions *per se* as to some ratios that are related to specific architectural elements. He speaks, for example, of the proportion of the width of the triglyphs to the diameter of the column, or of the height of the architrave with regard to the height of the frieze. Even though he questioned those ratios, he did not question the architectural forms themselves, that is to say, the orders. In effect, Perrault was taking for granted that the formal vocabulary of architecture could not be other than the one derived from the Greek temple.

Despite his criticism to Vitruvius's theory, Perrault did not break completely the amalgam that Vitruvius made of *imitation of nature, proportions, beauty* and *orders*. He began to break the link between nature, proportions and beauty, but left the orders untouched. But, the split between the conceptual and perceptual realms, which is implicit in Perrault's theories, would ultimately call for a renewal of the formal vocabulary of architecture. This goal would not be realized until the end of the following century, when geometric solids became the formal vocabulary of architects like Boullée.

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5.3 The rise of perception

5.3.1 The opposition between apparent and real stability in French theory

The *Procès-verbaux de l'Académie Royale d'Architecture*, published in Paris in 1676, reads: "la compagnie[...]a trouvé bon d'ajouter qu'il faut non seulement avoir égard à la solidité réelle et effective, mais mesme à l'apparence de la solidité, pour éviter les caprices gothiques qui affectent le merveilleux et le surprenant."³² And a century later, Potain wrote in the *Traité des Ordres d'Architecture*: "L'object de la (Gothique) étoit d'étonner les yeux du spectateur par un excès de légèreté[...]l'Architecture grecque au contraire a son principe dans la solidité non-seulement réelle, mais même apparente, parce qu'il ne suffit pas de faire un édifice solide, il faut encore qu'il tranquillise l'oeil du spectateur"³³

As we can see from these two references, French architects in the seventeenth century were intrigued by the fact that the real structure conforms to the apparent structure in the case of the Greek temple, while this congruency fails in the case of a Gothic church. By opposing real and apparent stability, they were in fact distinguishing between the *physical structure* of the building and the *conceptual structure* that the viewer perceives. This conceptual structure, which might be related to Perrault's interpretation of symmetry as visible proportion, is the form that arises in the mind of the beholder when this manages to organize the separate parts into a coherent whole.

The idea that started to take shape in seventeenth century France, was that it was necessary to bring inside the modern temple the same intelligibility as the one that the forms of Greek temple transmitted.³⁴ Some architects and theorists were particularly critical with some of the churches built in the time because of the lack of intelligibility of their interior spaces. They thought that the interior space of modern churches (St. Peter's in Rome and St. Sulpice were often mentioned as negative examples) was neglected by the presence of massive pillars and the absence of proper illumination.³⁵

³²Quoted in W. Herrmann, *Laugier and eighteenth century French theory*, 1962, p. 237.

³³*Ibid.*, p. 238.

³⁴J. F. Blondel, (*Cours d'Architecture*, 1771-1779, vol. 4, p. 153) spoke of "des difficultés qui se présentent à l'Architecte, lorsqu'il s'agit de concilier ensemble la régularité des dehors, et la distribution des dedans." Quoted in E. Kaufmann, *Architecture in the Age of Reason*, 1968, p. 252, note 92.

³⁵In their comparison between Greek and Gothic, French writers seemed to have overlooked the fact that in the case of the Greek temple, the identity of real and apparent stability stems from seeing the building from the outside, while in the case of a Gothic church, the impression of apparent instability derives from seeing it from the inside.

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In order to achieve intelligibility in the inside, the notion of space that had been prevalent in the Renaissance and Baroque had to be questioned.³⁶ In the churches of those styles, space was thought of as the void carved out from the mass—it was an architecture en *bas-relief*, as Cordemoy had put it. For the early French rationalists, on the other hand, form had to predominate over space and, therefore, architectural forms should be intelligible not only when seen from outside but *also* in the inside space. This means that in a church, for example, columns had to appear free-standing inside the nave so that the eye could perceive their contours precisely. In short, what the French theorists demanded was that the forms perceived by the eye would be immediately intelligible to the mind, in the inside as well as in the outside.

5.3.2 Physical and conceptual structure

This relationship between apparent and real structure, propounded by French architects in the seventeenth and eighteenth centuries, has created some misunderstandings with regard to the prevalent notion of architectural form at the time. More often than not, it has been thought that French architects were convinced that architecture was mainly construction and, consequently, architectural form should be subsumed under structural form (in the engineering sense). This hypothesis has been supported by the existence of a French tradition that, since the times of the Gothic, had considered architecture mainly as *l'art de bâtir*. It can be contended though, that the true aim of French architects was to eliminate the differences between apparent and real stability in the buildings they designed and that, to achieve this goal, they had two possibilities: one, to subsume the apparent under the real, which implies that architectural form should become structural form in its physical sense; and two, to achieve the apparent stability at the expense of the structural stability, which means the identification of building form with conceptual form. The first interpretation leads to the notion of architectural form as structural form in the physical sense; the second to the identification of architectural form with structural form in the conceptual sense.

Both meanings of structural form, physical and conceptual, are simultaneously present in the church of Sainte Geneviève by Soufflot.³⁷ Some critics have praised the physical-technical aspects of the building, particularly the ingenuity of the

³⁶Peter Collins has drawn the attention to the increasing interest for the quality of interior space manifested by architects in the eighteenth century. According to Collins, "the idea that 'space' is a positive architectural quality, and that it possessed as much, if not more architectural interest than the structure by which it was confined" was an innovation brought about by the revolutionary architecture of the mid-eighteenth century. See P. Collins, *Changing Ideals in Modern Architecture*, 1965, p. 22.

³⁷As Pérez-Gómez has written, "in this building, it is impossible to establish where aesthetic motivations end or at what point design decisions were prompted by an intention to rationalize the structural system." A. Pérez-Gómez, *op. cit.*, p. 69.

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structural solutions adopted by Soufflot and Perronet. Collins, for example, thinks that this "was probably the first building to be actually designed scientifically, and to be analysed by a professional civil engineer as a result of doubts as to its eventual stability when it was still in its early stages of conception."³⁸ But considered from the point of view of form perception, Sainte Geneviève epitomizes the desire to get rid of all features that prevented the eye from grasping the totality of the forms, inside as well as outside. Then, when Brébion, a pupil of Soufflot, commented that "*le principal objet de M.Soufflot en bâtissant son église a été de réunir[...]la légèreté de la construction des édifices gothiques avec la pureté et la magnificence de l'architecture grecque,*"³⁹ what he probably meant was that Soufflot tried to make the interior spaces as intelligible as the outer forms.

When we consider Soufflot's work in light of the previous discussions regarding the congruity between real and apparent structure, we can see that he was not concerned so much with the equilibrium of the structure, in its physical sense, as with the equilibrium in the conceptual sense. In other words, his aesthetic goal was to achieve, inside as well as outside, a unified image of the building that the viewer could grasp easily, at a single glance. As we will see in the following chapter, this conceptual sense of structural form, to which Soufflot gave expression in the church of Sainte Geneviève, is basically the same that his contemporary Marc-Antoine Laugier expressed with his theory of the primitive hut.

5.3.3 The geometrization of architectural form

In order to achieve the complete unity of the real form and the perceived form, the forms of a building must approximate the geometric solids. The process of geometrization of architectural form began first in England at the beginning of the eighteenth century, as Kaufmann has shown, and culminated with the works of the French revolutionary architects by the end of the century.

As we have seen in the previous chapter, the preoccupation with form perception was already a determinant factor of Palladio's architecture, in particular his villas. In the beginning of the seventeenth century in England, the concern for the intelligibility of architectural form came as a rejection of the exuberant forms of the Baroque and was accompanied by a renewed admiration for the work of Palladio, manifested in the works of those neo-Palladian architects like Colen Campbell, lord Burlington and Robert Morris. Campbell was the first to vindicate a return to the 'classical simplicity' of the antiquity (in which he included Palladio). As the classical theorists of the Renaissance did, Campbell praised in his *Vitruvius Britannicus* the simplicity of geometric figures like the square and circle. Thus,

³⁸Collins, op. cit., p. 189.

³⁹Kaufmann, op. cit., p. 139.

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commenting on a project for a church that he had proposed as an alternative to Wren's St. Paul cathedral, he wrote: "The Plan is reduced to a Square and Circle in the Middle, which, in my weak Opinion, are the most perfect Figures. In the Front I have removed the Angular Towers at such a distance, that the great Cupola is without any Embarrass.....the whole is dress'd very plain, as most proper for the sulphurous Air of this City, and, indeed, most comformable to the Simplicity of the Ancients."⁴⁰

For Robert Morris geometric figures were not only important because they could be easily apprehended, as it could be the case with Campbell, but also because they were a tool to design a building. Morris' concern with the perception of form conformed to the spirit of the time, particularly with the philosophical investigations of Locke and other empiricists. In *An Essay upon Harmony*, 1739, Morris appealed to a correspondence between the harmony of nature and the harmony imprinted in the mind: "Nothing surely is more strongly imprinted in Our Minds....than the idea or sense of order and Proportion; hence all the force of Numbers, and those powerful arts founded on their Management and Use." Before that, in his *Lectures* of 1734, he had associated proportions and geometric figures: "The Square in Geometry, the Unison or Circle in Music and the Cube in Building have all an inseparable Proportion; the Parts being equal....give the Eye and Ear and agreeable Pleasure, from hence may likewise be deduc'd the Cube and half, the Double Cube; the Diapason and Diapente, being founded on the same principles in Musick."⁴¹

In Morris' view, volumetric composition comes first in the design of the building: "The BUILDING which I would erect on that Spot, is the Plan and Profile before us, compos'd of three cubes.⁴² In delineating the Plan or Elevation of a Building, the Outline is to be first form'd, as in the Plan and Profile before us, which are composed of 3 Cubes, as represented by the cirumscribing Circles. It is from thence the internal Parts as well as the ornamenting and disposing the proper Voids, and Decoration of the Front are to be regulated."⁴³ In his project for a House Composed of Three Cubes, circles are inscribed in the facades as well as in the elevations, as a sort of visible proof that shows that the house *is* in fact a cube (Figure 5.1). Still, in other diagrams the idea of an architecture which is the result of the composition of solids is expressed more clearly (Figure 5.2). In these drawings, the classical architectural forms tend to be eliminated, leaving the volumetric figures as the only elements of composition.

⁴⁰C. Campbell, *Vitruvius Britannicus*, vol. 1, London, 1715. Quoted in Kaufmann, op. cit., p. 4.

⁴¹R. Morris, *Lectures*; quoted in R. Tavernor, *Palladio and Palladianism*, 1991, p. 180.

⁴²Morris, Lecture IX, p. 145; quoted in Kaufmann, op. cit., p. 25.

⁴³Morris, Lecture IX, p. 138; quoted in Kaufmann, op. cit., p. 25.

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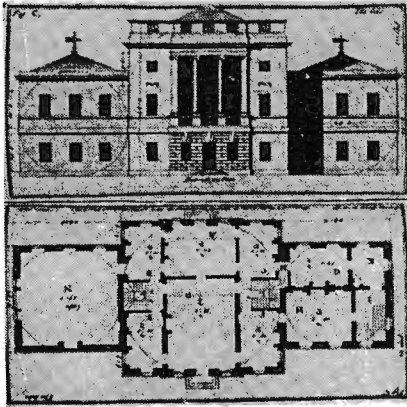


Figure 5.1. Morris. House composed of three cubes.

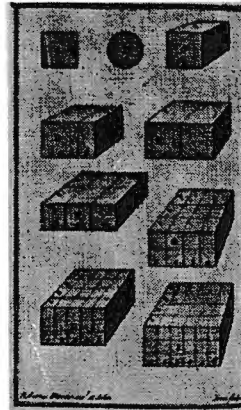


Figure 5.2. Morris. Combinations of cubes.

To some extent, Morris' ideas can be seen as a straightforward application of the Renaissance theory of proportions. This has been the interpretation offered by Wittkower, who thought that Morris had "developed a system of hard and fast rules of harmonic proportions."⁴⁴ Kaufmann, opposing Wittkower's interpretation, appeals to a passage in the *Lectures* where Morris capitalized the word Idea, and contends that "to Morris the 'IDEA' [his capitals] of the cube was of primary importance, the proportions derived from it, secondary."⁴⁵ According to Kaufmann, the ultimate purpose of the geometrization of architectural form that took place in the early eighteenth century, was to break with the patterns inherited from the Renaissance-Baroque architectural system. Kaufmann, therefore, sees Morris as a forerunner of the revolutionary architecture carried out later by French architects, particularly Boullée, rather than as a continuator of the Renaissance, as Wittkower's interpretation suggests.

In spite of the similar value that geometric figures might have had for the Renaissance authors and for Morris, a fundamental difference can be pointed out: for Alberti, a geometric figure like the circle was the invisible scheme underlying the visible architectural forms whereas, for Morris, as for Boullée later, geometric elements became the visible architectural form.

⁴⁴Wittkower, op. cit., p. 132.

⁴⁵Kaufmann, op. cit., p. 225, note 213.

5.4 Boullée: Image and Idea

The French architect Etienne-Louis Boullée took the process of geometrization of architectural form, that had started in England, to its ultimate conclusion. In spite of Morris' understanding of a building as a composition of geometric solids, the classical forms still constituted the visible and tangible forms of his designs. In Boullée's designs, on the other hand, pure geometric solids constitute the visible expression of the building. *Image* and *Idea* are no longer opposites: the geometric forms become the visible expression of the abstract idea.

5.4.1 The geometrization of the idea

At the beginning of his *Architecture. Essai sur l'art*, Boullée asked himself the following question: "*Q'est-ce que l'architecture? La définirai-je avec Vitruve l'art de bâtir? Non. Il y a dans cette définition une erreur grossière. Vitruve prend l'effet pour la cause.*"⁴⁶ Boullée stated clearly something that Vitruvius had neglected and Alberti started to claim: he vindicated the conceptual nature of architecture. Thus, he contended that "*il faut concevoir pour effectuer. Nos premiers pères n'ont bâti leurs cabanes qu'après en avoir conçu l'image. C'est cette production de l'esprit, c'est cette création qui constitue l'architecture.*"⁴⁷

The definition of architecture as a product of the mind was not new. Alberti had already acknowledged the conceptual nature of architecture, as he contended that architecture had to do with *lineamenta*, the lines and angles conceived in the mind. But, the value that Alberti assigned to geometric elements had to do more with perception than with conception. For Boullée, however, geometric elements are important not only because of their perceptual meaning but for their conceptual meaning as well. The geometric elements with which Boullée conceived his buildings were not the lines and angles that Alberti referred to, but full three-dimensional solids that could be immediately apprehended by the viewer.

To grasp the essence of a building (inside as well outside) with a *coup d'oeil*, had been a major preoccupation for architects since the early eighteenth century. Like Morris, Boullée also thinks that our souls are impregnated with a natural order, and that the sense of beauty is felt more strongly when the order of the form conforms to the order implicit in the senses: "*Dans l'ensemble, l'ordre des choses doit être combiné tellement que nous puissions d'un coup d'oeil embrasser la multiplicité des objets qui le composent.*"⁴⁸ Furthermore, Boullée thinks that regular bodies are more beautiful than the irregular ones because in the irregular

⁴⁶E. Boullée, *Architecture. Essai sur l'art*, 1968, p. 49.

⁴⁷*Ibid.*, p. 49.

⁴⁸*Ibid.*, pp. 76-77.

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forms one could only see “la confusion, produite par le nombre et la complication des figures irrégulières que présentaient leurs faces.”⁴⁹ The sphere is the most regular figure and, as such, the one that conforms better to the intrinsic regularity of the mind: “De toutes ces observations, il résulte que le corps sphérique, sous tous les rapports, est l’image de la perfection.”⁵⁰ Most significant, Boullée dismissed irregular forms on the grounds that they escape our understanding: “Composée d’une multitude de faces toutes différentes, la figure des corps irréguliers, comme je l’ai remarqué ci-dessus, échappe à notre entendement. Les faces, par leur nombre et leurs complications, ne nous présentent rien de distinct: elle ne nous offrent que l’image de la confusion.”⁵¹

It can be contended that Boullée’s predilection for geometric solids is related to some of the ideas developed by British empiricists, who stressed the cognitive or epistemological aspects of form perception. As a matter of fact, Boullée seems to have had a direct knowledge of the work of those philosophers, since he wrote: “Écoutons un philosophe moderne: ‘Toutes nos idées, toutes nos perceptions’, nous dit-il, ‘ne nous viennent que par les objets extérieurs. Les objets extérieurs font sur nous différentes impressions par le plus ou le moins d’analogie qu’ils ont avec notre organisation’. J’ajoute que nous qualifions de beaux les objets qui ont le plus d’analogie avec notre organisation et que nous rejetons ceux qui, dépourvus de cette analogie, ne conviennent pas à notre manière d’être.”⁵² Boullée is equating here beauty with truth, and in this regard his ideas are not substantially different from similar ones expressed before by Hutcheson. When Boullée praises the geometric solids, it is not only because of the aesthetic pleasure that might derive from them, but also because the form of geometric objects can be easily apprehended, that is, understood.

The shift from aesthetic to epistemological concerns that took place in the architectural theory of the eighteenth century can be better appreciated if we compare the thoughts of Alberti and Boullée. Alberti had argued that the circle was the most perfect figure, but he based his contention on the ground that it was the

⁴⁹Ibid., p. 62.

⁵⁰Ibid., p. 79.

⁵¹Ibid., pp. 62-63. Boullée’s rejection of irregular forms on the grounds that the mind could not apprehend them easily was not new either. We have already seen that Palladio had referred to the forms of the Gothic as confusing. Francesco Milizia, in his *Saggio sopra l’Architettura*, 1768, had criticized also Gothic forms on similar grounds: “Anything must be sufficiently simple to be taken in by the eye and sufficiently varied to be seen with pleasure. Gothic architecture appears to be extremely varied, but the confusion of ornaments fatigues because of their small size, hence one cannot distinguish one from the other, and because of their large number there is not one on which the eye could rest, so that it displeases precisely because of the features which are chose to make it more pleasant. A Gothic building is a kind of enigma for the eye of the beholder. Greek architecture, by contrast, looks uniform, but since it has sufficient divisions the mind can take it all in without tiring, and that variety is sufficient to cause delight.” Quoted in E. Gombrich, *The Sense of Order*, 1979, p. 28.

⁵²Boullée, op. cit., p. 61.

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form nature delighted the most. Thus, Alberti saw the circle in the stars and in the nests of animals. But Boullée does not find spheres in the productions of nature but in the human mind. For him the sphere is the expression of the regularity, symmetry and order that govern the inner working of the mind. To be sure, Alberti had been concerned with the issue of form perception. He had contended that “when the mind is reached by way of sight or sound or any other means, *concinntitas* is instantly recognized”(IX,5); and “that natural sense, innate in the spirit, which allows us, as we have mentioned, to detect *concinntitas*”(IX,7). But, in spite of these references to perception, Alberti did not draw any connection between the perception of beauty (e.g. form) and the easiness of apprehension of geometric figures by the viewer, as Boullée, and other eighteenth century architects, did.

5.4.2 The images of the ideal: the unrealized projects

In the previous chapter on the Renaissance, we have addressed the issue of the identity between idea and representation with regard to the illustrated treatises of Serlio and Palladio. This identity is also a theme in the projects of Boullée. In the illustrated treatises of the Renaissance authors, the idea of a building was expressed through schematic plan drawings. Similarly, the purpose of Boullée’s drawings is also to give expression to the ideal form (Figures 5.3, 5.4). Boullée’s illustrations express both the abstract and sensible qualities of architectural form. In effect, the renderings gave expression to the identity of *forme* and *figure* that he advocated in his writings.

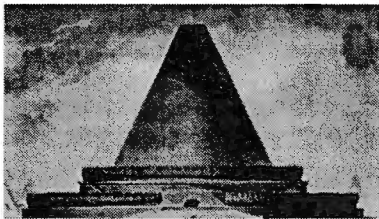


Figure 5.3. Boullée. Conic *Cénotaphe*.

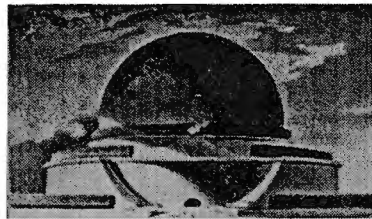


Figure 5.4. Boullée. Newton's *Cénotaphe*.

The rendering of the light effects, in particular, brings into the elevations and perspectives a sensible quality, in direct contrast to the intrinsic abstractness of the geometric volumes. Because, for Boullée light was important not only in the pictorial sense, but also in a conceptual sense. Commenting on his design for a church, he showed pride in having achieved a unique way to get the light inside the temple: “*Ce qui me satisfait actuellement, c’est que je crois avoir conçu, le premier, la manière d’introduire la lumière dans un temple et que mes vues à ce*

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sujet me semblent neuves et philosophiques."⁵³ Considering the interest shown by previous architects in the creation of more intelligible interior spaces in churches, we may be inclined to think that the *lumière* that Boullée is talking about is more a light in the intellectual sense than in the physical sense: it is an *éclaircissement*, that is to say, an enlightenment that brings intelligibility to the interior space, rather than a physical phenomenon.

5.4.3 Perception and character

There is another aspect related to form perception, which has to do with expression and character more than with the pure apperception of form, in its strict epistemological sense. In this case, the issue at stake is not so much to grasp the true form of the building at a single glance but to be moved by the character or force that emanates from the building. In the eighteenth century, this second meaning of perception was associated with *caractère*. The notion of *caractère* was first employed in a systematic way in Germain Boffrand's *Livre d'architecture*, 1745.⁵⁴ Boffrand contended that the purpose of a building should be easily understood by the beholder: "*Les différents Edifices par leur disposition, par leur structure, par la manière dont ils sont décorés, doivent annoncer au spectateur leur destination.*"⁵⁵ And in other part wrote that "*un homme qui ne connoît pas ces différents caractères, et qui ne les fait pas sentir dans ses ouvrages, n'est pas Architecte.*"⁵⁶ But, at the same time that Boffrand appealed to *caractère* as expression of the building's intrinsic qualities, he invoked also the other meaning of perception, the one that has to do with the ease of apprehension of forms. In this regard he wrote: "*Il faut dans un ouvrage suivre le même caractère depuis le commencement jusqu'à la fin, pour que toutes les parties soient relatives au tout*"⁵⁷ and that "*on doit toujours conserver la noble simplicité.*"⁵⁸

Later, Jacques-François Blondel made of the notion of *caractère* a fundamental component of his theory. He attributed this concept a variety of meanings. For example, he thought that every building type had a concrete character: the temple was associated with *décence*, public buildings with *grandeur*. Also, he considered that *caractère* had to do with the expression of the building's function. And, in some other cases, he gave to *caractère* a poetic meaning, as when he spoke of '*architecture mystérieuse*', or '*architecture vague*.'

⁵³Ibid., p. 95.

⁵⁴"Eine anderer Begriff scheint von Boffrand erstmals systematisch in die Architekturtheorie eingeführt worden zu sein: der des *caractère*." H. W. Kruff, *Geschichte der Architekturtheorie*, 1991, p. 162.

⁵⁵Boffrand, *Livre d'architecture*, 1745, p. 16. Quoted in Kruff, op. cit., p. 162.

⁵⁶Boffrand, op. cit., p. 26.

⁵⁷Boffrand, op. cit., p. 27.

⁵⁸Boffrand, op. cit., p. 8.

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Boullée also referred to *caractère* in his *Essai*, which he described in the following terms: “J’appelle caractère l’effet qui résulte de cet objet et cause en nous une impression quelconque.”⁵⁹ Expressed in this way, Boullée’s concept of *caractère*, like Boffrand’s before, embraced both the simplicity as well as the expressivity of a building’s forms.⁶⁰ Thus, the *caractère* of the spherical form of Newton’s cenotaph has to do with both the directness with which its form is imprinted in the mind of the beholder and with the symbolic meaning of the sphere as expression of the universe.⁶¹

5.5 Conclusions

With Alberti’s preoccupation with the perception of beauty began a separation of the metaphysical, aesthetic and epistemological meanings of the Platonic Idea. With Perrault, this disintegration of the multiple meanings of Form continued even further. By concentrating his attacks on the use of proportions in architecture, Perrault stressed the epistemological aspect of form, whilst playing down its metaphysical as well as aesthetic meanings.

It can be contended that the issues that Perrault was raising in the *Ordonnance* belong more to a general theory of cognition than to the specific realm of architecture. Indeed, it would be no exaggeration to contend that the real subject matter of the book is perception *per se*, rather than architecture. The greater value attributed to the epistemological meaning of form, as compared to other meanings, is in fact a reflection of the rise of scientific knowledge that was taking place in the seventeenth century. It was also at that time when the mind began to be considered an object of scientific enquiry. It is not surprising then, that some of the questions raised in Perrault’s text re-appeared in the theories developed later by philosophers like Locke, Hume and Kant, or by Gestalt psychologists in the twentieth century.

Apart from Perrault’s theory, there were other manifestations of the emergence of the epistemological meaning of form, like the geometrization of architectural form that began to take place in England in the early eighteenth century. By using simple volumes as elements of composition, architects like Morris attempted to make it easier for the viewer to *understand* the idea of the building. Ease of apprehension was identified with beauty. A similar equation between

⁵⁹Boullée, op. cit., p. 73.

⁶⁰Werner Oechslin has distinguished between the conception of *caractère* held before by Blondel and the one of Boullée, by saying that for Boullée “caractère is thus no longer defined in relation to other object, as is the case with J. F. Blondel, who did not proceed beyond listing the architectural means[...]. Instead character now refers, unequivocally and exclusively, to effect.” W. Oechslin, ‘*Emouvoir*-Boullée and Le Corbusier’, 1988.

⁶¹Boullée, however, did not stress the symbolic nature of architectural form as far as his contemporary Ledoux did with his *architecture parlante*.

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epistemology and aesthetics is still present in Boullée's work a few decades later. More radically than any other architect before, Boullée attempted to shorten the distance between *visible architectural form* and *idea*, using geometric solids as basic formal vocabulary.

The interest in form perception in the architectural theory of the seventeenth and eighteenth centuries can be seen as part of the same process that would lead, one century later, to Quatremère de Quincy's definition of Type. As we will see in the next chapter, Quatremère's concept of Type stands for the epistemological meaning of form, once the metaphysical and aesthetic meanings had become secondary.

Chapter 6

The Emergence of the Notion of Type: Laugier and Quatremère de Quincy

6.1 Introduction

In the culture of the eighteenth century, speculations on the origins of human creations were commonplace. In the field of architecture, the theories of Marc-Antoine Laugier epitomize this concern with origins. Laugier attributed to the *cabane*, or primitive hut, the character of a fundamental principle of architecture. He endowed his *cabane* with a normative character: it was the model after which new architecture should be created. But, apart from the question of the origins, Laugier's theory of the primitive hut participates in the preoccupation with perception that dominated the thought of British empiricists in the preceding century. From this point of view, the *cabane* can be understood as the idea that the architect abstracts from the realm of sensible forms. Laugier's *cabane* is, in this regard, a conceptual construct rather than a sensible one.

The primitive hut of Laugier is the direct antecedent of the concept of Type later formulated by Quatremère de Quincy. But, apart from the connection with Laugier's *cabane*, the sources of Quatremère's *type* need to be found in his concern with the doctrine of imitation, the main theme of his theory. In fact, the Platonic doctrine of imitation is the subject-matter that pervades most of Quatremère's writings. He attempted a reformulation of this doctrine to prove that architecture was an imitative art. For this reason, he distinguished between two different kinds of imitation in art: one literal or real, in which the object of imitation is the *modèle*; the other illusory or abstract, in which the object is the *type*. In much the same way as the primitive hut of Laugier, the concept of Type of Quatremère denotes an epistemological intention. Quatremère thought that imitation of nature by art was not a matter of copying external appearances but of

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understanding the procedures of nature in order to recreate them in the process of artistic invention. In this regard, both theoretical constructs, Laugier's *cabane* and Quatremère's *type*, can be interpreted as early attempts to develop a theory of the artistic creative process.

6.2 Laugier, and the primitive hut

In the previous sections, we have been tracing the rise of form perception in architectural theory in the writings of Alberti and Perrault. Their texts revealed an increasing awareness of the role of the beholder in the perception of form, and a shift from aesthetic to epistemological concerns. As a result, the cognitive aspects related to form perception came to the fore. We have also seen how the epistemological concern with architectural form was already manifested in the distinction between real and apparent solidity raised by French writers and in the idea of formal simplicity advocated by English writers at the beginning of the eighteenth century. The theory of Laugier can be seen as one more step in the process of this increasing awareness with form perception and with the subsumption of the aesthetic form under epistemological form.

Laugier's theories were born as a reaction against the formal excesses in the architecture of his time, exemplified in the Baroque and Rococo. In order to correct those excesses, Laugier found necessary to return to the origins to find the fundamental principles of architecture, that is to say, the 'primitive hut.'

6.2.1 The natural origins of the hut

Like previous classicist theorists, Laugier thought that architecture was, like other arts, imitation of nature. Obviously, Laugier's notion of nature was not the same as the one of Vitruvius or Alberti. Nature for Laugier meant simplicity and a few simple rules: "*Il en est de l'Architecture comme de tous les autres Arts: ses principes sont fondés sur la simple nature, & dans les procédés de celle-ci se trouvent clairement marquées les règles de celle-là.*"¹ It is in nature then where the principles of architecture are to be found. The principles of architecture that Laugier wanted to reveal are contained in the first hut, the *cabane*. The primitive hut was for him 'a rough sketch which nature offers us', the starting point from which architecture developed. He described the origins of the hut in the following manner: "*Considérons l'homme dans sa première origine sans autre secours; [...] L'homme veut se faire un logement qui le couvre sans l'ensevelir. Quelques branches abbatues dans la forêt sont les matériaux propres à son dessein. Il en choisit quatre des plus fortes qu'il élève perpendiculairement, & qu'il dispose en*

¹M. A. Laugier, *Essai sur l'architecture*, 1755, p. 8.

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*quarré. Au-dessus il en met quatre autres en travers; & sur celle-ci il en élève qui s'inclinent, & qui se réunissent en point de deux côtés. Cette espèce de toit est couvert de feuilles assez serrées pour que ni le soleil, ni la pluie ne puissent y pénétrer; et voilà l'homme logé. Il est vrai que le froid et le chaud lui feront sentir leur incommodité dans sa maison ouverte de toute part; mais alors il remplira l'entre-deux piliers, et se trouvera garanti."*² And he concluded: "*Telle est la marche de la simple nature: c'est à l'imitation de ses procédés que l'art doit sa naissance.*"³ For Laugier then, nature is not something static, permanent and immutable, as it was for Vitruvius or even Alberti. Rather, Laugier sees nature as a process of development that began with some simple origins.

6.2.2 The *cabane*: a perceptual construct

In the preceding chapter, we have made a case for the increasing concern on perceptual issues manifested by French architects and theoreticians between the years between 1650 and 1750. Laugier's work is a direct continuation of the same preoccupation with form perception that arouse among his predecessors. In this regard, we will argue that Laugier's primitive hut is, more than anything else, a metaphor for the idea, in the sense that Locke and other British empiricists used the word, that is to say, as a percept created in the mind by impressions received from the world of experience. In this light, Laugier can be seen as the initiator of an 'architectural epistemology', as opposed to the 'general epistemology' with which Empiricist philosophers were concerned.

In effect, the following description of the primitive hut, as rendered by Laugier in the first edition of the *Essai*, can be understood as the description of a process by which a percept or idea arises in the mind of a viewer: "*Les pièces de bois élevées perpendiculairement nous ont donné l'idée des colonnes. Les pièces horizontales qui les surmontent, nous ont donné l'idée des entablements. Enfin les pièces inclinées qui forment le toit, nous ont donné l'idée des frontons: voilà ce que tous les Maîtres de l'Art ont reconnu.*"⁴ The suspicion that what is behind this description is just the outcome of the act of perception is further confirmed by the reference to 'seeing' (*voir*) in the following paragraph: "*Je n'y vois que des colonnes, un plancher ou entablement, un toit pointu dont les deux extrémités forment chacune ce que nous nommons un fronton. Jusqu'ici point de voûte, encore moins d'arcade, point de piédestaux, point d'attique, point de porte même, point de fenêtre.*"⁵ The reference to *voir* in this passage, and to *idée* in the preceding one, suggests that Laugier is describing nothing but the act of

²Ibid., pp. 8-9.

³Ibid., p. 9.

⁴Ibid., p. 10.

⁵Ibid., pp. 10-11.

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apprehension by which an idea arises in the mind. To this idea, this 'abstract construct', Laugier gave the name of the *cabane rustique*.

Subsequently, Laugier converted his revelation (i.e. the idea of the primitive form) into a principle: he considered that the primitive hut was "*le modèle sur lequel on a imaginé toutes les magnificences de l'Architecture.*"⁶ At this point, Laugier was transforming a *percept* into a *precept*. To understand why this percept, the *cabane*, had to be raised to the level of an architectural principle we have to recall the above discussion between apparent and real structure. We have already seen that French architects and theorists, starting from the middle of the seventeenth century, had aimed to achieve the unity of the physical and the conceptual structure of a building. Laugier is driven by the same purpose when he introduces the notion of the primitive hut. When he demands that new buildings should be designed having the idea of the *cabane* in mind, he is not calling for the reduction of architectural form to structural form in its physical sense, but rather, to structural form in its conceptual sense. In this regard, Laugier was not, as some authors have interpreted him, postulating that architecture would become more *natural* as a result of imitating the first model that nature provided.⁷ Laugier, like the French writers who were debating the incongruence of apparent and real solidity in Gothic architecture, was concerned with form perception and, therefore, what he was demanding was an architectural form which could be immediately apprehended by the viewer in a *coup d'oeil*. In other words, Laugier was claiming that the sensible form should conform as much as possible to the idea or conceptual form, that is to say, the primitive hut.

6.2.3 The two meanings of structural form: physical and conceptual

Among those authors who have commented on Laugier's primitive hut, it is possible to find these two distinct approaches: one that stresses the physical dimension of the primitive hut and a second one that emphasizes its conceptual nature.

Some authors have wanted to see Laugier as one of the exponents of the French tradition of *l'art de bâtir* and, consequently, they have stressed the connections between him and writers like Félibien, Fremin and particularly Cordemoy. Consistent with this view, it has also been suggested that Laugier was postulating that architectural form should be devoid of ornament and become purely and simply structural form, in its physical sense. Laugier's declared aversion to pilasters, niches, pedestals and other elements that he considered as

⁶Ibid., pp. 9-10.

⁷Sylvia Lavin considers that "for Laugier, the hut was a vehicle for the return to nature because it was itself a model of natural simplicity." S. Lavin, *Quatremère de Quincy and the Invention of a Modern Language of Architecture*, 1992, p. 110.

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not essential, is mentioned as an argument to support this interpretation (e.g. “*Les pilastres ne sont jamais nécessaires*” since they are a “*innovation bizarre, qui n’étant autorisée par aucun besoin, n’a pu être adoptée que par ignorance*”⁸). This interpretation of Laugier’s theories, as an exponent of the *l’art de bâtir*, was already advanced in his own time. Some of his contemporary architects had interpreted his primitive hut, and also his project for a church described in the *Essai*, as if they would be actual projects ready to be built. Logically, the conclusion drawn by those professional architects who analyzed Laugier’s proposals from the point of view of construction and technique was that Laugier was incompetent in matters of architecture.⁹ But such a conclusion was certainly not correct, since Laugier’s theories, as he claimed, should be judged within the realm of ideas: they were meant to be more philosophical than practical.¹⁰

Even in recent times, some scholars have continued to view the primitive hut of Laugier as a sensible model, a construction in the physical sense. Peter Collins, for example, has contended that “Laugier published the first book equating architecture with rational construction.”¹¹ Tom Heath considers that Laugier’s hut was a construction, “a hut not unlike the bowers and shelters which Laugier may have seen in the countryside.” Moreover, Heath identifies construction with rationalism, and thus contends that “Laugier is the father of structural rationalism: the notion that architecture is ‘nothing but’ structure.”¹² A more balanced interpretation of Laugier’s theories is provided by Herrmann. In his authoritative study on Laugier, he writes that “differing from all previous writers he interpreted the classical principle of the balanced interplay of the whole and its parts in a concrete sense by demanding that the actual construction of a building should be formed by the members hitherto regarded as decoration.”¹³ Herrmann seems to imply that in the primitive hut both the apparent and the real became unified.

In contrast to those opinions, for which the primitive hut would be mostly a physical construction, other authors have understood the primitive hut mostly as a conceptual construct, that is to say, as an Idea. John Summerson, for example, thinks that the hut is a “symbolic diagram[...]that expresses the essence of architecture”, while Joseph Rykwert contends that “the primitive hut is *notionally*

⁸Laugier, op. cit., p. 17.

⁹Blondel thought that Laugier was ‘lacking the fundamental knowledge indispensable for someone dealing with this specialized subject’. Briseux and La Font de Sainte-Yenne published a critical review of Laugier’s theory in 1754. In the same year, Frézier published an article in which he spoke of Laugier’s church ‘as a theatre decoration that will crumble under the slightest gust of wind’. All quotations from W. Herrmann, *Laugier and eighteenth century french theory*, 1962, pp. 148-156.

¹⁰As Joseph Rykwert recalls, by the time Laugier wrote the *Essai*, he was close to the Encyclopedist circles, so “he describes himself as philosophe, and it is en philosophe that he defends his right, against the overpragmatic practitioners, to state the rules and aims of an art like architecture.” J. Rykwert, *On Adam’s House in Paradise*, 1981, p. 46.

¹¹P. Collins, *Changing Ideals in Modern Architecture*, 1965, p. 29.

¹²T. Heath, *Method in Architecture*, 1984, pp. 32-33.

¹³Herrmann, op. cit., p. 21.

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primitive. It is a demonstration of a priori reasoning, put forward as a criticism and a precept."¹⁴

These contrasting interpretations of the primitive hut can be attributed to Laugier's own ambiguity in his use of language. He often described the primitive hut so it could be interpreted in either way, as a physical structure or as a conceptual structure, as in the following passage: "*Je voudrais persuader à tout le monde une vérité que je crois très-certaine; c'est que les parties d'un Ordre d'Architecture sont les parties mêmes de l'édifice. Elles doivent donc être employées de maniere non-seulement à décorer le bâtiment, mais à le constituer. Il faut que l'existence de l'édifice dépende tellement de leur union, qu'on ne puisse retrancher une seule de ces parties, sans que l'édifice croule.*"¹⁵ Because of the word *crouler*, to collapse, a reader is induced to think that Laugier was mainly concerned with the physical stability of the building, with *firmitas* rather than *venustas*. However, if we consider *crouler* figuratively, rather than literally, then we see the primitive hut under a new light. Now, the collapse that Laugier is talking about does not refer to the physical stability of the building, but to the inability of a viewer to reconstruct in the mind the different parts of the building to make a coherent whole. If this interpretation is correct, then the primitive hut of Laugier would be close to what later Rudolf Arnheim has called 'the structural theme or skeleton' of a design.¹⁶ When the viewer's attempt to grasp this 'skeleton' fails then, the 'building', more precisely, the building's form, 'collapses' in the mind. We suspect that in the above statement, Laugier was concerned with the apparent stability and not with the real one, and that his use of the term 'collapse' was more in a figurative sense than in real sense.

The mixing of the two realms, physical and conceptual, put Laugier sometimes in serious trouble, as when he had to justify why his primitive hut had no doors and windows, and no walls. He admitted though that a hut only made up of posts and beams could not be inhabited. But he claimed too that walls were elements added to the structural skeleton for reasons of functional necessity: "*Un édifice à colonnes isolées qui portent un entablement, n'a besoin ni de Portes, ni de Fenêtres: mais aussi, ouvert de toutes parts, il n'est pas habitable. La nécessité de se garantir des injures de l'air, et bien d'autres motifs plus intéressans encore nous obligent à remplir les entre-colonnements, & dès-lors il faut des Portes et des Fenêtres.*"¹⁷

¹⁴Rykwert, op. cit., p. 48.

¹⁵Laugier, op. cit., p. xvij.

¹⁶Rudolf Arnheim defines 'the structural skeleton' "as the carrier of the building's principal meaning, which the viewer must grasp if his to understand the design as a whole." See R. Arnheim, *The Dynamics of Architectural Form*, 1977, p. 270.

¹⁷Laugier, op. cit., p. 49.

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Taken strictly as an idea or abstract form, the primitive hut would not need doors nor walls to protect against the weather. It is a construct of the mind, and as such, it should not be affected by the elements of the natural world. Considered as a physical construct, however, the absence of those elements is hardly justifiable. Laugier attempted to solve this conflict between the hut as a conceptual form and the hut as a physical structure, by distinguishing between elements that are essential and elements that are added by necessity or caprice: "*Il est facile désormais de distinguer les parties qui entrent essentiellement dans la composition d'un ordre d'Architecture, d'avec celles qui ne s'y sont introduites que par besoin, ou qui n'y ont été ajoutées, que par caprice.*"¹⁸ The essential parts are those represented in the primitive hut, like the posts that stands for the columns and the roof that prefigures the pediment; walls and doors have been introduced by necessity, but they are not essential; and pilasters and other decorations have been added by caprice.¹⁹

Finally, one last point in the discussion about the double nature of the primitive hut, sensible and conceptual. The illustration that was published in the second edition of the text shows a goddess who personifies architecture, pointing out at the hut depicted in its natural setting (Figure 6.1). This illustration, we would argue, has also contributed to the misunderstanding of Laugier's primitive hut. In spite of the allegoric character of the illustration, some authors have taken it quite literally and have seen it as a physical construction made out of trunks, branches and logs. But, we should keep in mind that Laugier's primitive hut is a mental construct -Idea, Form or Type- and, as such, it cannot be properly speaking, visualized.²⁰

¹⁸*Ibid.*, p. 10.

¹⁹Ribard de Chamoust, in a text written in 1783, confronted a similar problem. Chamoust drew a distinction between *type* and *archetype* that embraces the double meaning that fits the *cabane* of Laugier: as a physical object, made by nature; and as a conceptual form, apprehended by the mind's eye. Chamoust wrote: "I mean by this word *type*, the first attempts of man to master nature, render it propitious to his needs, suitable to his uses, and favorable to his pleasures. The perceptible objects that the Artist chooses with justness and reasoning from Nature in order to light and fix at the same time the fires of his imagination, I call *archetypes*." R. de Chamoust, *L'Ordre Français*, p. 5. Quoted by Anthony Vidler, 'The Idea of Type: The Transformation of the Academic Ideal, 1750-1830', 1977. Using Chamoust's terminology, we could say that Laugier pretended his primitive hut to be both a type and an archetype.

²⁰John Summerson has written that Laugier did to the primitive hut something that nobody had done before: "He visualised it. He visualised it as a structure consisting of upright posts, cross beams and a pitched roof - much what you see in the allegorical frontispiece to his book[...]This, he declared, was the ultimate image of architectural truth." J. Summerson, *The Classical Language of Architecture*, 1980, p. 91. However, it would more appropriate to say that he had described it or represented, rather than visualized it. The question of the image of the type constitutes one of the classical problems in philosophy. In *A Treatise Concerning the Principles of Human Knowledge*, 1710, the British philosopher George Berkeley had claimed that every idea must correspond to an image and he had used this argument to deny that universals, like 'triangularity', could exist by themselves since no image can be found that could stand for all triangles. The problem also concerned Kant, who in his *Critique of Pure Reason*, 1781, contended that "in truth, it is not images of objects, but schemata,



Figure 6.1. Laugier. The primitive hut

6.2.4 Laugier and Vitruvius

In our previous discussion of Vitruvius' theory of the origins of architecture, we have pointed out two possible interpretations for the notion of structural form: 1. real, in the sense of building form or prototype 2. figurative, as a 'materialized' Idea. While in the case of Vitruvius we can speculate as to whether his wood construction was meant to represent the first or the second concept of structural form, there seems to be little doubt that in the case of Laugier's primitive hut, structural form means basically a conceptual structure or Idea.

Unlike the wood construction of Vitruvius, Laugier's primitive hut is supposed to be more a product of man than of nature. Vitruvius thought that the first constructions were an extension of nature. Laugier also refers to a first model given by nature, but he sees it as 'a sketch' or 'idea', thus acknowledging that the model is mostly a product of the mind, although originated in the realm of nature.

It should be noticed though that neither Vitruvius' wood constructions nor Laugier's *cabane* are as primitive as these authors claim them to be. Because, to recognize a column or a pediment in a structural form made up of wooden posts and beams it is necessary first to be in possession of notions like column and pediment. But, this is tantamount to acknowledging that the Greek temple existed

which lie at the foundations of our pure sensuous conceptions. No image could ever be adequate to our conception of triangles in general."

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before the primitive hut. Therefore, the *actual* primitive model for both Vitruvius and Laugier was in fact the temple. In effect, without mentioning it explicitly, both authors considered that the Greek temple was the true origin of architecture, and starting with it, they elaborated a theory whose purpose was to determine a simpler model after which the temple might have been shaped.

6.2.5 The understanding of the creative process

Wolfgang Herrmann, in his book *Laugier and eighteenth century french theory*, 1962, has rightly suggested a possible connection of Laugier's theories with some incipient attempts to understand the nature of the artistic process. Herrmann refers to a text by Bossuet, *Fécondité des arts*, in which this tries to envisage the process of creation carried out in his mind: "*Je suis un peintre, un sculpteur, un architecte; j'ai mon dessin ou mon idée; j'ai le choix et la préférence que je donne à cette idée par un amour particulier. J'ai mon art, j'ai mes règles, mes principes, que je réduis, autant que je puis, à un premier principe qui est un, et c'est par là que je suis fécond. Avec cette règle primitive et ce principe fécond qui fait mon art, j'enfante au dedans de moi un tableau, un statue, un édifice, qui dans sa simplicité est la forme, l'original, le modèle immatériel de ce que j'exécuterai sur la pierre, sur le marbre, sur le bois, sur une toile...*"²¹

This comment of Bossuet reveals that the concern with the understanding of the mechanisms of the mind, which characterized the work of most eighteenth century philosophers, like Descartes, the British empiricists and Kant, was also present in the artistic field. Laugier's theory can also be seen as part of an incipient interest in understanding the design process. In this regard, the meaning of the primitive hut is not fundamentally different from the '*premier principe*' that Bossuet was referring to. It stands for the idea that the artist has in the mind, an idea that initiates and guides the development of the design process.

²¹Herrmann, op. cit., p. 52. Herrmann thinks that the ideas contained in this passage "have called forth a line of thought which in the end gave rise to the idea of the primitive hut as the guiding principle for architecture."

6.3 Quatremère, and the concept of Type

Laugier's theory of the primitive hut is the direct antecedent of the concept of Type that Quatremère de Quincy introduced in the theory of architecture. Both Laugier and Quatremère shared the belief that architecture had to be regenerated after the excesses committed in the immediate past. They were also concerned that, after the abandonment of the classical model, architecture would fall into caprice and arbitrariness. The solution that they advocated was the same: it was necessary to go back to the first principles. For Laugier those principles were contained in the *cabane*; for Quatremère in the *type*.

6.3.1 Primitive hut and type

Quatremère acknowledged the importance of Laugier's theory by dedicating an entry to the word 'Cabane' in the first of the three volumes of his *Encyclopédie Méthodique*, published between 1788 and 1825. In this entry, Quatremère included some excerpts of Laugier's *Essai*, along with other passages from Vitruvius' account of the origins of architecture.

A parallelism between Laugier's *cabane* and the concept of *type* that Quatremère would introduce later in the third volume of the *Encyclopédie*, can already be detected in the article dedicated to the *cabane*. Whereas Laugier had written "*ne perdons point de vue notre cabane rustique....*", Quatremère wrote instead that "*ce type, qu'on ne doit jamais perdre de vue, sera la règle inflexible qui redressera tous les usages dépravés.*"²² Like Laugier, Quatremère thought that the *cabane* is a creation of the mind's eye, that is to say, an abstract form derived from sensible ones: "*dans tous les temps, [c'est] sur le type de la cabane qu'il faut reporter les yeux pour apprendre à rendre raison de tout ce qu'on peut se permettre dans l'architecture, à connoître l'emploi, la destination, la vraisemblance, la convenance, l'utilité de chaque chose.*"²³

The influence of Laugier's primitive hut in Quatremère's thought can hardly be overestimated. The issue of the primitive model became the major theme of Quatremère's thought, and he referred to it in different articles of the *Encyclopédie*. This notwithstanding, Quatremère's concept of the primitive model needs to be understood within the context of his own theoretical framework which, as we will see in the following discussion, was centered around the doctrine of art as imitation of nature.

²²Entry 'Cabane', *Encyclopédie Méthodique*, vol. 1, pp. 382-386.

²³*Ibid.*

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One model or many models

Unlike Laugier, Quatremère admits that there cannot be only *one* model from which all architecture is derived. Quatremère was well aware that there were styles in architecture that did not evolve from the Greco-Roman model, like Egyptian or Chinese. He considered though that every style began with a first model whose form had been the result of necessity (*besoin*), meaning that the form of those models had been determined by the conditions of the place, like climate, productions of the country, and the lifestyle of the inhabitants.

Quatremère proposed then three different primitive models from which every architectural style would have derived: the cave, the tent and the hut. These primitive constructions were the product of the ingenuity of man, working in accordance with the principles of nature.²⁴ The hunters lived in caves, the shepherds used tents and the farmers built huts. And he went on saying that "*tels sont les trois états de la vie naturelle auxquels on peut rapporter l'origine de toutes les constructions, & des différences de goût qu'on y reconnoît chez tous peuples.*"²⁵ Every historical style derived from one of these three models. Thus, the cave was the model for Egyptian architecture, the tent for Chinese and Scythians; and the hut for the Greeks.

According to Quatremère, the character of the first model determined the characteristics of the style. Thus, he thought that Greek architecture is superior to all others because it started from a superior model, the primitive hut. By the same token, he considered Egyptian architecture inferior to the Greek because it derived from a less sophisticated model, the cave. And he dismissed Chinese architecture on the grounds that the model on which it was based, the tent, had too few things to imitate.²⁶ As the previous theories from both Laugier and Vitruvius, Quatremère's notion of the primitive model is based on the assumption that Greek architecture, more precisely the Greek Doric temple, was *the* architecture. Even though Quatremère acknowledged the existence of a diversity of styles, he could not mask his predilection for Greek architecture which he considered superior to others.

²⁴Francesco Milizia, had advocated that the first model was not provided by nature but was a creation of man: "Architecture, therefore, is an art of imitation, as are all the other arts. The only distinction is that some of them have a natural model on which their system of imitation may be based. Such a model architecture lacks, but she has an alternative one offered to her by the natural industry of men when they built their first dwellings." F. Milizia, *Memorie degli architetti antichi e moderni*, vol. 1, p. i., 3rd ed., 1781. Quoted in Rykwert, op. cit., p. 67.

²⁵Entry 'Architecture', *Encyclopédie Méthodique*, vol. 1, p. 110.

²⁶In a previous study on Egyptian architecture, Quatremère had appealed to a similar argument to dismiss Chinese architecture, as he said that the model they used, the tent, had "*trop de petites choses à imiter.*" *De l'architecture égyptienne*, p. 239.

Chapter 6

The material of the hut

Quatremère agreed with both Vitruvius and Laugier in the choice of the material of the primitive hut which served as a model for Greek architecture: the material could only be wood. We have seen that Vitruvius justified the use of wood in terms of the availability of the material in the areas where the first dwellings were built. For Laugier wood was the material because the hut was made with natural elements, trees and branches.

Like Vitruvius, Quatremère contended that the availability of wood in the territory populated by the Greeks was a determinant factor in the construction of their primitive huts. But he also advances other sort of reasons. More than the material wood itself, he thought that the determinant factor of the form of the primitive hut was carpentry, considered as a rational system of construction.²⁷ It was carpentry which made the primitive hut of the Greeks superior to the others: *"C'est incontestablement la charpente, comme nous allons le faire voir, qui a servi de modèle à l'architecture Grecque; & il faut avouer que des trois modèles que la Nature peut présenter à l'art, celui-ci est sans doute le plus parfait & le plus beau de tous."*²⁸ Moreover, he contended that *"sans la charpente, il n'y auroit jamais eu dans l'architecture d'art raisonné"*²⁹ and that *"la charpente est le principe unique de l'architecture."*³⁰

Therefore, Quatremère raises timber frame construction to the category of principle of architecture because it produces forms which, like the ones created by nature, are only the result of necessity. Necessity, in the case of the timber frame construction, means that the system of construction itself provides a series of positive rules from which the forms of buildings would derive. In this regard, Quatremère writes that *"cette première ébauche de l'architecture exigea dès lors des calculs, une intelligence, une disposition raisonnée de poussées & de résistances, un accord dans l'équilibre des forces."*³¹ As examples of the logic inherent to the

²⁷In *De l'architecture égyptienne*, p. 241, Quatremère had contended that 'the school of carpentry in itself could make a reasoned art out of Architecture'. Cited in Rykwert, op. cit., p. 63.

²⁸Entry 'Architecture', *Encyclopédie Méthodique*, vol. 1, p. 112.

²⁹Ibid.

³⁰Ibid., p. 114.

³¹It should be noticed, that Quatremère is mixing here statics with aesthetics. He is judging the *cabane* from an aesthetic point of view, even though the expressions he uses can led one to think that he is actually referring to the static of the timber frame construction. Once again, we are facing here the distinction between physical and conceptual realms, as in the previously discussed issues of apparent and real solidity, and physical structure versus conceptual structure. The fact that words like structure, solidity, balance and equilibrium can be used both in a proper and figurative way leads to the confusion between the physical and conceptual realms, and in the case of this passage of Quatremère, between statics and aesthetics. For example, the adjective 'balanced' can be used in its proper, physical sense, as the equilibrium of forces within a physical structure, or in a figurative way, as a 'balanced composition' of forms as perceived by the beholder. Nevertheless, in this particular commentary from Quatremère, there seems to be no ambiguity. He is expressing the aesthetic qualities of the primitive wood construction.

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timber frame construction, he mentions that the purpose of the abacus is to protect the column from humidity and to give support to the beams; that the ends of the girders correspond to the triglyphs; and that the stylobate exists to protect the columns from humidity. Similar contentions would be made later by Viollet-le-Duc, as he attempted to demonstrate the eminently rational character of architecture.

There are other sorts of reason, apart from the logic of wood construction, that could justify the use of wood as material of the temple prototype; reasons that have to do with more with form than with material. Hegel, in his *Vorlesungen über die Aesthetik*, accurately pointed out that the real issue behind the employment of wood as material in the primitive constructions was form, rather than technique. He contended that “zur näheren Bestimmung dieses Anfangs hat man dann nach dem Unterschiede des Materials gegriffen, mit welchem konnte gebaut werden, und sich gestritten, ob die Architektur vom Holzbau ausgegangen -wie Vitruv meint[...]oder vom Steinbau. Dieser Gegensatz ist allerdings von Wichtigkeit, denn er betrifft nicht nur, wie es beim ersten Blick scheinen kann, das äußere Material, sondern mit diesem äußerlichen Material stehn wesentlich auch die architektonischen Grundformen wie die Art der Ausschmückung derselben in Zusammenhang.”³² For Hegel, the first shelters had to be made out of wood because “das Holz für sich schon eine bestimmte Formation hat, aus vereinzelt linearen, mehr oder weniger geradlinigten Stücken besteht, welche unmittelbar können in rechten wie in spitzen und stumpfen Winkeln zusammengesetzt werden und so Eckpfeiler, Stützen, Querbalken und Dach liefern. Der Stein dagegen hat von Hause aus keine so fest bestimmte Gestalt, sondern ist mit dem Baum verglichen eine formlose Masse, die erst, zweckmäßig vereinzelt, bearbeitet sein muß, um nebeneinander und aufeinander gebracht und wieder zusammengefügt werden zu können.”³³

Quatremère de Quincy drew a similar comparison between stone and wood. He wrote that “lorsque la pierre n’offre que des surfaces et ne suggère aucune idée de variété, le bois ou la charpente procure partout des saillies, des renforcements, des corps avancés ou en retraite, des distributions de parties, diversement en rapport les unes avec les autres.” So, this is one more reason why stone could not have been the material of the primitive hut, because it was a formless material: “Nous avons déjà fait voir que la pierre, en se copiant elle-même, ou pour mieux dire en ne copiant rien, n’eût offert aucune forme à l’art, aucune variété à l’oeil, aucun rapport à l’esprit.”³⁴

³²G. W. F. Hegel, *Aesthetik*, 1955, p. 592.

³³*Ibid.*, p. 619.

³⁴Entry ‘Architecture’, *Encyclopédie Méthodique*, vol. 1, p. 114.

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The proportions of the hut

The logic of a construction system, Quatremère realizes, is a fundamental cause in the creation of the first models, but it could not be the only one. Not all the forms produced by carpentry could have served as models for Greek architecture, and as an example he mentions the primitive constructions of Vitruvius. He thought that Vitruvius' constructions "*ne pouvoient[...]fournir à l'architecture, ni l'idée d'un modèle à copier, ni aucun accord de formes dont l'ensemble pût devenir harmonieux*", because "*la hauteur prodigieuse des combles s'opposeroit seule à la beauté de l'imitation.*"³⁵ The first model, therefore, had to be already endowed with some pleasant proportions.³⁶ The *cabane* of the Greeks, according to Quatremère, was already "*assujettie à des proportions déterminées*"³⁷, so that "*le bois s'y trouvoit disposé de manière à offrir le mélange heureux de la solidité & de la légèreté, un accord harmonieux de pleins & de vuides, un équilibre de forces, de poussées & de résistances, un rapport du tout aux parties, un tempérament juste de dimensions & de parties, qui permissent la transposition du bois à la pierre.*"³⁸

As a matter of fact, the primitive model that Quatremère had in mind was not really 'primitive', since it had already reached a certain level of perfection before it became a model. As Quatremère contends, "*avant que la cabane pût devenir le type de l'Architecture grecque, il fallût qu'elle même eut reçu sa perfection.*"³⁹ At some point in this development, the primitive hut had reached certain form and proportions without which it could have never been considered as a model to imitate: "*La cabane sans perdre la simplicité de sa forme première aura vu ses supports, ses combles, ses porches, ses plafonds, ses proportions se combiner, se modifier, s'embellir succesivement et se disposer avec plus de recherche et d'élégance.*" The process of development by which the primitive hut became the Greek Doric temple was in fact the process by which construction became architecture. In this regard, Quatremère writes that "*l'origine de l'art de bâtir dut précéder celle de l'architecture*"⁴⁰, that is to say, architecture first had to fulfill the basic needs of shelter before it could also provide pleasure to the eyes. *Firmitas* had to precede *venustas*.

³⁵Entry 'Cabane', *Encyclopédie Méthodique*, vol. 1, pp. 383-384.

³⁶Antonio Paoli, a contemporary Italian writer, questioned the belief according to which wood construction could have served as a model for the stone temple in the following terms: "I cannot see how proportions which are suitable to working in wood might possibly be adapted to stone." Quoted and translated in Rykwert, op. cit., p. 51 (originally in J. J. Winckelmann, *Storia delle arti e del disegno presso gli antichi*, vol. 3, p. 178).

³⁷Entry 'Architecture', *Encyclopédie Méthodique*, vol. 1, p. 111.

³⁸Entry 'Cabane', *Encyclopédie Méthodique*, vol. 1, p. 383.

³⁹*De l'architecture égyptienne*, pp. 229-230. Quoted in S. Lavin, op. cit.

⁴⁰Entry 'Bâtir', *Encyclopédie Méthodique*, vol. 1, p. 250.

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At this point, we must recall that Vitruvius did not consider that the primitive house was endowed with any particular proportions. In Vitruvius' theory, the primitive house provided the structural form that later gave rise to the orders. The proportions of the temple did not derive from the first house but from *symmetria*, the general principle governing all creations of nature, as exemplified in the human body. There are, therefore, two distinct models in Vitruvius theory: first, the primitive house, whose form is determined by material and construction techniques; second, the proportions of the human body, which are the expression of the principle of *symmetria*.⁴¹ In contrast to Vitruvius, Quatremère postulates one model instead of two: a single hut, which is already endowed with the right proportions.

6.3.2 The doctrine of imitation

In the previous sections we have focused on the parallels between Laugier's and Quatremère's theories. In the following sections, we will shift our attention to the doctrine of imitation, which is at the core of Quatremère's concept of Type. Already in the first volume of the *Encyclopédie*, Quatremère began to differentiate between two different kinds of imitation: one illusory or figurative and the other real. He spoke, for example, of the imitation "*tout-à-la-fois illusoire & réelle de la charpente & de la cabane.*"⁴² And with regard to Vitruvius' account of the origins of architecture, he contended that when Vitruvius suggested that the orders derived from the human body, he was referring to an "*imitation d'analogie & non de ressemblance*"⁴³ because architecture "*ne se calque jamais matériellement sur son modèle: elle n'en fait qu'une copie intellectuelle.*"⁴⁴

On other occasions, Quatremère distinguished between copying and imitating. Imitation for him conveys the repetition of the idea of an object into another object which in turn becomes its image. A copy, on the other hand, is the repetition of a particular object without necessarily grasping its idea. Copying has always a pejorative meaning for Quatremère. He thought that the word *copier* should only be applied to artistic productions, while *imitation* should be used in regard to the works of nature: "*L'idée d'imitation s'applique aux oeuvres de la nature, l'idée de copie s'applique aux ouvrages de l'art.*"⁴⁵

⁴¹Hans-Karl Lücke contends that for Vitruvius the Greek temple is composed of *forma* and *symmetria*, and that in his architectural theory the first precedes to the second. According to Lücke, for Vitruvius the development of the Greek temple would be composed of four phases: 1. the discovery of the form of the temple 2. the normalization of the form, that is, its repetition 3. the form is recognized as universally valid 4. the form of the temple is submitted to the laws of *symmetria*. H. K. Lücke, 'Alberti, Vitruvio, Cicerone', 1994, p. 72.

⁴²Entry 'Architecture', *Encyclopédie Méthodique*, vol. 1, p. 115.

⁴³Entry 'Architecture', *Encyclopédie Méthodique*, vol. 1, p. 119.

⁴⁴Entry 'Architecture', *Encyclopédie Méthodique*, vol. 1, p. 119.

⁴⁵Entry 'Copier', *Encyclopédie Méthodique*, vol. 2, p. 71.

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The distinction between two kinds of imitation -real and illusory- or between copy and imitation, is a distinctive aspect of Quatremère's thought which was not contemplated by his predecessor, Laugier. As we have seen, Laugier's primitive hut was ambivalent: it could be taken as a physical construct participating in the physical reality of nature, or as a conceptual construct or idea in the mind of the beholder. Laugier did not distinguish clearly between the two, so he ran into trouble when he had to justify why his primitive hut had no doors, walls or windows. It was not clear to him whether the primitive hut was to be *copied* or *imitated*, continuing with Quatremère's terminology. By distinguishing between figurative and real imitation, Quatremère avoided the troubles that Laugier faced. The model that Quatremère proposes as the object of imitation for architecture is clearly an abstract one, the *type*.

Illusory and real imitation

In his *Essai sur la nature, le but et les moyens de l'imitation dans les beaux-arts*, 1823, Quatremère gave a thorough account of his interpretation of the doctrine of imitation in art. In this text, references to architecture are punctual, and they appear in the context of a broader discussion about imitation in the arts. Altogether, this essay on *L'Imitation* appears to be an exercise in metaphysics and an application of well-known Platonic theories of form to art theory. Nevertheless, *L'Imitation* gives expression to some preoccupations that are unique to Quatremère's thought and help us understand the real meaning of the concept of Type that he introduced in the third volume of the *Encyclopédie*, published in 1825.

Quatremère begins *L'Imitation* with the already familiar distinction between different kinds of imitation. On this occasion, he distinguishes between two kinds of repetition: mechanical repetition and imitation. Mechanical repetition takes place in the creation of exact copies from existing models, as in the manufacturing of industrial products. Imitation has to do with producing resemblances, rather than reproducing exactly the object: "*Imiter dans les beaux-arts, c'est produire la ressemblance d'une chose, mais dans une autre chose qui en devient l'image.*"⁴⁶ Unlike an imitation, a copy fails to convey the image (i.e. idea) of the original model. An object which is a direct copy of a model "*n'est pas l'image de son modèle, il n'en est que la répétition.*" A corollary of this, is that no pleasure can be derived from works which are copies of other objects, like manufactured products or works of art copied from previous works.⁴⁷

⁴⁶Q. de Quincy, *Essai sur la nature, le but et les moyens de l'imitation dans les beaux-arts*, 1823, p. 3.

⁴⁷In page 190 of the *Essai sur la nature*, Quatremère distinguishes between *l'imitation dans le monde des réalités* and *imitation idéale*, a distinction that echoes the previously discussed one between copy and imitation.

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Quatremère also addressed the issue of the correspondence between each sense organ and the different arts. He thought that in much the same way as every sense organ can only capture a part of the total reality, all art is also bound to grasp only a part of that reality which as a whole can only exist in nature. Therefore, he argues, art is always *fictif* with regard to the truth and *incomplet* with regard to resemblance. Every art is *fictif* with regard to reality because it can only offer an image of this reality, but never reality itself. True reality can only be achieved through intellectual means, by comparing the fictitious image offered by the work of art with the ideal model. Also, art is *incomplet* with regard to resemblance because it can only offer one aspect of the reality. For example, figures can only be drawn from a point of view and we are never certain about the image that another point of view will offer. As we can see, Quatremère's opposition between figurative and real imitation matches the opposition between idea (*eidōs*) and image (*eidolon*) previously established by Plato.

Following Plato, Quatremère thinks that the work of art approximates the original model (i.e. the idea) without ever becoming like it. The pleasure that a work of art provides -he argued- is due to the constant tension between the image and the idea: "*En effet, le plaisir que produit la vue des oeuvres de l'imitation, procède de l'action de comparer.*" In accordance with the previous characterization of art as being fictitious and incomplete, the comparison between the image and the idea involves two kinds of operations: one, looking for relations between the image provided by the work of art and its model, and the other the completion of the image in the imagination. As he wrote: "*Ces deux opérations qui procurent à l'ame le plaisir véritable de l'imitation, et en expliquent aussi la cause, consistent donc, de notre part, l'une à rapprocher l'image du modèle, l'autre à compléter ou à rendre insensible ce qui manque à l'intégrité de la ressemblance.*"⁴⁸ In the case of a direct copy, as opposed to an imitation, the tension between the idea and the image would vanish, and with it the aesthetic experience: "*Si le plaisir est dans le jugement même que l'on porte entre l'objet à imiter et l'objet imitant; si l'ame jouit d'autant plus[...]qu'il y a plus à comparer et plus à juger, on comprend que, dans l'imitation par répétition identique, elle ne peut jouir de rien, puisque rien ne l'avertit qu'il y ait quelque chose à comparer, qu'il y'ait à juger quelque chose.*"⁴⁹ For Quatremère, the pleasure that derives from the contemplation of a work of art is an intellectual activity that embraces two distinct tasks: the perception of beauty, in the strict aesthetic sense, and the understanding of the *cause* that gives rise to beauty. The simultaneous fulfillment of these two tasks by the observer gives rise to the *plaisir* that this obtains from the contemplation of a work of art.

In Quatremère's theory, therefore, the aesthetic experience is inseparable from the acquisition of knowledge. We have seen in the previous chapter, that the aesthetic and epistemological meanings of Form began to blend into one meaning

⁴⁸Ibid., p. 140.

⁴⁹Ibid., p. 6.

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-mostly epistemological- in the theory of Perrault, and that Hutcheson later identified the idea in the epistemological sense with the idea in the aesthetic sense. Quatremère's theory, and particularly his concept of Type, belongs to a similar trend of thought distinguished by the subsumption of the aesthetic under the logical. In this connection, it is significant that Quatremère speaks of [underline mine] "*l'effet utile du plaisir de l'imitation*", which "*doit consister dans ce que nous acquérons par elle, en connoissances, en sensations, en idées, en images, autrement dit, dans ce qui augmente le domaine de notre intelligence, enrichit notre esprit de conceptions nouvelles, ouvre à notre imagination des routes sans nombre vers des points de vue sans terme.*"⁵⁰ The universal is not only an abstract knowledge, the absolute truth, but at the same time, the model that the artist imitates in the creation of a work of art.

6.3.3 Type and Model

In his article 'Type' in the *Encyclopédie Méthodique*, 1825, Quatremère introduced the distinction between Type (*type*) and Model (*modèle*). He begins the article with the etymology of the word *type*, and then gives a list of synonyms for it like *modèle, matrice, empreinte, moule, figure en relief and en bas-relief*. Then, he formulates the well-known definition of Type: "*Le mot type présente moins l'image d'une chose à copier ou à imiter complètement, que l'idée d'un élément qui doit lui-même servir de règle au modèle. Ainsi on ne dira point (ou du moins auroit-on tort de le dire) qu'une statue, qu'une composition d'un tableau terminé et rendu, a servi de type à la copie qu'on en a faite. Mais qu'un fragment, qu'une esquisse, que la pensée d'un maître, qu'une description plus ou moins vague, aient donné naissance, dans l'imagination d'un artiste, à un ouvrage, on dira que le type lui en a été fourni dans telle ou telle idée, par tel ou tel motif, telle ou telle intention.*" And he contrasts *type* with *modèle*: "*Le modèle, entendu dans l'exécution pratique de l'art, est un objet qu'on doit répéter tel qu'il est. Le type est, au contraire, un objet d'après lequel chacun peut concevoir des ouvrages qui ne se ressembleroient pas entr'eux. Tout est précis et donné dans le modèle, tout est plus ou moins vague dans le type.*"⁵¹

In light of this distinction between *type* and *modèle* we can draw a new comparison between Laugier and Quatremère which can help to better understand their respective theories. It now appears clear that when Laugier was referring to the primitive hut as [underline mine] "*le modèle sur lequel on a imaginé toutes les magnificences de l'Architecture*" what he actually meant was that the hut was [underline mine] "*le type sur lequel on a imaginé...*"⁵² This parallel between the 'modèle' of Laugier (i.e. the *cabane*) and Quatremère's 'type', however, should not

⁵⁰Ibid., pp. 168-169.

⁵¹Entry 'Type', *Encyclopédie Méthodique*, vol. 3, pp. 543-545.

⁵²Ibid.

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be stretched so far that it hides the differences that still exist between both terms. It should not be overlooked, for example, that Laugier refers to the imitation of the primitive hut in an impersonal way *-on a imaginé-* and that Quatremère, in his definition of type, appeals to *l'imagination d'un artiste*. The difference is significant, because it reveals the different concept of imitation that every author has. Laugier thinks of the first model as the beginning of a natural process of development, and he applies this paradigm both to nature and to architecture. He seems to assume then that architecture, like nature, follows an autonomous process of growth, independent from human action. In contrast to Laugier, Quatremère, in his definition of type, appeals explicitly to the mind's creative power. Seen in this light, the *modèle* of Laugier and the *type* of Quatremère are not exact equivalents.⁵³

Setting aside the parallels between Laugier and Quatremère (important as they are) the notion of *type* of Quatremère has to be seen within the context of his own preoccupation with the question of imitation in the arts which, as we have seen, constitutes the major theme in his thought. By distinguishing between *type* and *modèle*, Quatremère pursued a more systematic formulation of the two kinds of imitation he introduced earlier, illusory and real: *type* has to do with figurative or illusory imitation; *modèle* with direct copying, with real imitation. The identification of an object of imitation that is abstract rather than sensible (the *type*) allows Quatremère to claim that architecture is an imitative art⁵⁴ since "*il n'est pas nécessaire, pour qu'un art puisse être appelé art d'imitation, que son modèle repose d'une manière évidente & sensible sur la nature physique & matérielle.*"⁵⁵

6.3.4 Nature and art

The relationship that Quatremère established between nature and art helps to understand the ultimate meaning of his theory of Type. Quatremère was convinced that the doctrine of imitation was as valid for architecture as it was for sculpture and painting. The only difference was that in architecture the object of

⁵³In a translation of a quotation of Laugier into English, Joseph Rykwert renders Laugier's *modèle* as type: "the type on which all the magnificences of architecture are elaborated." Rykwert, op. cit., p. 44.

⁵⁴The idea that architecture was imitative had already subjected to criticisms in the previous century, so Quatremère's opinion in this regard seems to be contrary to the beliefs of the time. Werner Oechslin contends that by the end of the sixteenth century, "viewpoints specific to architecture had for the most part, as a commonly shared principle, already dropped the mimesis theory from serious consideration." W. Oechslin, 'Premises for the Resumption of the Discussion of Typology', 1986. Sylvia Lavin refers to the classification of the arts in the *Encyclopédie* of Diderot, 1750, where architecture was first separated from the category of imagination where painting and sculpture were included. She noticed though that "architecture was however united with the other arts in the revised version of the *Système figuré* published following the *Discours préliminaire* in the first volume of the *Encyclopédie*." Lavin, op. cit., p. 249.

⁵⁵Entry 'Imitation', *Encyclopédie Méthodique*, vol. 2, p. 543.

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imitation is an abstract one while in sculpture and painting it is a sensible one. In this regard, the opinion expressed by Argan, according to which the notion of type implies the negation of imitation,⁵⁶ seems to be contrary to Quatremère's purpose, as Oechslin has already pointed out.⁵⁷ In fact, in the light of the development of the concept of *type* that we have been tracing in the previous pages, it seems to be clear that what Quatremère tried to do was precisely the opposite: to validate the doctrine of *mimēsis* by transforming the object of imitation from something concrete and visible (the primitive hut, visible forms of nature) into something abstract and invisible, that is, the *type*.

The numerous references to nature that can be found in *L'Imitation* insist on the same thought: the artist has to study nature, to discover the general principles underlying individual things, the rules that govern the creations of nature. In other words, the artist has to learn to derive the type from nature. In the following passage for example, Quatremère refers to the '*type original de la création*': "*Que dès-lors l'artiste devoit chercher la règle d'imitation de la nature, et le principe de la perfection à laquelle il aspire, non dans le détail toujours variable de la créature individuelle, subordonnée à tant de conditions étrangères au but de l'art, mais bien dans l'ensemble du système, ou du type original de la création, que la vue bornée des sens est incapable de saisir.*"⁵⁸ And in another part, he mentions '*le type idéal de l'imitation*', that is, the abstract concept or idea, which is the intellectual creation of the artist and constitutes the basis for imitation in art: "*Voilà ce que fit le véritable imitateur: et il ne put le faire, qu'en généralisant, par une observation étendue, l'étude de la nature, et en la réduisant en système. Or, ce système n'est autre chose que le type idéal de l'imitation, type formé non sur tel ou tel ouvrage isolé de la nature, mais sur la généralité des lois et des raisons qui se manifestent dans l'universalité de ses oeuvres.*"⁵⁹

⁵⁶With regard to Quatremère's concept of Type, Giulio Carlo Argan has contended that "the type is accepted but not 'imitated' which means that the repetition of the 'type' excludes the operation of that kind of creative process which is known as mimesis." G. C. Argan, 'On the Typology of Architecture', 1963.

⁵⁷Oechslin contends that "more than any architect before him, he [Quatremère] gave special attention to the doctrine of imitation. In his article on typology, however, Argan's efforts to forge a link with the doctrine of mimesis had to lead to confusions." Oechslin, op. cit.

⁵⁸Q. de Quincy, *Essai sur la nature*, p. 195.

⁵⁹*Ibid.*, p. 196. It should be noticed, with regard to our previous discussion of Type and Model, that in the preceding passages from the *L'Imitation* the word *type* has not yet acquired the precise meaning that Quatremère gave to it in the third volume of the *Encyclopédie*. We assume that by that time Quatremère wrote the *L'Imitation* he had not yet distinguish clearly between Type and Model. This assumption is confirmed by the fact that in the *L'Imitation* he found necessary to clarify his use of the word model: "*J'emploie encore dans un sens général le mot modèle, qui, selon l'usage de l'école sur-tout, se dit de l'individu, ou de tout être particulier qu'on imite. Au contraire, on a vu que, selon l'esprit de cette théorie, j'ai entendu par modèle cette portion du règne de la nature, soit morale, soit physique, qui forme exclusivement le domaine imitatif d'un seul art.*" *Ibid.*, p. 152. In light of the distinction introduced later between Type and Model this clarification would have been unnecessary.

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Basically, what Quatremère is saying, is that it is necessary to transcend mere appearances and to discover the rules and principles of nature with the mind's eye. His concern with form is mostly epistemological, as was the case in the work of Empiricist philosophers like Locke. It is necessary, according to Quatremère, to grasp the generalities that underlie the individual cases, that is, the universal or type: "*C'est en étudiant la nature, non point partiellement et en détail, mais dans l'ensemble de ses plans, que nous parvenons à reconnoître ce qui est, ou non, conforme à ses lois générales, que pénétrant le secret de ses intentions, nous saisissons à-la-fois, et le principe d'ordre qui domine tout le système de la création, et les raisons des irrégularités qu'on remarque dans les créatures.*"⁶⁰ It should be noticed, that the common traces and irregularities that are recognized in the individual cases appeal to the sense of sight. What the mind is supposed to deduce from the individual cases is the abstract form or pattern that underlie the visible forms. The ability to grasp the inner principles governing nature is what distinguishes the true artist from the simple imitator who can only replicate the external forms of nature: "*L'imitation générale de la Nature dans ses principes d'ordre, d'harmonie relatifs aux affections de nos sens, & aux perceptions de l'entendement, lui ont donné l'âme, & en ont fait un art non plus copiste, non plus imitateur, mais rival de la Nature même.*"⁶¹

Different writers in the eighteenth century appealed to the simplicity of the works of nature. Voltaire, in his *Essay on Taste*, had referred to "the beautiful simplicity of nature,"⁶² and also Jacques François Blondel had alluded to the "*grand goût de la belle simplicité.*"⁶³ Quatremère also thinks that the artist should imitate the simplicity that nature exhibits in her creations. According to Quatremère, the artist should achieve the same simplicity and unity in his work as nature attains in her productions. *Simplicité* and *unité*, are close words which, in Quatremère's view, can be seen as the consequence of one another. In the *Encyclopédie*, he writes that "*l'unité consiste particulièrement, dans les arts d'imitation, à produire la liaison de toutes les parties avec le tout, à ramener tous les détails à un point fixe, à faire enfin que chaque chose, en quelque genre que ce soit, offre une combinaison nécessaire, d'où l'on ne puisse rien détacher, sans que l'ensemble en soit détruit.*"⁶⁴ On the other hand, "*la simplicité, à l'égard des arts d'imitation, consiste à établir dans les éléments dont se compose chaque ouvrage, l'ordre le plus naturel, à en disposer les idées et les images avec cette économie qui nous les présente, comme le fait la nature.*"⁶⁵

⁶⁰Ibid., p. 200.

⁶¹Ibid., p. 120.

⁶²Collins, op. cit., p. 53.

⁶³J. F. Blondel, *Cours d'architecture*, 1772, vol 3, p. boxviii.

⁶⁴Entry 'Simple, Simplicité', *Encyclopédie Méthodique*, vol. 3, pp. 382-385.

⁶⁵Ibid.

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There are three kinds of simplicity that the architect must consider: in the conception, in the general effect and in the means of execution. The first refers to the idea of the building, which in its simplicity has to approximate that of the primeval types; the second has to do with a judicious and moderate use of ornaments, avoiding any exaggeration; and the third, with a reasoned use of the methods of construction. In every case, the purpose is the same. *Simplicité* appeals to the immediate and easy apprehension of the forms: "Ainsi nous demandons aux idées et aux images de se présenter à notre ame dans l'ordre le plus clair, et sous des formes qui se laissent saisir sans confusion."⁶⁶

Quatremère began to depart from Laugier's theory when he transformed the object of imitation of architecture from a concrete model (e.g. Laugier's *cabane*) into a generic principle directly derived from nature: "C'est par là que, généralisant de plus en plus l'idée de son modèle, l'architecture parvint à étendre la sphère de l'imitation. Ce n'est plus ni la cabane dont elle sortit, ni l'homme sur lequel elle se modèla, c'est la Nature entière qui devient le type de son imitation."⁶⁷ This abstract principle, which is the object of imitation of architecture, is not linked to a particular image or creation, as it could be the case with other arts: "Les autres arts ont des modèles créés qu'ils imitent ou rectifient: l'architecture crée le sien. Son modèle étant l'ordre de la Nature, il est existant part-tout, sans être visible nulle part."⁶⁸

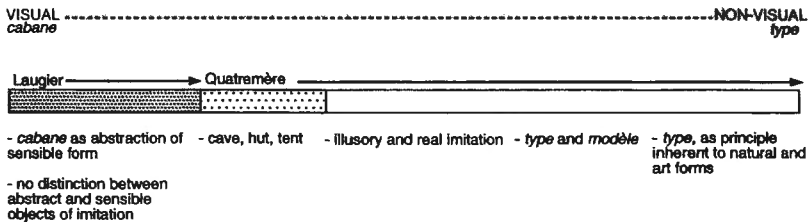


Figure 6.2. Synopsis of the relationships between Laugier and Quatremère's theories.

6.3.5 Art and science

Quatremère considered that the *type* is a primitive form or principle that is embedded in the creations of nature as well as in the productions of man. In both cases, an inner principle rules the creation of form. As he contends in the article 'Type', the *type* is the 'raison originaire de la chose'; an abstract principle or 'germe préexistant' from which everything develops. Because, "il faut un antécédant à tout. Rien, en aucun genre, ne vient de rien, et cela ne peut pas ne point

⁶⁶Ibid.

⁶⁷Entry 'Architecture', *Encyclopédie Méthodique*, vol. 1, p. 120.

⁶⁸Ibid.

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s'appliquer à toutes les inventions des hommes." This principle or 'raison originnaire' persists in the human creations in spite of the continuous transformation to which the natural creations are submitted: "*Aussi voyons-nous que toutes, en dépit des changements postérieurs, ont conservé toujours visible, toujours sensible au sentiment et à la raison, ce principe élémentaire, qui est comme une sorte de noyau autour duquel se sont agrégés, et auquel se sont coordonnés, par la suite, les développemens et les variations de formes dont l'objet étoit susceptible.*"⁶⁹

The parallels between Quatremère's *type* and the notion of 'primitive form' that was developed in the seventeenth and eighteenth centuries in the realm of natural philosophy are manifest. The chemist Thomas Sherley had written in 1672 that "there is an internal Mind, virtue, and Idea, contained in the Seeds of things", and in 1719, Domenico Gulielmini used the word *typos* to refer to a primary form that resulted from the grouping of the elementary particles (see Chapter 1). It is basically the same meaning that Quatremère attributes to *type*, namely, as a primitive form or principle embedded in the objects themselves. The following passage leaves no doubt about this meaning of *type*: "*Ainsi, nous sont parvenues mille choses, en tout genre, et une des principales occupations de la science et de la philosophie, pour en saisir les raisons, est d'en rechercher l'origine et la cause primitive. Voilà ce qu'il faut appeler type en architecture, comme dans autre partie des inventions et des institutions humaines.*"⁷⁰

Therefore, it can be said that the concept of *type* formulated by Quatremère is born in the territory where science and art tend to converge. Quatremère suggests that the artist should study nature with the same spirit as the scientist does: with the purpose of discovering the inner causes, the abstract principles that rule the actions of nature. The architect in particular should investigate those principles for applying them later in his work. Imitation of nature, therefore, becomes equated to scientific understanding of nature's procedures, making true a statement of Ernst Cassirer, who once contended that "the artist is just as much a discoverer of the forms of nature as the scientist is a discoverer of facts or natural laws."⁷¹

6.3.6 Type and Idea

From what we have seen so far, there can be no doubt that the whole theory of Quatremère breaths an unmistakable Platonic fragrance. In effect, the Platonic theory constitutes the background against which the theory of Type of Quatremère is formulated, to the extent that it is difficult not to think of Quatremère's *type* as a reformulation of the Platonic *eidōs*.

⁶⁹Entry 'Type', *Encyclopédie Méthodique*, vol. 3, p. 544.

⁷⁰*Ibid.*

⁷¹E. Cassirer, *Essay on Man*, pp. 143-144.

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In this connection, we might wonder why Quatremère did not simply use the Platonic opposition idea-image, or *eidōs-eidolon*, instead of proposing a new pair of terms, *type-modèle*. There are different reasons why Quatremère found necessary to use *type* instead of *idée*. Some of these reasons can be elucidated from his description of the term *idée* in the corresponding article of the *Encyclopédie*. In this article, Quatremère traces the origin of the word *Idée* back to the Greek *eidolon* (*image*) but, quite surprisingly, he does not mention *eidōs* as the root of the word idea. Based on this belief in the etymological origin of idea, Quatremère contends then that *idée* and *image* are synonyms. He thinks that *idée* means “*cette espèce d’image que laissent & produisent en nous les impressions des objets.*”⁷²

Immediately after contending that idea and image are synonyms, Quatremère concedes that some philosophers distinguish nevertheless between both, using *idée* to refer to “*la représentation qui se fait, dans notre esprit, de tout ce qui est du domaine moral*”, and *image* as “*la représentation de tous les objets matériels ou qui tombent sous les sens.*” As examples of this *moral* (i.e. intellectual) meaning of idea, Quatremère mentions “*l’idée du juste & de l’injuste’ or ‘l’idée du devoir, de l’ame, de la divinité’*”. These are cases in which the word *idée* could not be replaced by *image* because the idea of justice or divinity does not have a counterpart in the sensible word. In the cases where such a correspondence exists, one can equally use the word *idée* as well as the word *image*, as for example, “*l’idée ou l’image du soleil’ or ‘d’un arbre, d’une figure, d’un homme, d’un statue, d’un édifice’*”. In architecture, and in all the arts, Quatremère continues, the use of the word *idée* responds to the same criteria as in normal language. It is used “*pour exprimer l’impressions que laissent dans l’esprit, les objets qui sont du ressort de l’art de bâtir*”; for example “*l’idée du plan, d’un monument, de son élévation, de ses ornemens, de sa figure, de son caractère*”. Idea means for Quatremère, as for the Empiricist philosophers, the impression that an object imprints in the mind.

Therefore, the reasons why Quatremère decided to turn to the term *type* to refer to an abstract form or principle, instead of using the word *idée*, need to be found in this interchangeability of the words *idée* and *image*, in the language of the time. He needed two opposing terms with which to express the two contrasting objects of imitation that his artistic theory called for: one abstract and generic (*type*), the other sensible and concrete (*modèle*). But he could not use *idée* and *image* because these terms could be taken as synonyms. Thus, he found a substitute for the terms *idée-image* in the pair *type-modèle*.⁷³

⁷²Entry ‘*Idée*’, *Encyclopédie Méthodique*, vol. 2, p. 538.

⁷³There are other reasons, of course, that can be presented to explain Quatremère’s use of the word *type* instead of *idée*. These have to do with the notion of type as a primitive form, seed or principle contained in the object itself, a notion of form that had been adopted by the natural sciences in the seventeenth and eighteenth centuries (see Chapter 1). This concept of Type is not strictly Platonic, but rather it is a combination of Platonic and Aristotelian concepts of form. In this context, Quatremère’s *type* cannot be considered equivalent to a Platonic Idea.

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If this interpretation is correct, then by proposing the term *type* and distinguishing this from *modèle*, Quatremère might have attempted a return to the true principles of Platonic philosophy. In other words, the pair *type-modèle* would correspond to the opposition *eidōs-eidolon* in the system of Plato. A difference between Quatremère's interpretation of the theory of imitation and the original doctrine of Plato would be then, that Quatremère explicitly included architecture among the imitative arts, while Plato had given to architecture the status of non-imitative or original.

There is still another sort of correspondence between Quatremère's theory and the doctrine of imitation of Plato. In this connection, the distinction between *type* and *modèle* would parallel the distinction drawn by Plato between two objects of imitations, abstract and sensible. As we have seen in Chapter 2, Plato had already considered the existence of two objects of imitation: abstract forms (*eikastikē*) and sensible appearances (*phantastikē*). The concept of *type* of Quatremère would correspond to one of the two kinds of imitation that Plato had considered in his theory of Ideas: the indirect imitation that Plato had called the art of *eikastikē*, an imitation whose object is more abstract than real. And to some extent, *type* could also be a remembrance of the Greek *symmetria*, the abstract principle that Vitruvius adopted as a model for architecture.

Another point of contact between Quatremère's theory and Plato's theory of Ideas has to do with the conception of nature. Like the Greek philosopher, Quatremère thought of nature as consisting of physical and intellectual objects: "*Il faut prendre ici le mot de nature dans son sens les plus étendu, c'est-à-dire, dans celui qui comprend le domaine des êtres physiques, & le règne des choses morales ou intellectuelles.*"⁷⁴ This notion of nature which embraces the Ideas, in the Platonic sense, constitutes the object of imitation for the architect. The notion of *type* of Quatremère applies mainly to this abstract object of imitation derived from nature. It is therefore misleading to think of Quatremère's *type* as a formal structure derived from the analysis of the buildings of past styles. This prejudiced interpretation of Quatremère's *type*, furnished after the work on typology carried out in the 1960's and 1970's, does not do justice to the original significance of Quatremère's *type*.⁷⁵

⁷⁴Entry 'Imitation', *Encyclopédie Méthodique*, vol. 2, p. 543.

⁷⁵It is true that Quatremère also contemplates the possibility of imitating the architecture of antique styles. In the entry 'Copier' he refers to 'l'imitation du style antique' and he recommends imitating that style in the same way as nature must be imitated: "*Ce n'est donc point de copier l'antique qu'il s'agit, mais de l'imiter; c'est-à-dire, d'en pénétrer l'esprit, de s'en approprier les procédés, & non d'en répéter au hasard & sans réflexion, les détails et les formes.*" Entry 'Copier', vol. 2, p. 73. To infer from this that Quatremère was advocating a systematic study of the architecture of the past with the purpose of deducing a principle that then is applied to create new works, is to betray the original spirit of his theory of *type*.

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The parallels between Quatremère's *type* and the Platonic Idea notwithstanding, both concepts should not be confused. They are different insofar as the notion of *type* represents, as Sylvia Lavin contends, a 'secularization' of the Neo-Platonic and Christian tradition, that before had considered types as divine revelations.⁷⁶ In effect, the metaphysical connotations associated to the concept of Idea played no role in Quatremère, who thought of *type* either as an inner principle of nature or as a human invention, but by no means as a 'thought in the mind of God.'

6.3.7 Type and character

The extension of the entry '*Caractère*' in the *Encyclopédie* gives an idea of the importance that Quatremère attributed to this concept. As usual, he begins his article with the etymology of the term in question. So, *caractère* derives from the Greek *charaktér*, which originally meant 'graver, imprimer.' In accordance with the etymology of the word, Quatremère considers that *caractère* is "*un signe distinctif & apparent qui les fait reconnoître pour ce qu'ils sont.*"⁷⁷

In view of the previous definition of *caractère*, the question arises whether this refers to an attribute intrinsic to the object or, conversely, to an attribute that the subject recognizes in the object. As in other parts of the *Encyclopédie*, Quatremère is confronting here various philosophical dilemmas, in this case the split subject-object or the opposition sensible-abstract. Usually, he assumes that the etymology of the word always indicates the true meaning of a term, and that later meanings are a distortion of the original one.⁷⁸ Consequently, he thinks that, originally, *caractère* had a sensible meaning and that later it acquired an intellectual meaning. There are, therefore, two kinds of *caractère*: "*de caractère physique ou visible, & de caractère moral ou intellectuel.*"⁷⁹

In the following pages of the article, Quatremère undertakes a comprehensive account of the multiple meanings of *caractère* in nature, civilizations, art and architecture, coming up on the way with a number of distinctions between different kinds of *caractère*. First he proposes to distinguish between three kinds of *caractère*, equally applicable to the visible or physical character. Then, he speaks of characters that are '*essentiel*', '*distinctif*' or '*accidentel*', and '*relatif*'. The first one

⁷⁶Lavin, op. cit., p. 91.

⁷⁷Entry '*Caractère*', *Encyclopédie Méthodique*, vol. 1, p. 477. In the creations of nature, *caractère* is "*le signe par lequel la nature écrit sur chaque objet son essence, ses qualités distinctives, ses propriétés relatives, enfin tout ce qui peut empêcher de la confondre avec une autre.*" Ibid., p. 478.

⁷⁸"*Je reviens toujours à l'étymologie du mot. On est convenu que caractère ne pouvoit être autre chose que le signe ou la marque distinctive d'un objet.*" Ibid., p. 479. This reliance on the first meaning of a word as being the first truth, is not very much different to the belief that the first architectural types were also the expression of the architectural truth.

⁷⁹Ibid., p. 478.

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-caractère essentiel- bears certain connotations with the notion of *type* presented some years later in the third volume. He refers to it as “*le type par lequel la nature fait reconnaître ses ouvrages.*” Later, he presents another threefold classification. Now he contends that “*il a du caractère, il a un caractère, il a son caractère.*”⁸⁰ The first one *-du caractère-* means something close to what he previously called the *caractère essentiel*, that is to say, “*ces traits énergiquement prononcés qui tiennent à l’essence des êtres.*”⁸¹ The second *-un caractère-* refers to the distinctive features “*qui modifient à l’infini tous les objets d’un même genre.*”⁸² The third *-son caractère-* appeals to a distinctive mark that is a property of a particular object. These three categories made up a taxonomy that can be applicable to the works of nature as well as to the works of man.⁸³

With regard to the creations of nature, Quatremère acknowledges the influence that local factors might have had in determining the *caractère relatif*. In the case of nature, the external influences have to do with air, climate and ground. Thus, “*le caractère, quel qu’il soit dans la nature, considéré dans son ensemble ou dans le détail de ses productions, est une qualité dépendante, soit du système général auquel est subordonné l’univers, soit des causes accidentelles qui sont la suite & le complément de ce système.*”⁸⁴ Similarly, external factors could have determined the relative character of civilizations as well as of the different arts. In the case of architecture, climate, available materials, and social and political conditions, would have determined the character of buildings. We must point out, that the distinction between *caractère essentiel* and *caractère relatif*, and the consideration of the influence of external factors in determining the second, foreshadows the notion of style held by later authors like Semper or Viollet-le-Duc.⁸⁵

Quatremère, however, did not attribute to the notion of style the same importance that he gave to *caractère* or *type*. First of all, he considered that style was a synonym of character.⁸⁶ Second, he thought that every style had developed from a first model that already contained the characteristics that distinguished a

⁸⁰Ibid.

⁸¹Ibid.

⁸²Ibid., p. 479.

⁸³Considering the numerous references to nature that appear in the article, it is not adventurous to presume, that this taxonomy of characters could have been influenced by the classificatory work carried out in the realm of the natural philosophy by Linnaeus and Buffon.

⁸⁴Entry ‘*Caractère*’, *Encyclopédie Méthodique*, vol. 1, p. 482.

⁸⁵The greater value that Quatremère assigns to *caractère* in comparison to *style*, is understandable if we think that what concerns Quatremère more than anything else is to know the principle or type from which the works of a particular civilization derived, more than the actual process by which this original model developed into a particular style. Unlike Quatremère, later writers like Semper or Viollet would be more interested in style, i.e. in the process of form development in art, than in type.

⁸⁶“*style, disons-nous, devient synonyme de caractère.*” Entry ‘*Style*’, *Encyclopédie Méthodique*, vol. 3, p. 411.

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style.⁸⁷ In this regard, the especial character of Greek architecture is '*la grâce & l'harmonie*'; attributes which the primitive hut of the Greeks already possessed. The distinctive character of Chinese architecture is la '*légèreté*', in accordance with the properties of its first model, the tent.

Elsewhere, Quatremère referred to *caractère* as something that has to do with '*propriété & de convenance*', with the aptitude of the visible forms (*physionomie*) of a building to its '*usages*' and '*destination*'. This notion of suitability has to do more with the Vitruvian *decorum*, and with Blondel's previous interpretation of *caractère*, than with the *architecture parlante* practiced by his contemporary Ledoux. It does not seem either that *caractère* had meant for Quatremère the same as for Boullée, for whom, as we have seen, this was "*l'effet qui résulte de cet objet et cause en nous une impression quelconque.*"⁸⁸ Quatremère, on the other hand, was more concerned with the objective qualities of objects as he was in the purely subjective aspects of perception. This applies to *caractère* as well as to the notion of *type*. In both cases Quatremère appears to be more concerned with objective principles inherent in the objects themselves than the impression that they produce on the beholder.⁸⁹

6.3.8 Type and creativity

Behind Quatremère's concern with the doctrine of imitation, lies a preoccupation with the artistic process of invention. Quatremère addressed the question of artistic creativity in the article '*Invention*'. There, he differentiated between *invention* and *création*; two words usually taken as synonyms. Quatremère rejects this alleged synonymy between the two words, and reminds us that there is a difference between them: "*Le mot création n'est qu'une métaphore; que l'homme ne crée rien dans le sens absolu de ce terme, & qu'il ne fait autre chose que trouver des combinaisons nouvelles d'éléments préexistants.*" And he concludes: "*Trouver ces combinaisons, c'est inventer.*"⁹⁰

⁸⁷As Anthony Vidler has contended: "The early discussions of type had generally been developed apart from any consideration of style; for Durand, and certainly for Quatremère, there was no real question as to the true style of architecture." A. Vidler, op. cit.

⁸⁸E. L. Boullée, *Architecture. Essai sur l'art*, 1968, p. 73.

⁸⁹Therefore, we cannot but disagree with the following interpretation that attributes to Quatremère a preoccupation with form perception: "By relating mimesis to the imitation of character, Quatremère opened a new path to pluralism and generated an irreversible movement from formal models to which architectural imitation must refer toward psychological subjective content that was linked, no longer to the reference models found in producing architecture, but to the content perceived by the spectator of architecture." I. Solá-Morales, 'The Origins of Modern Eclecticism: The Theories of Architecture in Early Nineteenth Century France'.

⁹⁰Entry '*Invention*', *Encyclopédie Méthodique*, vol 2., pp. 569-572. Buffon, in a lecture to the *Académie Française* in 1753, had expressed similar thoughts: "The human mind can create nothing, and only produces after having been fertilized by experience and meditation, in that its perceptions are the germs of its products." Quoted in Collins, op. cit., p. 151.

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For Quatremère, *creatio ex nihilo* has no meaning in art. Architectural invention is basically a matter of composition, and a work of architecture is a “*composé, c’est-à-dire, une image nouvelle, formée de la réunion d’un grand nombre d’autres détails images, dont l’imagination reproduit un ensemble qui n’avoit encore été produit par aucun autre.*”⁹¹ Nevertheless, he still admits that the artist needs to have an idea in his mind before proceeding to invent something new. The expression of this idea is the image or figure drawn on paper: “*Mais l’image de cet ensemble nouveau, il faut que l’artiste l’ait présente à son esprit, avant d’entreprendre de la réaliser par le dessin: c’est ce qu’on appelle se faire l’idée d’un monument.*”⁹²

In the same article, there are passages in which the word *type* is used to denote a sort of generic form that sets the limits within which invention becomes possible. For example, it is written that: “*il fut tenu de respecter un certain nombre de types, de caractères, de formes & de systèmes consacrés d’abord par l’usage, & ensuite par le génie de l’observation. Ces conventions tracèrent le cercle, dans lequel l’imagination avoit tout l’effort nécessaire pour inventer, sans avoir cette indépendance absolue qui, trop souvent, égare le génie.*”⁹³ Here, the words ‘*types, caracteres, forms*’ can be interpreted, indistinctively, as the limit, boundary or theme, that makes creativity possible. But again, these forms or types are not meant as forms in the mind of the artist, nor are they meant to be a priori Platonic Ideas. Rather, they are thought as objective, tangible and generic forms that the artist discovers but does not invent. This is also one of the meanings that Quatremère assigned later to *type*, that he associated with “*certaines formes générales et caractéristiques de l’édifice qui les reçoit*”, contending that “*cette application rentre parfaitement dans les intentions et l’esprit de la théorie qui précède.*”⁹⁴ As example of these general forms are the geometric forms of pyramids and tumulus and, also those forms which have become so intimately associated to a particular object, that they have established a certain type.

It is true, that there are other passages in Quatremère’s writings where one is led to think that he is suggesting that the artist derives the idea from a variety of sources by means of his intellectual capacity. For example, in the following passage from *L’Imitation*, it is suggested that the artist creates something new from combining different elements derived from a variety of sources: “*C’est cette imitation dont les oeuvres ne sont l’image d’aucun objet, qu’on puisse dire réel, puisqu’elle se forme par les études de l’artiste, et se manifeste dans ses productions, à l’aide d’un ensemble d’idées, de formes, de rapports, de perfections qu’aucune réalité ne pourroit nous montrer réunies sur un seul être, en un seul sujet.*”⁹⁵ But,

⁹¹Entry ‘*Idee*’, *Encyclopédie Méthodique*, vol. 2, p. 538.

⁹²Ibid.

⁹³Entry ‘*Invention*’, *Encyclopédie Méthodique*, vol 2, p. 570.

⁹⁴Entry ‘*Type*’, *Encyclopédie Méthodique*, vol. 3, p. 545.

⁹⁵Q. de Quincy, *Essai sur la nature*, p. 183.

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it must be noticed though, that the term *type* is not mentioned as the abstract form that the artist conceives out of the particular instances.

Quatremère guards against an extreme rationalization of the process of artistic invention: *“Si l’on abuse du raisonnement, pour restreindre par trop la notion de l’unité dans l’imitation, en la rapprochant le plus qu’il seroit possible de la notion d’unité, mathématiquement entendue, on réduira tout art, et tout ouvrage d’art, à une nullité de moyens, à un unisson d’effet, qui ne laisseront presque aucune prise à l’ame, et rendront son action à peu près inutile.”*⁹⁶ In spite of his attempt to build an artistic theory based on objective principles, like those that *Type* stand for, Quatremère was still aware that not everything in art could be explained rationally: *“La liaison de nos sens et de notre esprit est telle, et telle est la connexion qui existe entre les opérations de l’une et de l’autre de ces facultés, que la raison humaine doit renoncer à en expliquer le mystère.”*⁹⁷

The question arises at this point whether the idea that the artist has in mind corresponds to what later Quatremère defined as *type*. In principle, there is the temptation to think that Quatremère’s *type* was in fact the mental image or concept that the artist derived from the study of nature, or from other art works, and that this image was the starting point of the creative process. In a previous section, we have made the contention that one of the reasons why Quatremère might have decided to use *type* instead of *idée* was to distinguish clearly between idea and image, between an object of imitation that is abstract and one that is sensible. And we have suggested that by doing this, Quatremère might have wanted to restore the original meaning of *Idea*, by means of the term *type*.

However, it should be kept in mind that *type* and *idée* are not equivalent terms for Quatremère. *Idée* is the image that the object imprints in the mind while *type* is an attribute of an object (natural or artistic); an inner principle that is contained in it, or to put in Aristotelian terms, a potency concealed in the matter seeking to become the actual Form. Thus, in the entry ‘*Type*’ it can be read that *“le mot type présente moins l’image d’une chose à copier ou à imiter complètement, que l’idée d’un élément qui doit lui-même servir de règle au modèle.”*⁹⁸ *Type* is, therefore, an idea of something that the artist imitates. But, from this it cannot be shown that the *type* lies in the mind of the artist; quite the contrary, the *type* is a property that the object has and that the artist imitates. A similar conclusion can be drawn from

⁹⁶*Ibid.*, p. 50. Presumably, while writing the previous passage Quatremère might have had in mind Perrault’s system of proportion. Also the following excerpt from the article ‘*Type*’ might have been directed against Perrault’s theory: *“ils confondent l’idée de type (raison originaire de la chose) qui ne sauroit ni commander, ni fournir le motif ou le moyen d’une similitude exacte, avec l’idée de modèle (chose complète) qui astreint à un ressemblance formelle. De ce que le type n’est pas susceptible de cette précision que les mesures démontrent, ils le rejettent comme une spéculation chimérique.”* Entry ‘*Type*’, *Encyclopédie Méthodique*, vol. 3, pp. 544-545.

⁹⁷Q. de Quincy, *Essai sur la nature*, p. 189.

⁹⁸Entry ‘*Type*’, *Encyclopédie Méthodique*, vol. 3, p. 544.

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the following passage contained in the same article: "*Mais qu'un fragment, qu'une esquisse, que la pensée d'un maître, qu'une description plus ou moins vague, aient donné naissance, dans l'imagination d'un artiste, à un ouvrage, on dira que le type lui en a été fourni dans telle out telle idée, par tel ou tel motif, telle ou telle intention.*"⁹⁹ It cannot be deduced from this passage either that the *type* is a sort of abstract schema that the artist derives from precedents by means of a deliberate act of intellectual abstraction. Rather the *type* has been 'provided' (*fourni*) to him. It can be concluded then, that the notion of *type* distinguishes itself from *idée*, in the sense that the first is an abstract principle or quality that the object possesses, while the second is an abstract image that lies in the mind of the artist.

6.4 Conclusions

We have traced the sources of Quatremère's *type* to different origins. We have started by stressing the connection with Laugier's *cabane*, that constituted a departure point of Quatremère's theory. The case has been made, to show that Laugier thought of the *cabane* as a conceptual construct, more than as a physical prototype. The *cabane* was the abstract pattern that is left in the mind after the observations of the similarities between two distinct objects: a wooden hut and a Greek temple.

Quatremère's theory of the three models (the cave, the tent, and the hut) is still dependant on Laugier's previous theory. Like Laugier, Quatremère's comparison between a tent and the Chinese buildings, or between a wooden hut and the Greek temple is based on *visual similarity*. Thus, the formal similarity between the outline of the tent and the roofs of the Chinese buildings, or between the overall figure of the hut and the overall figure of the Greek temple, provided the argument for the theory of the first models.

But, at some point in his theory, Quatremère began to develop a distinct notion of primitive form, more in accordance with the idea of *type* that was being developed in the natural philosophy, and less dependent on the previous theory of Laugier. This notion of primitive form was not so much an abstraction in visual terms, like the theory of the three primitive models, as was an abstract, formless principle governing the generation of form, both in nature and in art.

There is another aspect which is peculiar to Quatremère's theory for which no precedent could be found in Laugier's. This has to do with the doctrine of art as imitation. A fundamental premise of Quatremère theory is that architecture is an imitative art. In the course of his writings, he strove to demonstrate the validity of this theory by reformulating, paradoxically, Plato's doctrine of imitation. Thus,

⁹⁹Entry 'Type', *Encyclopédie Méthodique*, vol. 3, pp. 543-545.

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Quatremère's distinction between two kinds of imitation, figurative and literal (or otherwise said, between two objects of imitation, one abstract the other sensible), is at the root of the concept of *type* that he formulated in the *Encyclopédie*. As an alternative to the dualism Idea-Image of the Platonic system, Quatremère proposes his own pair of terms, *type-modèle*. After establishing the existence of two objects of imitation, one abstract, the *type*, the other sensible, the *modèle*, Quatremère is in the condition to assert that architecture is an imitative art whose object of imitation is an abstract form, the *type*.

But, even though Quatremère's *type* is close in spirit to the Platonic Idea, *type* is meant to be quite different from *idée*. Quatremère understood *idée* as the *image* or impression left in the mind by the sensible objects. In common language, *idée* and *image* had become interchangeable. The word *idée* no longer denoted an abstract concept, in opposition to the sensible image. But Quatremère's doctrine of imitation asked for a clear-cut distinction between abstract and sensible realms. For that reason, he proposed the pair *type-modèle* as a reformulation of the opposition *eidōs-eidolon* in the Platonic system.

This means that Quatremère's *type* should not be understood as a sort of formal structure that lies in the mind of the artist, that is to say, as a scheme resulting from an intellectual and conscious process of abstraction. Such a notion of Type cannot be attributed to Quatremère. The idea of Type as a principle derived from the systematic study of architectural precedents, can be assigned to Durand (even though he did not use the term *type*) and, with more reason, to the advocates of typology in the 1960's and 1970's. However, the notion of type as a link between analysis and synthesis, between scientific analysis and artistic creation, did not belong to Quatremère's theory. Type was for Quatremère a much less deterministic concept than the later advocates of typology had presumed. It was the inner principle governing nature, the principle that the architect should imitate.

In sum, it can be contended that Quatremère's *type* embodies in fact different concepts. There is the concept of the primitive form or principle embedded in the object itself; there is the more generic notion of Type as principle or system of rules governing nature; and there is the idea of Type as an abstract object of imitation.

Chapter 7

Type and Systematization of Architectural Knowledge: The Theory of J.N.L. Durand*

7.1 Introduction

The theoretical work of Jean-Nicolas-Louis Durand offers a different view of the notion of Type, which complements the one provided by Quatremère de Quincy. Durand did not use the term type explicitly, nor did he share Quatremère's enthusiasm for the doctrine of imitation. Quite the opposite, he rejected the theories of Vitruvius and Laugier, who had contended that the orders would have been created as imitations of the proportions of the human body, or as imitation of the *cabane*. With regard to the question of imitation, Durand appears to be less inclined to speculative thought than Quatremère or Laugier. He demanded concrete and tangible proof that demonstrated the validity of the theory of imitation in architecture. For example, he rejected Vitruvius' theory of proportions on the grounds that the foot of a man is the eighth of his height, while the proportions given by Vitruvius for the Doric temple is six diameters. One example of Durand's pragmatism is the following question he poses: "*Quelle comparaison peut-on faire entre le corps de l'homme, dont la largeur varie à chaque hauteur différente et une espèce de cylindre dont le diamètre est part-tout le même?*"¹ Similarly, his rejection of Laugier's *cabane* was based on the lack of apparent similarity between the temple and the primitive hut. He argued that a column with base and capital could not have been created as imitation of a simple cylindrical wooden post because this has no base and no capital. Moreover, he contended that the *cabane* was more a product of art (e.g. "*le produit informe des*

*The main body of this chapter was published in the Journal of Architectural Education, JAE, September 1994, under the title 'Durand and the Science of Architecture.'

¹J. N. L. Durand, *Précis des leçons d'architecture données à l'École Royale Polytechnique*, 1819, vol. 1, p. 14.

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premiers essais de l'art"²) than a product of nature (*objet naturel*), and for that reason, the *cabane* could not be used as a demonstration that architecture imitated nature.

Nevertheless, Durand's theoretical construct is based on an idea of Type. His notion of Type does not stem from the theory of imitation, as does Quatremère's, but rather, has its origins in the tradition of the illustrated treatise of Serlio and Palladio. As in the treatises of the Renaissance authors, a fundamental issue in Durand's books is to arrive at a certain systematization of architectural knowledge by graphical means. But apart from the points of contact with previous works, Durand's books gave expression to questions that were peculiar to the nineteenth century architectural debate, especially, the question of the relation between the architecture of the present time and the architecture of the past. In this connection, the idea of Type has for Durand a double meaning: first, it means a common principle that can be abstracted from the buildings of the past; second, it becomes the generative principle of the design process. In the course of the evolution of his theory, Durand progressively moved from one concept of Type to the other.

Compared to the more speculative approach of theorists like Quatremère, Durand reveals himself as a 'pragmatic theoretician'. His ideas have an eminently practical purpose: to serve as a basis for a pedagogic method to teach architectural design. His 'method of composition' epitomizes the character of his theoretical work. From a theoretical point of view, the method can be taken as an investigation of the nature of the architectural design process, particularly of the role that Type can play in it. This relation between the idea of Type and the creative process was something that also concerned Laugier and Quatremère, as we have seen in the previous chapter. But, unlike these theorists, Durand sought a practical application of the notion of Type.

7.2 Durand and the science of architecture

The quest to determine the scientific nature of the discipline of architecture has been a permanent goal in the architectural tradition. During the fifteenth century, Renaissance theorists, under the direct influence of Vitruvius, strove to build a scientific basis for architecture. The complete unity that art and science enjoyed during the Renaissance, began to break down during the course of the following centuries. The seventeenth and eighteenth centuries, saw the creation of new scientific disciplines, each one having its own object of knowledge and methods. Knowledge progressed rapidly in the newly created branches of science, and the results of this progress could be seen in the succession of technological achievements that quickly transformed the built environment and life itself.

²Durand, *Précis*, vol. 1, p. 16.

Type and Systematization of Architectural Knowledge: The Theory of J.N.L. Durand

By the end of the eighteenth century, there was a growing concern that architecture was falling behind the new sciences in terms of progress. As a result, attempts started to be made to construct a *science of architecture*. The work of Jean-Nicolas-Louis Durand epitomizes this effort to achieve a systematization of architectural knowledge. The task he set for himself was to discover the generic principles that are implicit in works of architecture. In pursuing that goal, Durand necessarily touched upon some of the dilemmas that are inherent to architecture: particular *versus* general, abstract *versus* physical, subjectivity *versus* objectivity and art *versus* science. Because of this, his theoretical work transcends the limits of a particular historical period; it has a timeless value that makes it a necessary reference in any discussion about the systematization of architectural knowledge.³

7.3 The general principles of architecture

Durand's contribution to architecture stems from his activity as a teacher and theoretician. In 1796, he became a professor of architecture at the *École Polytechnique*. The School had been founded two years earlier with the goal of bringing scientific knowledge closer to practical life. Some of the most prestigious scientific minds of the time, like Monge, Lagrange and Laplace, were also professors of the *Polytechnique*. The students of Durand were not architects but rather engineers. Little time was allotted for their architectural training.⁴

Confronted with the task of teaching architecture under these conditions, Durand found it necessary to develop a theory of architecture that could form the basis of his lessons. His theoretical work is summed up in two books: the *Recueil et Parallèle des édifices de tout genre, anciens et modernes*, published between 1799 and 1801 and *Le précis des leçons d'architecture données à l'École polytechnique*, published for the first time between 1802 and 1805.

Durand believed that architectural education should not be based on the study of particular buildings or styles: "*Ce n'est donc point ainsi que l'on doit étudier l'architecture.*"⁵ For him, the study of any subject, whether scientific or artistic, had

³Interests in method and systematization seem to be symptomatic of a moment of crisis. Faced with a conflictive situation, the reaction from the architectural discipline shows an introspection directed at identifying the origin of the problem in order to solve it. It is precisely the sense of crisis that explains the interest in method, in *how* to make architecture. This sense of crisis was present at the end of eighteenth century, as classical language started to lose its exclusivity as the only possible model for architecture. Also around 1970, after the great masters of the Modern Movement had disappeared, architecture entered in a new period and again the method, rather than the buildings, became the center of attention.

⁴W. Szambien, *Jean-Nicolas-Louis Durand, 1760-1834. De l'imitation à la norme*, 1984, p. 69. Engineering students at the *École Polytechnique* spent one in seven lecture hours in Durand's course.

⁵Durand, *Précis*, vol. 1, p. 28.

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to be based on the study of general principles: “Un homme qui se propose de courir la carrière dramatique, n’apprend pas à faire telle ou telle tragédie; un musicien, tel ou tel opéra; un peintre tel ou tel tableau. En quelque genre que ce puisse être, avant de composer, il faut savoir avec quoi l’on compose.”⁶

To identify the general principles of architecture, Durand followed a logical path that started by verifying that which confirms unquestionably the existence of architecture itself, that is to say, by recognizing the existence of the buildings of the past. This first step is exemplified by the *Recueil*, in which the buildings from the past are collected and classified. In a second step, the analysis of past buildings revealed their common features, that is, the general principles of architecture.⁷

7.3.1 General principles and classification

During the eighteenth century, an intensive collection and classification of data took place in different disciplines, especially in the natural sciences. Linneaus’ *Species Plantarum*, 1753, and Buffon’s *Histoire Naturelle*, 1749, are the most significant examples of this spirit of classification that dominated the epoch. In both books, drawings of plants and animals appear organized in tables according to different criteria. Linneaus’ classification was based on the reproductive organs of plants, while Buffon used the historical evolution of animals as the basis of his classification system.⁸

⁶Ibid., vol. 1, p. 28.

⁷ Durand’s overall strategy to define the fundamental principles of the discipline of architecture, from the most simple elements to the methods to operate on them, is still a reflection of the rationalism that dominated European culture in the preceding centuries and particularly, of the ideas developed by Descartes in the domain of philosophy. In the *Discours de la méthode*, published in 1637, Descartes set up his four basic rules that should serve as a guide for the mind to solve any kind of problem.

- The first rule was never to accept anything as true that I did not know evidently to be so....
- The second, to divide each of the difficulties I was examining into as many parts as possible and as is required to solve them best (*rule of analysis*).
- The third, to conduct my thoughts in an orderly fashion, commencing with the simplest and the easiest to know objects, to rise gradually, as by degrees, to the knowledge of the most composite things (*rule of synthesis*).
- And last, everywhere to make enumerations so complete and reviews so general that I would be sure of having omitted nothing (*rule of enumeration*).

Durand seems to follow these four rules in his attempt to determine the fundamental principles of architecture. According to the first rule, the first step is to recognize what defines architecture in a way that cannot be denied, that is to say, to start with the study of the existing buildings. It is for that reason that the theoretical work of Durand must start with the *Recueil*. Then, it is possible to define the fundamental elements of architecture by *analyzing* the buildings of the past. The method of composition that Durand introduces later, aims at *synthesizing* those elements in order to create a building. Finally, the possible combinations that can be achieved by applying the method of composition are *enumerated* in the engravings of the *Précis*.

⁸P. Collins, *Changing Ideals in Modern Architecture*, 1965, p. 149.

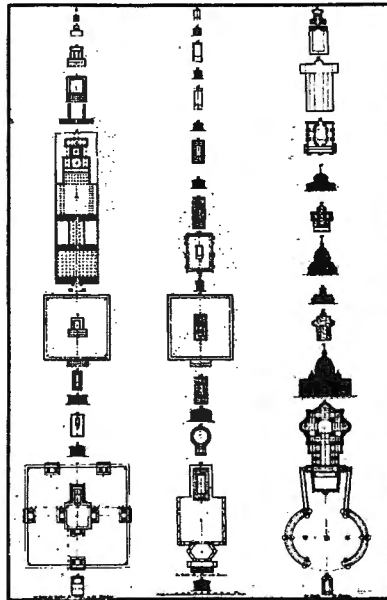


Figure 7.1. J.D. Leroy. Comparative analysis of temples and churches. 1770.

Classification and systematics also influenced architecture. Some of the architecture books of the time show buildings organized in tables in much the same way that animals or plants were shown in biology books. A significant example of this kind of work is the book *Ruines des plus beaux monuments de la Grèce* by Julien-David Leroy, first published in 1758. In a table that appeared in the 1770 edition of the book (Figure 7.1), Leroy showed the temples of the past drawn in plan view and at the same scale.⁹

In their quest for systematization, both the biologist and the architectural theorist were using similar conceptual categories; the *species* of the natural sciences corresponding to *type* in architecture. By means of these categories, it was

⁹Szambien, *op. cit.*, p. 28. Szambien shows some illustrations that preceded the one by Leroy. Most notably, an illustration by J.-A. Meissonnier that showed temples at the same scale but in elevation view. Leroy's is the first to show temples from different periods of the past in the same scale and in plan view. Collins writes that "Being an architect by training, Leroy was faced with a dilemma, new to the age, of deciding whether the ruins of antiquity were to be studied as architectural history or architectural theory; for he had the perspicacity to see that the two were not the same thing. He therefore divided his book in two parts, and in the second dealing with theory, he suggested that the whole question of the proportions of the Orders might require renewed study in the light of his own research." Collins, *op. cit.*, p. 82. For Collins, Leroy's illustration made it necessary to distinguish, for the first time in modern history, between the history and the theory of architecture.

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possible to transcend the study of separate individual examples and discover more generic principles that lied behind them. Classification, therefore, was a technique for extracting general principles from particular cases.¹⁰

7.3.2 Durand's *Recueil*: history versus theory

Similar to Leroy's book, Durand's *Recueil* also shows the buildings of the past grouped according to certain classes. The categories used by Durand generally fall within two major groups: historical (Egyptian temples, Roman palaces, Moorish details) and functional (theatres, markets, hospitals). There is, however, one plate in the book which falls outside these two main categories. The title of the third plate reads: *Temples ronds* (Figure 7.2). This is not a historical or functional classification, but rather one that, like the one of Serlio in the fifth book, is based on the form of buildings. This significant exception among the plates of the *Recueil* opens a new path of theoretical development and anticipates the direction that Durand took in his next book, the *Précis des leçons*.

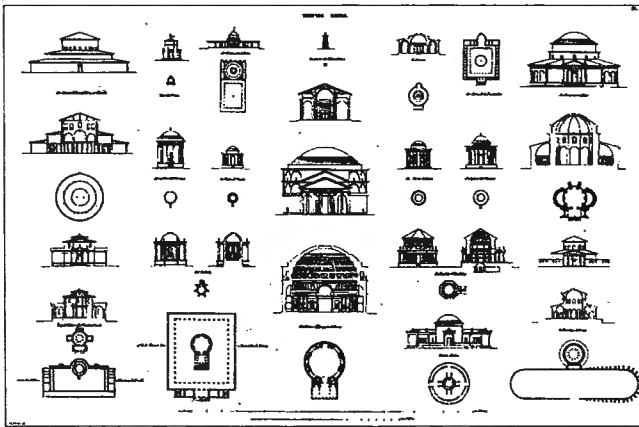


Figure 7.2. J.N.L. Durand. *Temples ronds. Recueil et Parallèle des édifices*, 1801.

What the classification of buildings according to form also indicates, is that in spite of its appearance, the *Recueil* cannot be considered a purely descriptive archaeological survey. This suspicion is further confirmed by the fact that Durand consciously modified some of the plans to make them appear more regular and

¹⁰Philip Steadman has contended that "the practical purpose of classification in architecture, beyond historical description and scientific analysis, lies in the hope that out of an ordering of the variety of buildings of the past will come theoretical principles, which may be applied in designing new buildings, of new forms, to answer new programmes and new circumstances." P. Steadman, *The Evolution of Designs*, 1979, p. 29.

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geometric than they actually were. In the plates that correspond to the Roman ruins, for example, it can be seen that the drawings are not so much a faithful description of some old buildings as idealized images of them. His justification for this was that the drawings of the Romans ruins made by other authors before him, like those made by Palladio or Piranesi, could also not be considered authentic.¹¹

It can be asserted that what Durand was intending with the simplification and regularization of the drawings was to use the individual buildings to illustrate some generic principles of architecture. This is the reason he found it necessary to eliminate individual or accidental traits by subjecting the representations of buildings to a process or regularization. In this context, antique buildings provide the ground material for Durand from which he makes a case about the systematization of architectural knowledge.

With the *Recueil*, Durand initiated a dialectic relationship between past and present that would continue in his next book, the *Précis des leçons*. The second plate of the *Précis* shows the plan of Saint Peter's and next to it, another plan which is an invention of Durand's. It is based on the original basilica that once stood on the same spot where the Basilica of Saint Peter's was built (Figure 7.3).

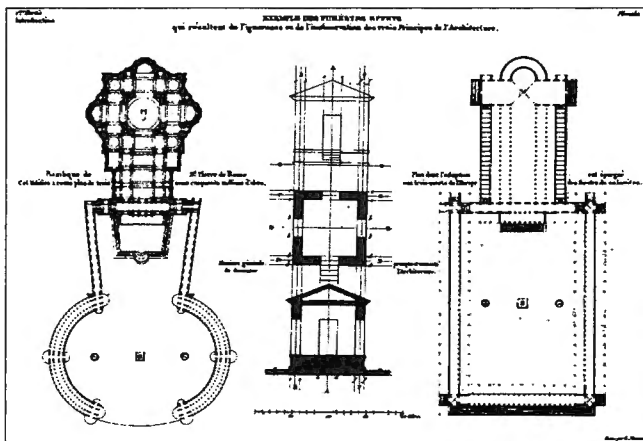


Figure 7.3. J.N.L. Durand. *Exemple des funestes effets qui résultent de l'ignorance ou de l'inobservation des vrais Principes de l'Architecture. Précis des leçons, 1819.*

¹¹Szambien, op. cit., p. 96.

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In accordance with the tendency to simplify existing buildings, as demonstrated in the *Recueil*, a different interpretation of the relationship between the two plans depicted in the plate can be made. The plan proposed by Durand could also be understood as a simplification created after the existing plan of Saint Peter's. The purpose of such a simplification being to reveal the true principles that underlie the complex forms of the actual design. Thus, the plan that Durand proposes is the illustration of those principles which, according to him, were neglected by the architects of Saint Peter's. These principles are based on the economy of means exemplified by the use of grids, simple geometric figures and simple building types.

According to Durand's interpretation of the history of architecture, even though true principles had existed in the past, a progressive distancing from those original principles had occurred as architecture evolved. The complex forms of the existing temple of Saint Peter's, therefore, were to him nothing more than a derivation of some original and simple forms.

Behind Durand's interpretation of history lies a concept of Type that constitutes one of the main pillars of his theoretical construct. This concept of Type is based on the distinction between, on the one side, simple, geometric forms, and on the other, complex and more architectural ones. According to this distinction, Type means a simple, geometric form, from which more elaborate forms can be derived. It is this concept of Type which epitomizes the genuine principles of architecture that Durand pretends to find.

7.4 The elements of architecture

To determine the fundamental principles of architecture, it was first necessary to establish the basic elements that characterize it as a discipline. Effectively, just as Euclidean geometry begins with the definition of the point and the line, architecture also needed to have its own axiomatic elements.

The fundamental elements of a building, and by extension of architecture, are for Durand those that can be found in any building, regardless of its style or epoch. Thus, he argued, the simplest elements that can be found in most buildings include walls and openings, columns and the parts to which they give support, slabs and roofs, and vaults. These are the *éléments des édifices* (Figure 7.4). Porches, lobbies, stairs, lounges and courts are those parts of the buildings, or *parties*, which result from the combination of the simplest elements. Finally, the last step is the *ensemble des édifices*, which means to combine the *parties* to produce a building.¹²

¹²In 1902, almost a century later than Durand, Julien Guadet made a distinction between the *elements of architecture* and the *elements of composition*. Walls, roofs and domes, for example, are elements of

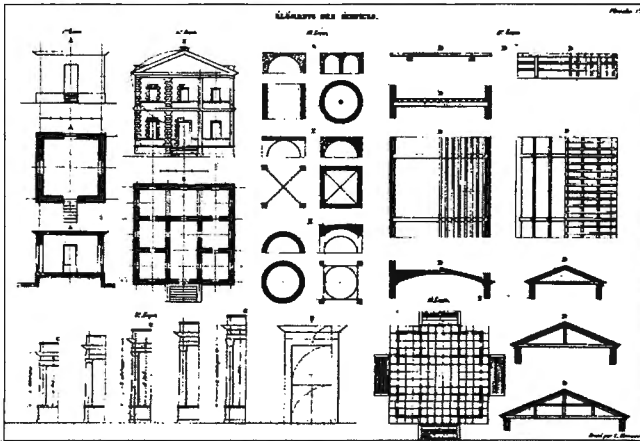


Figure 7.4. J.N.L. Durand. *Les éléments des édifices. Partie Graphique*, 1821.

Durand considers the *éléments des édifices* to be “ce que les mots sont au discours, les notes à la musique.”¹³ However, the comparison of language or music with architecture is not completely justified in this case. Because words and notes are purely abstract symbols whereas Durand’s *éléments des édifices* (walls, columns and vaults) are not abstractions, but rather physical components that make up a building.

At this point of his theoretical discourse, Durand ran across one of the permanent dilemmas of architecture: the separation between the *abstract* and the *physical* realms. He responds to this dilemma, immediately after defining the *éléments*, when he writes that the study of those elements will be considered from two points of view: first, with regard to materials and construction and second, form and proportions.

The illustration of the *éléments* reflects this separation of the abstract and physical realms (Figure 7.4). Some elements, like the pitched roofs and slabs are depicted in much the same way as they would appear in a construction manual. The drawings of vaults, on the other hand, are more conceptual and schematic. They are reduced to geometric figures and symbols.

architecture. Rooms, lobbies and stairs are the elements of the composition. Translated and quoted in R. Banham, *Theory and Design in the First Machine Age*, 1960, p. 20.

¹³Durand, *Précis*, vol. 1, p. 29. It does not seem reasonable to conclude from his reference to words and notes, that Durand’s theory is based on a sophisticated linguistic model. What Durand tried to express by means of this analogy with language and music, was the idea of *composition* in its most intuitive form, that is, as the process by which complex parts are created from simple ones.

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In the light of Durand's elements, a distinction between building and architecture has to be made. As the title of the plate properly indicates, Durand's elements are in fact the 'elements of buildings', but they could barely become the 'elements of architecture'. Hence, walls and vaults, considered as physical components, could constitute the elements of a *building science* but not of a *science of architecture*, since the basic elements of a 'science of architecture' would be not walls, but more abstract elements like planes or surfaces.¹⁴

Apart from the separation between abstract and physical realms, Durand faced a second issue in his attempt to define the elements common to all buildings, that of the classical orders. Since Durand had previously acknowledged in the *Recueil* that there are buildings in the past that do not derive from the Greek classical model, considering the parts of the classical order as fundamental elements would contradict the basic premise that the 'elements' should pertain to *any* building. But a look at the illustration shows that, together with the schematic representations of vaults and the more detailed ones of other building components, the drawings of columns appear, which still carry connotations of the classical language. In this case, the illustration reveals some unresolved issues in Durand's theoretical construct.

The conflictive issues that are implicit in the definition of elements adopted by Durand are revealed in the next step of the development of his theoretical construct, namely at the moment that he introduces a generic method of composition to produce buildings. As we will see in the next section, faced with the difficulty to defining abstractions that are specific to architecture, Durand turned to geometry to borrow its abstractions. Only then was it possible for architecture to exist in the realm of abstraction, making attempts to convert it into a scientific discipline meaningful. The price for borrowing these abstractions, however, maybe that some of the essential characteristics of architecture are lost when architecture is represented through the abstractions of another discipline.

7.5 The method of composition

Once the elements of architecture have been defined, the next logical step, according to Durand's strategy, is to define a method of composition by which the most primitive elements may be combined, in a logical fashion, into more complex ones in order to produce a building. The definition of architecture that can be read at the beginning of the *Précis* is consistent with this principle of

¹⁴Christian Norberg-Schulz, for example, has proposed a theory of architecture consisting of *elements and relations*. Following Paul Frankl, who had previously introduced the concepts of 'space-cells' (*Raumzellen*) and 'mass-forms' (*Körperformen*), Norberg-Schulz proposes three kind of elements: mass, space and surface. See C. Norberg-Schulz, *Intentions in Architecture*, 1963, pp. 133-140.

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composition: “L’ Architecture est l’art de composer et d’exécuter tous les édifices publics et particuliers.”¹⁵ To design is then, to compose, that is to say, to combine some previously determined elements according to certain procedures that can be made explicit.¹⁶

7.5.1 Description of the method of composition

In the didactic manner that characterizes his whole work, Durand describes the method graphically as a step-by-step process. This method is illustrated in the last plate of the first volume under the title *Marche à suivre dans la composition d’un projet quelconque*. At first sight, it looks as if the purpose of the method is to produce a neo-classical building in a logical way. This is not the case, however, since the goal that Durand is pursuing with his method is independent of stylistic considerations.

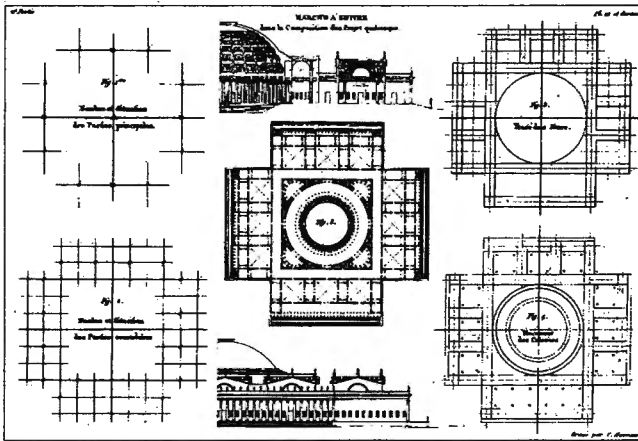


Figure 7.5. J.N.L.Durand. *Marche à suivre dans la composition d’un Projet quelconque. Précis des leçons*, 1813.

The process described in the plate is based on six stages (Figure 7.5). The first stage consists of the lay out of the main axes of the composition (*Nombre et situation des parties principales*). In the second stage, a new grid of secondary axes

¹⁵Durand, *Précis*, vol. 1, p. 1.

¹⁶Durand’s concept of composition had a lasting effect on the education of architects. Already in the twentieth century, Julien Guadet stated in his *Éléments et Théories de l’Architecture* that “to compose is to make use of what is known (ce qu’on sait). Composition has materials just as construction has, and these materials are, precisely, the Elements of Architecture.” Translated and quoted in R. Banham, *Theory and Design in the First Machine Age*, p. 20.

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complements the primary ones (*Nombre et situation des parties secondaires*). Then, walls are laid out along the axes (*Tracé des murs*) and columns are placed within the areas bounded by walls (*Placement des colonnes*). In the fifth stage the walls, porticoes, stairs and other architectural elements are drawn in plan view. Finally, the elevation and the section are generated from the plan.

A fundamental aspect of the method is the fact that it can be described by means of a graphic. The graphic, in this case, is much more than a mere illustration of a procedure that could be described by other means; it is the expression of an architectural concept by means that are exclusively architectural. Because of this, a detailed analysis of the illustration is not only pertinent, but also necessary to assess the scope of the method proposed by Durand.

7.5.2 Analysis of the illustrated method

Although Durand's previous taxonomy (*éléments des édifices, parties, ensemble des édifices*) might suggest that a method of composition should start with the selection of a set of architectural elements, his method does not reflect this. The illustrated method does not start with a selection of walls and vaults, for example. Rather, it starts with a geometric scheme made up of lines in plan view. Moreover, the idea of a method being a set of rules for combining simple elements into more complex ones cannot be derived from the illustration either. Durand's method does not explain how to combine walls and domes into lobbies or porches.¹⁷

What Durand is actually describing is a step-by-step transformation of a rough scheme into a detailed representation of a building, that is to say, a transformation of geometry into architecture (Figure 7.6). At the beginning of the process, the basic features of the design are determined by means of geometric elements in plan view. Then the points and lines of the scheme are replaced by representations of architectural elements, such as columns and walls. At the end of the process, a reference to some architectural form and style is made through the explicit representations of architectural elements in section and elevation.¹⁸

¹⁷There are plates in the *Précis* where Durand shows how the *ensembles* can be produced from the horizontal (in plan) and vertical (in elevation) combination of the *parties*. However, these pure combinatorial exercises do not necessarily result in the creation of a building understood as a complete unity, that is to say, as something more than the mere combination of parts. In the plate of the *marche à suivre*, on the other hand, Durand addresses the description of a procedure whose goal is the creation of a complete formal structure.

¹⁸As Collins explains at a certain point the word 'composition' could be applied equally in both architecture and painting. Somehow, the association between architecture and painting still persists in the method of composition proposed by Durand. The method, rather than being specifically architectural, resembles the way a painter might work, starting from a very rough scheme which is later refined. Collins, *op. cit.*, p. 226.

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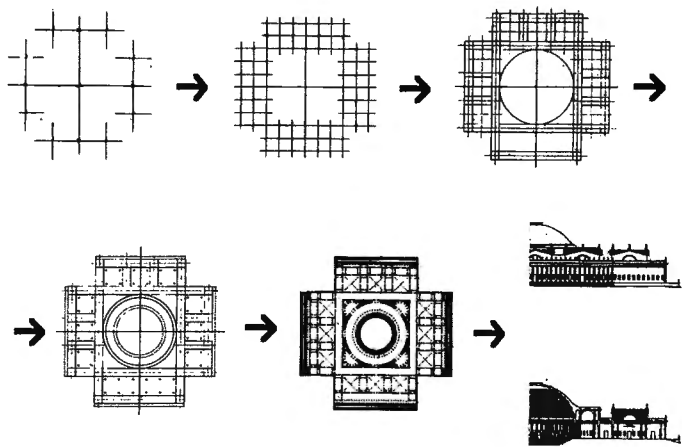


Figure 7.6. Method of composition in the order proposed by Durand.

To be consistent with the idea of a composition being a combination of elements and rules, Durand's method should have started with a set of architectural elements rather than with geometric lines. However, those architectural elements would have inevitably carried connotations of a certain architectural form or style. This is precisely what Durand tries to avoid since the purpose of his method is to exemplify some fundamental principles of architecture. As the title of the illustration claims (e.g. *'Marche à suivre dans la composition d'un projet quelconque'*) the method needs to be universal; it cannot be specific to a particular style.

Geometric elements, unlike representations of architectural form, are not tied to a particular style; they underlie all architectural forms regardless of style or epoch. It is because of this that the method starts with lines rather than with representations of walls, columns or vaults. Therefore, geometric lines, rather than walls and domes, constitute the fundamental elements of the discipline of architecture.

Effectively, this means that, in much the same way that mathematical operations rely on the existence of numbers as abstractions, a method for designing a building also needs a set of fundamental abstractions which are specific to the discipline of architecture. In the absence of those abstractions, Durand turns to geometry to borrow from it, the fundamental elements of architecture. However, by doing that, Durand raises some doubts about whether it is possible for a genuine 'science of architecture' to exist.

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7.5.3 The meaning of the method: architecture versus geometry

More than anything else, Durand’s illustration of the method of composition should be taken as an expression of his perception of the relationship between architecture and geometry; one of the constant issues of debate in the architectural tradition. The question that the illustration raises is where and how the boundary between architecture and geometry can be defined or, in other words, where geometry stops and architecture begins in the process of design.

Because, as Durand maintained, geometric elements underlie all architectural forms, they can be considered the fundamental elements of architecture. Geometric schemes, therefore, are the result of a process of abstraction of architectural forms. This relationship between architecture and geometry, is manifested more clearly when the order of the transformations in Durand’s method is reversed (Figure 7.7). This is, in fact, a more accurate way to read the illustration, since the process does not *conclude* with the creation of the final design, as Durand pretends, but rather *starts* from the design of an existing project made by the architect Percier.¹⁹

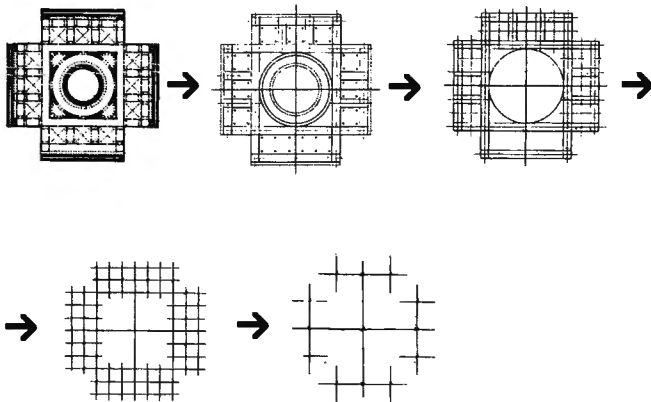


Figure 7.7. Durand’s method of composition reversed.

When the order of the transformations is reversed, the plan based on the existing design becomes the first stage in the process. The next step is to minimize any references to a particular style, so the design is reduced to a plan made up of basic architectural elements, such as walls and columns. It is possible to create an even more abstract representation of a building by replacing the walls and columns

¹⁹Werner Szambien has shown the project for the Academy of Arts made in 1786 by Charles Percier which Durand used in the plate of the method of composition. See Szambien, ‘Durand and the continuity of tradition’, 1982, p. 21.

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with pure geometric elements as, for example, a set of axes and an orthogonal grid. By continuing with the process of abstraction, the essential characteristics of the design are revealed when all references to architectural form have been eliminated, leaving only the geometric scheme.

7.6 The discovery of the type

In his article *On the typology of architecture*, Giulio Carlo Argan writes that "in the process of comparing and superimposing individual forms so as to determine the *type*, particular characteristics of each individual building are eliminated and only those remain which are common to every unit of the series. The *type* therefore, is formed through a process of reducing a complex of formal variants to a common root form.[The type] has to be understood as the interior structure of a form or as a principle which contains the possibility of infinite formal variation and further structural modification of the type itself."²⁰

According to the method described by Durand, the fundamental properties of a design are already present in the geometric scheme of the plan. In the illustration of the method of composition (Figure 7.5), the cross shape is one of the fundamental properties of the design. In spite of the formal transformations that take place in the process of composition, the characteristic cross shape can be recognized in every stage of that process. This suggests that the initial geometric scheme can be considered the *type*, according to Argan's definition.

As has been discussed earlier, Durand's initial intent was to present geometric figures as an abstraction of architectural form, that is to say, the geometric scheme is the result of "reducing a complex of formal variants to a common root form," using Argan's terms. In the illustrations of the later editions of the *Précis*, however, the geometric scheme becomes the generator of the architectural form, rather than a by-product of it. At that point, the geometric figure becomes the "principle which contains the possibility of infinite formal variation and further structural modification of the type itself," as Argan contends. This change in the relationship between geometric figure and architectural form can be traced through the evolution of the plates of the successive editions of the *Précis*.

²⁰G. C. Argan, 'On the typology of architecture', 1963.

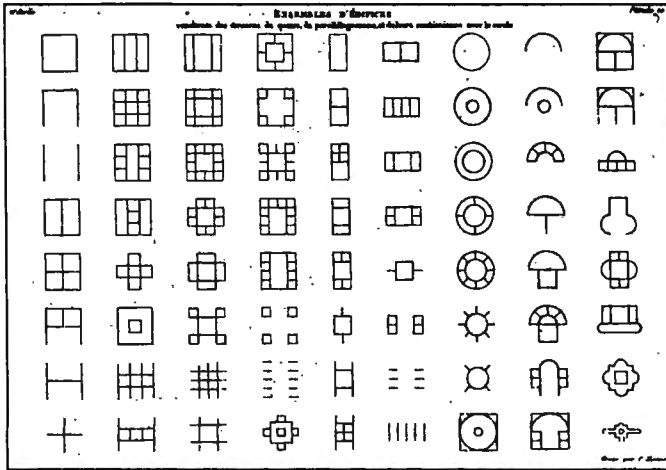


Figure 7.8. J.N.L. Durand. *Ensembles d'édifices résultants des divisions du carré, du parallélogramme et de leurs combinaisons avec le cercle. Précis des leçons, 1802.*

7.6.1 Type and geometric figures

The first edition of the *Précis* in 1802, includes a plate named *Ensembles d'édifices résultants des divisions du carré, du parallélogramme et de leurs combinaisons avec le cercle* (Figure 7.8). In spite of the title, there are no buildings represented in this illustration; only geometric figures. It can be assumed, however, that each one of the figures is the abstraction of one or more buildings, as it is the case with the illustration of the *marche à suivre* (Figure 7.5).

In a new edition of the *Précis*, the so called *Nouveau Précis* that appeared in 1813, the former plate is replaced by a new one (Figure 7.9), which shows geometric elements and buildings together.²¹ The correspondence between geometric figures and buildings is made explicit. In most of illustrations, this correspondence is univocal, that is to say, for every building there is one geometric figure assigned to it. In a few other examples, several buildings correspond to only one geometric figure.

²¹W. Oechslin, 'Premises for the Resumption of the Discussion of Typology', 1986. The substitution of one plate by another is noted by Oechslin in this article. Oechslin contends that Durand replaced one for the other in order to make his ideas clearer. He also comments on the fact that buildings are absent from the first plate, while in the second buildings and geometric figures are shown together.

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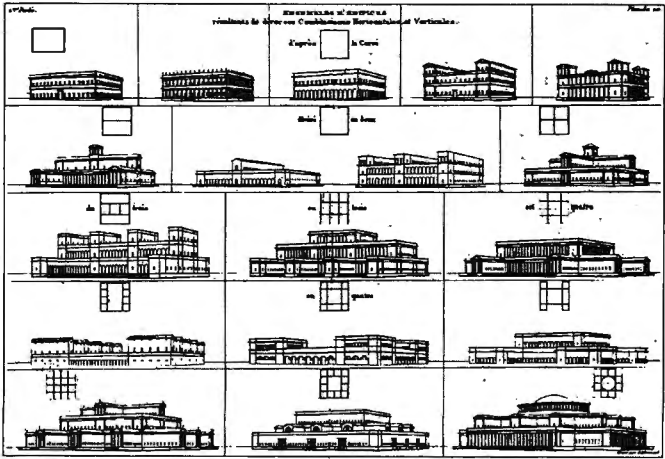


Figure 7.9. J.N.L. Durand. *Ensembles d'édifices. Précis des leçons*, 1813.

A step further in the changing relationship between buildings and geometric figures is taken in the plate titled *Ensembles d'édifices formés par la combinaison de parties de cinq entr'-axes de largeur*, of the *Partie Graphique des cours d'architecture*, that appeared in 1821 (Figure 7.10).

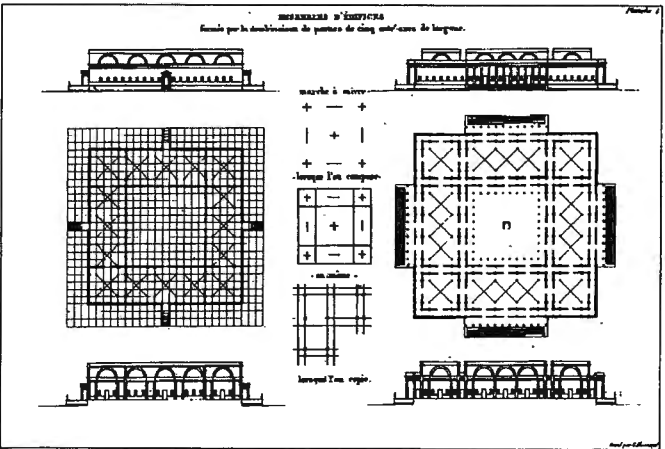


Figure 7.10. J.N.L. Durand. *Ensembles d'édifices. Partie Graphique*, 1821.

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In this plate, the geometric schemes are drawn in the center of the illustration. Two different buildings are represented in plan, section and elevation on either side of the schema. In much the same fashion that is illustrated in the plate of the *marche à suivre*, this plate also describes a process for arriving at architectural form from an initial geometric scheme. The starting point, in this case, is represented by a scheme made up of five points, one placed at each of the four corners and the center of the square. The corners are in turn connected by lines. Two more abstract schemes follow the first one, suggesting a step-by-step progression towards the final architectural plan. However, unlike the illustration of the previous method of composition, the process results in *two* different architectural plans, rather than one.

In summary, while in the first edition of the *Précis* the geometric scheme is just the abstraction of the architectural form (Figure 7.11), in the later editions this process is inverted. The geometric figure is no longer a simplification of an existing architectural form, but rather the starting point for the creation process of a design (Figure 7.12). Therefore, it can be affirmed that an idea of Type, in the terms expressed by Argan, is implicit in Durand theories, even though he does not use the term in his writings.²²

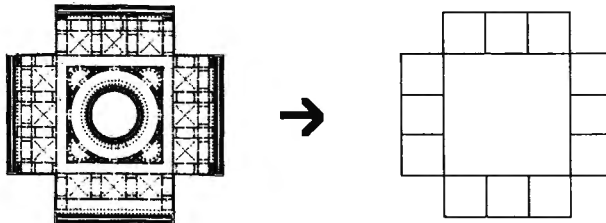


Figure 7.11. The geometric scheme is the result of the abstraction of architectural form.

²²Durand does not use the word *type* in his text. Instead he uses *genre* to refer to buildings with different functions, private or public. Sylvia Lavin also calls the attention on the fact that Durand did not use the term *Type*. Lavin writes that "the notion of type has long been associated with Jean-Nicolas-Louis Durand-who in fact never used the word- and with a functionalist notion of programmatic systems in design." S. Lavin, *Quatremère de Quincy and the Invention of a Modern Language of Architecture*, 1992, p. 86.

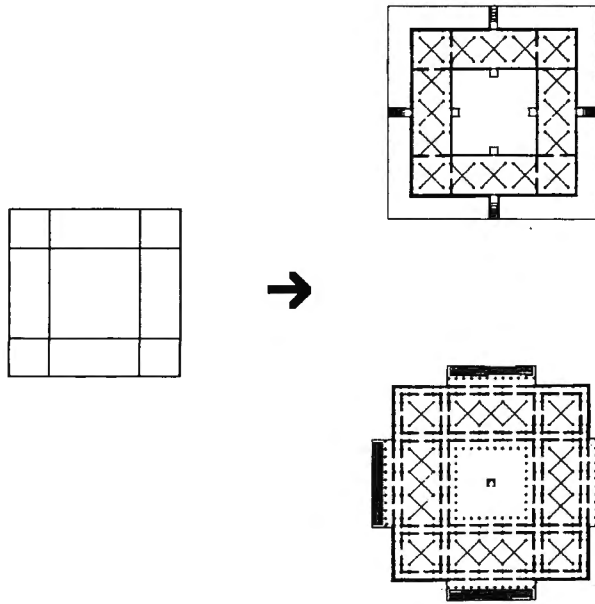


Figure 7.12. Different architectural forms derived from the same geometric scheme.

For Argan, the concept of Type conveys a distinction between objectivity and subjectivity in the design process. The objective part of the design process is represented by the selection of a type. The subjective part corresponds to the creation of formal variations that can be derived from the type. A similar separation between objective and subjective process is implicit in Durand plate of the *Ensemble d'édifices* (Figure 7.10). The process of composition starts by selecting a geometric figure, in this case the square. This is the objective part of the process. The subjective part is exemplified by the two formal variations that, among many others, can be created from the initial geometric figure or type.

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7.7 Architecture: art and science

In a passage of the *Précis*, Durand reflects on the double artistic and scientific nature of architecture: "*L'Architecture est tout-à-la-fois une science et un art: comme science, elle demande des connaissances; comme art, elle exige des talents: le talent n'est autre chose que l'application juste et facile des connaissances, et cette justesse et cette facilité ne peuvent s'acquérir que par un exercice soutenu, par des applications multipliées. On peut dans les sciences connaître parfaitement une chose après que l'on s'en est occupé une seule fois; mais dans les arts on ne peut la savoir bien exécuter qu'après l'avoir faite un nombre de fois plus ou moins considérable.*"²³

The division between objective and subjective components in architecture is expressed here as an opposition between science and art. For Durand, science is based on generic principles; those that, like the Pythagorean theorem in geometry, need only be defined once.²⁴ However, in architecture, unlike the sciences, the accumulation of individual works over time does not result in an objective body of knowledge. There is also an artistic component in architecture, which is based on particular applications rather than generic principles.

Even though Durand admits to the double nature of architecture, artistic and scientific, he cannot mask his predilection for generic principles. In effect, he maintains that the architect should first learn the fundamental principles and then apply them many times 'with talent'. These fundamental principles are precisely what Durand is searching for architecture. Architectural knowledge, Durand seems to reason, is inseparable from the individual works and their authors. He attempted to formalize that knowledge, that is to say, to make it generic and explicit.

One way to prove that architectural knowledge can be made objective is by defining methods for creating buildings. After a method or methods have been created, architectural knowledge is no longer embedded in the buildings themselves, but rather in the procedures used to create them. By codifying

²³Durand, *Précis*, vol. 2, pp. 1-2.

²⁴The idea that in architecture generic principles exist as they do in the sciences, has not yet been confirmed either by Durand's work or by those who, later shared similar belief. As a matter of fact, already in this century many opposing arguments have been made. Edmund Husserl suggests that architecture cannot be part of an 'ideal objectivity', as sciences are: "This is, we note, an 'ideal objectivity'. It is proper to a whole class of spiritual products of the cultural world, to which not only all scientific constructions and the sciences themselves belong but also, for example, the constructions of literature. Works of this class do not, like tools (hammers, pliers) or like architectural and other such products, have a repeatability in many like exemplars. The Pythagorean theorem, (indeed) all of geometry, exists only once, no matter how often or even in what language it may be expressed." E. Husserl, *Origin of Geometry: An Introduction*, 1978, p. 160. Effectively, it would be difficult to find in architecture the sort of concept that, as the Pythagorean theorem in geometry, needs to be formalized only once.

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architectural knowledge in the form of a method it becomes objective: it can be transmitted to and be applied by other architects; in other words, it becomes scientific. As a result, architects would not need to learn architecture by studying the works of the past, but rather by learning and practising abstract methods of design. According to Durand, only then could architecture be taught properly in the Schools of Architecture.

The idea of method can be considered the corner stone of Durand's theories and his main contribution to the architectural debate. In effect, the idea that the design of a building is the result of a rational procedure, had not been suggested in such a bold manner by anybody before Durand. In a broader cultural context, Durand's theoretical system expresses the changes that science in general and architecture in particular underwent between the fifteenth and eighteenth centuries. By the beginning of the nineteenth century, architecture, could no longer stand as a link between the world of nature and the artificial world of man-made creations. Architecture became part of a system of abstract ideas and concepts, self-sufficient and detached from the natural world, its ultimate purpose to replace nature itself.²⁵

7.8 Architecture: buildings or methods

Durand's attempt to systematize architecture had a notable precedent in the work carried out by Palladio in the *Quattro Libri*. Both Durand and Palladio attempted to arrive at some generic principles of architecture that transcended individual works, and both attempted to express those principles by graphical means.²⁶ In the second book of his *Quattro Libri*, Palladio had re-drawn the different villas in a consistent manner, emphasizing the aspects that were common to all of them and eliminating some of the irregularities, just as Durand did later in his books with the buildings of the past. Like Durand, Palladio was not interested in showing the particularities of his designs, but rather to use them as a vehicle for expressing some of, what he believed to be, the fundamental principles of architecture.

²⁵Alberto Pérez-Gómez writes: "Architectural theory during the nineteenth century would be founded on the belief that all the variables of the real world can be reduced to the conceptual realm and the resultant of any architectural problem is a direct 'function' of the combination of these variables." A. Pérez-Gómez, *Architecture and the Crisis of Modern Science*, p. 322.

²⁶The fact that the illustrations play a significant role in both books, the *Quattro Libri* and the *Précis*, is by no means secondary to the discussion about the systematization of architectural knowledge. Both architects, Durand and Palladio, were aware of the importance that graphical expression of an idea has in architecture. They excelled in presenting their ideas graphically, to the point that it is not an exaggerate to argue that the influence of both books is due more to their illustrations than to the texts themselves. James Ackerman, in a short bibliographical reference on the *Quattro Libri*, writes that there is little abstract theory in Palladio's books, and that their extraordinary influence on so many generations of architects is mostly due to the illustrations. See *Architectural Theory and Practice from Alberti to Ledoux*, D. Wiebenson, editor.

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In spite of their different backgrounds, Palladio being a practical architect and Durand a theorist, the ultimate goal of both texts, the *Quattro Libri* and the *Précis*, is identical: to determine some general principles of architecture. To achieve that goal, Palladio begins with the particular cases and finishes, eventually, with the definition of some generic principles. Durand, on the other hand, does the opposite: his primary goal is to define generic principles that embody the procedures for, in a second step, creating a building. Palladio searches first for the general principles through experimentation, with his own designs. At a certain point in this process he was able to design a building, the Villa Rotonda, which embodies his whole architectural theory. Expressing generic principles with a single building, like Palladio does with the Villa Rotonda, is totally alien to Durand's approach, which is based on the predominance of the generic procedure over the individual building. The application of the sort of composition mechanism that is proposed by Durand, can lead to endless variations of a single theme. However, a generic procedure cannot guarantee the sort of singular building which stands as a symbol of a whole culture, as is the case with Palladio's Villa Rotonda.²⁷

7.9 Conclusions

Durand's notion of Type, as expressed in the drawings of his books, is mostly related with the question of the systematization of architectural knowledge. Durand assumed that a generic principle could be abstracted from the analytical study of past architectural works, and that based on that principle, new works could be created. This principle was the Type.

For Durand, type was a link between analysis and synthesis. In this regard, Durand -but not Quatremère- is the most direct precursor of architects like Aymonino or Rossi, for who Type was the link between scientific analysis and artistic synthesis. Even though the Italian architects had referred to Quatremère's *type* as the source of their theories, it must be kept that Type for Quatremère was not so much a principle abstracted from the works of the past, as an abstract object of imitation which the artist derives from nature.

²⁷The difference between both Palladio and Durand, has been explained by Mario Gandelonas in the following terms: "In Palladio the process of formal transformation within an established type implies the existence of a creative subject present in the term 'invenzione' used by Palladio to describe both built and unbuilt designs. In Durand, on the other hand, the subject is reduced to zero, any combinatory creativity being seen as structural property of the system, a system organized as a language, where shapes act as signifiers of functional signs." M. Gandelonas, 'From Structure to Subject: The Formation of and Architectural Language'; published in P. Eisenman, *House X*, 1982, p. 18.

Type and Systematization of Architectural Knowledge: The Theory of J.N.L. Durand

Durand's attempt to build up a solid base for the education of architecture reveals the limitations of a hypothetical systematization of the design process in architecture. The practical results of the application of Durand's theories can be seen in the numerous designs realized by the students of the *École des Beaux Arts*. These works can be praised for their coherence and consistency as much as they may be criticized for the limited vision of architecture that they exhibit as a whole. What Durand's method provided was a sort of conceptual space within which endless variants could be created. The limits of that space, however, were not questioned. The very same coherence exhibited by these works prevented them from addressing architecture in its full complexity. The few built projects, which can be considered the ultimate expression of Durand's principles, are also purely syntactic exercises, lacking soul and distinguished by an endemic incapability to express anything beyond themselves.²⁸

Durand's attempt to establish a science of architecture has become the necessary point of reference for those who have later pursued a similar goal. In recent times, Durand's work has received the attention of design methodologists, particularly by those working within the field of computer-aided design. In this connection, his method of composition has been seen as a precedent of such formalisms as top-down design and shape grammars. In this light, a method of composition like the one proposed by Durand seems to fit quite naturally to the characteristics of computer tools. The basic idea of the building, the *partie*, is represented by means of geometric entities, points and lines. The idea of a recursive substitution of some geometric elements by others (axes by wall representations, points by column representations) fits well to the characteristics of computers. Nevertheless, as we will see in the next chapters, the current advocates of 'rational' design methods, might be repeating the same mistake as Durand did: to undervalue the meaning of architectural form by reducing it to geometric shape.²⁹ Thus, the advocates of 'systematic' design processes, have failed to realize that the lesson to be learned from Durand is that the existence of architecture might depend on the permanence of those insoluble dilemmas he touched upon in the process of building up his theory.

²⁸For a compendium of these built works, see Szambien, *J. N. L. Durand*, pp. 295-335.

²⁹The repeated attempts to make architecture a scientific discipline suggest that what is actually being attempted is an adjustment of architecture to the predominant conception of science in a particular historical period. This was the case in the early sixties, when the so called Design Methods group attempted to create a science of design, based on rational principles, which according to their theories embodied not only architecture, but any man-made production. In the domain of architecture, some architects in the seventies borrowed the idea of syntactic structures from linguistics to attempt a formalization of architectural knowledge. Behind all of these attempts, ideas and concepts founded in the emerging area of computing played their part. It is precisely in the area of design and computing that the quest for a systematization of architectural knowledge has received major attention. However, much work that has been developed in this area is based on the dubious assumption that architecture can be the same as geometry or mathematics.

Chapter 8

Type and Style, in Nineteenth Century Architectural Theory

8.1 Introduction

While the question of Type had been a predominant issue in the architectural theory of the eighteenth century, particularly in France, in the nineteenth century the emphasis shifted towards Style. At the outset, a basic distinction between Type and Style can be suggested. Type refers to the internal form underlying diverse works in differing historical periods, and therefore, it knows no temporal barriers. Style, on the other hand, would refer to the external forms that characterize the works of a particular historical moment or author.

But this basic distinction between Type and Style is not always true. In the architectural theory of the nineteenth century, the meanings of both terms often overlapped. In the writings of Heinrich Hübsch, for example, the concept of a basic form or *Grundgestalt* has to do with both Type and Style. Also, the notion of *style* that Viollet-le-Duc contraposed to the concept of historical *styles*, bears similarities with the notion of Type. Gottfried Semper was perhaps the theorist most aware of the different meanings that the terms Type and Style conveyed. He pursued the integration of both concepts in a unified theory of artistic form.

The most prominent theorists of the nineteenth century, like Hübsch, Bötticher, Semper and Viollet-le-Duc, rejected the previous theories of the origins of architectural forms, particularly the theory of the primitive constructions of Vitruvius. For those writers, the visual similarity between the form of the hut and the form of the Greek temple was not enough reason to maintain that the last derived from the former. In that time, the notion of form as a pair made up of 'form' plus 'context', made popular by biology, became the prevalent 'form

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paradigm' in architectural theory as well. According to this paradigm, the connection between form and the determinant factors that give rise to it (material, climate, function) was stressed.

The awareness that their era was lacking 'style' was the reason why so many nineteenth century architectural theorists turned to the past with the intention to discover the causes that had led to the emergence of genuine styles in the previous epochs. This attempt to 'rationalize' the processes by which architectural form comes to being is a distinctive mark of the theory of the nineteenth century, particularly, of the theories of Viollet-le-Duc.

8.2 The problem of style in nineteenth century architecture

Originally, the Latin *stilus* and the Italian *stile* were used in literary criticism to denote "those features of literary composition which belong to the form and expression rather than to the substance of the thought or matter expressed."¹ In the seventeenth century, musicians referred to *stile moderno* and *stile rappresentativo*. The usage of the term style in the visual arts can be traced back to the beginnings of the eighteenth century. According to the *Oxford English Dictionary*, the earliest references to style in painting date from 1706, and in architecture an early use of the word style can be found in a novel by Henry Fielding, written in 1749, in which the author refers to 'the Gothic style of building'. At this time, and in keeping with the original meaning of word in literature, style in architecture also referred to the external form of the building. Thus, in his lectures of around 1750, Jacques-François Blondel appealed to the comparison between architecture and poetry in his definition of style: "Style is, in a figurative sense, the poetry of architecture; a colouring which contributes towards rendering all an architect's compositions really interesting."²

By the beginning of the nineteenth century, it was clear that the history of architecture could not be reduced to a single model -the classical one- but consisted of different styles. Architects and theoreticians gained a new awareness of the architectural history which, in turn, would affect their perception of the architecture of their own time. Thus, they looked at the past and saw that every civilization had its own peculiar architectural form: the Egyptians, the Greeks, the Roman and the Middle Ages, as well as other distant peoples, like the Chinese, all had succeeded in creating a characteristic architectural form or style. But looking at their own culture they often came to the conclusion that the nineteenth century had no style of its own.³ Furthermore, new functional demands asked for new

¹P. Collins, *Changing Ideals in Modern Architecture*, 1988, p. 62.

²*Ibid.*, p. 181.

³Multiple statements that reflect that this was a widespread feeling in the first half of the nineteenth century appeared in the introduction to the book *In What Style Should We Build?*. The

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building types (railway stations, department stores, exhibition halls) which could not simply be borrowed from the past. In this situation, theorists believed that the solution to the lack of style passed through the discovery of the causes that had given rise to the great styles of the past. They thought, that once those causes had been discovered, they could apply a similar procedure to the creation of the style of the nineteenth century.

This process of applying to the present the principles and ideas discovered through the study of the past, was anticipated by Durand, as we have seen in a previous chapter. In order to deduce the fundamental principles of architecture, Durand classified the forms of historical buildings and determined some fundamental form-types. But, later nineteenth century theorists were no longer content with discovering formal similarities between buildings belonging to different styles; they wanted to understand the *process* by which architectural forms were created. To do so, they began to consider the different factors that influence the development of form in architecture. As a result, the static notion of Type as a permanent form or principle gave place to a more dynamic concept, Style, in which the time dimension plays now a decisive role. Incidentally, this preoccupation with process rather than with an static scheme pervades much of the scientific work of the nineteenth century, particularly, in biology. The theories of Cuvier regarding the relationship between form and function and, later, the theory of evolution of Darwin, gave expression to a fundamental paradigm of form that was also adopted by other disciplines, like architecture.

8.3 Type and Style: the theories of Heinrich Hübsch

In his lectures, Jacques-François Blondel had once referred to style and type in the following terms: "The style [is] suitable to different subjects which leads to infinite variety in different buildings of the same type or in buildings of different types. In a word, style, in this sense is like that of eloquence."⁴ It can be inferred from this, that for Blondel style had to do more with the exterior appearance or form of the

German Debate on Architectural Style, 1992, by Wolfgang Herrmann. For example, Johann Heinrich Wolff wrote that "every period and every nation had attained its characteristic style," while Heinrich Hübsch demanded that "modern art must be a clear expression of the present." Already in 1843, Otto F. Gruppe, could still write that "having no style of our own we build at one time in the Greek style, at another in the Gothic, then in the Byzantine, perhaps even in the Anglo-Saxon, Moorish, Chinese, Egyptian, and Japanese styles." The discussions about the possibility or impossibility of creating a style for the nineteenth century became commonplace in that time. Some contended that it was not possible to invent a new style, that styles are not invented but grow naturally out of a particular culture. Others, among them Hübsch, thought that it was possible to create a new style out the repertoire of historical styles, or at least to continue further the development of some past styles.

⁴Quoted in Collins, op. cit., p. 181.

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building, while type would stand for an inner form that places the building in a specific class.

But, in nineteenth century architectural theory, such a clear distinction between style and type was not always possible to maintain. A certain overlapping between the two terms can be detected in the works of architectural theorists, like Heinrich Hübsch and Gottfried Semper. For these authors, style did not have so much to do with the external form that distinguish the art works in a particular historical moment, as with some permanent principles of architecture; principles that could be embraced by type as well as style.

8.3.1 The search for objective principles

The dialectic between past and present, which is at the root of the theoretical discussions on style in the nineteenth century, comes to a head in the writings of the German architect Heinrich Hübsch. In his article *In welchem Style sollen wir bauen?*, 1828, Hübsch contended that the historical styles could not fulfill the needs of the present time. He rejected the 'slavish imitation' of historical styles and advocated the creation of 'a suitable architectural style through reflection'. In order to create the appropriate style for the present, Hübsch thought that it was necessary to study not only the past (this is what Durand did) but also to know those present 'formative' factors in which the key for the creation of a contemporary style would lie. As Hübsch declared in this article, "*wenn wir demnach einen Styl gewinnen wollen, welcher dieselben Eigenschaften, die wir an den als schön anerkannten Bauarten anderer Völker so sehr erheben, besitzen soll; so muß derselbe nicht aus einer früheren, sondern aus der gegenwärtigen Beschaffenheit der natürlichen Bildungsmomente hervorgehen: also erstens aus unserem gewöhnlichen Baumaterialie, zweitens aus dem heutigen Standpunkte der technostatischen Erfahrung, drittens aus der Art von Beschützung, welche die Gebäude in unserem Klima für sich selbst der Dauerhaftigkeit wegen ansprechen, und viertens aus der allgemeineren Eigenschaft unserer Bedürfnisse, die in dem Klima, vielleicht auch zum Theil in der Cultur begründet sind.*"⁵

The desire to understand the conditions of the present as a necessary step to create a genuine style, persisted in the thoughts of the most prominent architectural writers of the nineteenth century. Hübsch, like Semper and Viollet-

⁵Heinrich Hübsch, *In welchem Style sollen wir bauen?*, 1828, p. 13. English translation by Wolfgang Herrmann, *In What Style Should We Build? The German Debate on Architectural Style*, 1992, p. 71: "If we wish, therefore, to attain a style that has the same qualities as the buildings of other nations that are accepted as beautiful and are much praised by us, then this cannot arise from the past but only from the present state of natural formative factors- that is: first, from our usual building material; second, from the present level of technostatic experience; third, from the kind of protection that buildings need in our climate in order to last; and fourth, from the more general nature of our needs based on climate and perhaps in part on culture."

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le-Duc, was searching for new architectural forms that were no longer dependent upon existing styles. All of them thought that the path to achieve that goal passed through the rational understanding of the connection between formative or constituent factors and architectural form, both in the past as well as in the present.

The ideas expressed by Hübsch in this article have much in common with the previous concept of Type formulated by Quatremère. In particular, it can be observed that Hübsch was also concerned with the separation between abstract and sensible forms; a separation that reminds the distinction between *type* and *modèle* proposed by Quatremère. Hübsch's distinguished between basic form (*Grundgestalt*) and details: the first was the objective form, determined by the laws of construction; the second was the decorative form that only depended on the creativity of the architect.⁶ Thus, Hübsch thought that "*die Schönheit eines Gebäudes ist gleich der Schönheit einer Gegend oder eine Symphonie ein aus vielen Momenten Zusammengesetztes, und diese Momente sind in Bezug auf das Ganze von sehr ungleicher Wichtigkeit. Wie in einer Gegend mancher Baum fehlen oder durch einen andern ersetzt werden kann, oder wie in einer Symphonie manche einzelne Passage geändert werden kann, ohne daß der Totaleindruck dadurch verändert wird: ebenso können zwei ganz verschieden verzehrte Capitüle für dieselbe Säule gleich schön sein, und selbst die Größe derselben ist, obgleich weniger gleichgültig, doch nicht so wichtig, als etwa die Entfernung der Säulen von einander, und diese ist endlich immer noch nicht so wichtig, als die Grundgestalt des ganzen Gebäudes. Doch ist damit nicht gesagt, daß bei der Wahl der unwesentlicheren Momente der blinde Zufall schalten könne: vielmehr wird hier das Talent und der Geschmack des Künstlers hauptsächlich in Anspruch genommen.*"⁷ The essential elements were for Hübsch the enclosure

⁶This distinction between two kinds of form, one objective, represented by material and construction, the other subjective, confined to the external form and decoration, anticipates the duality *Kernform-Kunstform* formulated later by Carl Bötticher in his *Die Tektonik der Hellenen*, 1844. According to Bötticher, "the concept of each part can be thought of as being realized by two elements: the core-form and the art-form. The core-form of each part is the mechanically necessary and statically functional structure; the art-form, on the other hand, is only the characterization by which the mechanical-statical function is made apparent." C. Bötticher, *Tektonik* 1, p. xv. Quoted and translated in W. Herrmann, *Gottfried Semper. In Search of Architecture*, 1984, p. 141.

⁷Hübsch, op. cit., p. 3. English translation by Herrmann, op. cit., p. 65: "The beauty of a building, like the beauty of a landscape or a symphony, is composed of many elements, all of which are not of equal importance in relation to the whole. Just as in a landscape a tree here or there might be changed without affecting the overall impression, so two quite differently decorated capitals can be equally beautiful on the same column; and even its size, though more significant, is not as important, as say, the distance between columns, while the latter in its turn is not as important as the basic form (*Grundgestalt*) of the building as a whole. This does not mean, however, that the choice of less essential elements can be left to blind chance but rather that here the artist's talent and taste are mainly called upon." Using a linguistic analogy, we could think of the *Grundgestalt* as being the pattern of a sentence in which the individual words can be replaced without, for that reason, affecting the internal structure of the sentence; that is to say, the *Grundgestalt* stands for the syntax of the sentence.

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-consisting of walls, ceiling and piers- and door and window openings. From the combination of these elements resulted the different buildings of the past.

A literal interpretation of the previous passages, might suggest that Hübsch wanted to justify the eclecticism that characterized much of nineteenth century architecture. But, the ultimate purpose of Hübsch's *Grundgestalt* -as was also the purpose of Quatremère's *type*- was to establish some fundamental and objective principles for architecture. In a time were the classical rules of architecture were no longer universally accepted, architectural theorists felt the absence of established principles. They thought that in the absence of those principles, architecture would fall into absolute chaos, in which the only established rule would be the rule of the individual artist. For that reason, theorists like Hübsch argued that it was necessary to establish some objective basis for the art of architecture, independent from aesthetics and taste. For him, the objective principles are contained in the basic form, the *Grundgestalt* that is not the result of the artist's caprice but the outcome of functional necessity or *Zweckmäßigkeit*, a term that for him embraced two different purposes, commodity and solidity: "*nämlich Erfüllung der jedesmaligen Bestimmung (Bequemlichkeit) und dauernde Existenz (Festigkeit) den wesentlichen Theilen eines jeden Gebäudes die Grundgestalt und Größe gibt.*"⁸

8.3.2 *Grundgestalt*, Type and Style

Hübsch, in much the same way as Durand, thought that buildings from different periods were the result of the combination of some essential elements, like walls, ceilings, piers, columns, doors, windows, roofs.⁹ And he contended that in spite of the changes of the elements, there is a form that remains throughout the evolution of architectural form, and this form is the Type: "*Außerdem geht ein gleicher Typus selbst bis ins Detail der Verzierung durch.*"¹⁰

In principle, the notion of *Grundgestalt*, postulated by Hübsch can be thought of as a manifestation of the notion of Type. *Grundgestalt*, like the notion of Type formulated by Quatremère, has a supra-individual character. It refers to some fundamental principles, formative factors that control the development of architectural forms throughout history. However, the use of the word *Typus* here

⁸Hübsch, op. cit., p. 2. English translation by Herrmann, op. cit., p. 64: "Namely, fitness for purpose (commodity) and lasting existence (solidity) determine the size and basic form of the essential parts of every building."

⁹Hübsch, op. cit., pp. 5-6: "*Der Unterschied zwischen den Denkmahlen eines und desselben Volkes und einer Zeit nur in der ihren verschiedenen Bestimmungen gemäßen mannichfaltigen Zusammenstellung und Anzahl von Wänden, Decken, Pfeilern oder Säulen, Thüren, Fenstern, Verdachungen und Gesimsen besteht.*" English translation by Herrmann, op. cit., p. 66: "The difference between the monuments of one nation and one period lies in the number and manifold combinations of walls, ceilings, piers or columns, doors, windows, roofs, and cornices, according to the various purposes."

¹⁰Hübsch, op. cit., p. 6. English translation by Herrmann, op. cit., p. 66: "Aside from these variations, however, the same type reappears again and again, even in its decorative detail."

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suggests that for Hübsch this might not be exactly the same as *Grundgestalt*. In effect, while *Typus* would embrace both the basic forms as well as the detailing, *Grundgestalt* would be a term that exclusively refers to a basic form.

Similarly, a certain overlapping of meanings between *Grundgestalt* and *Style* can also be observed in Hübsch's thought. He contended that all historical styles derive from two basic systems of roofing: trabeated and arcuated.¹¹ The trabeated system was adopted by the Greeks. Most the later styles applied the arcuated system: Roman, Byzantine, pre-Gothic (*Rundbogenstil*) and Gothic (*Spitzbogenstil*). The use of expressions like *Rundbogenstil* reveals the strong relation between style and *Grundgestalt* in Hübsch's theory. He thought that the basic form already contains the characteristics that will pervade in the style that develops from it. The intersecting meanings of *Type* and *Style* notwithstanding, Hübsch used the word *style* in the sense of a formal attribute characterizing all the buildings of a particular historical moment, e.g. when he contends "*daß unter Styl etwas Allgemeines verstanden werde, welches allen Gebäuden eines Volkes zukommt, sie mögen zur Gottesverehrung, zur Staatsverwaltung, zum Unterrichte u.s.w. bestimmt sein.*"¹²

To achieve a genuine style for the architecture of his time, Hübsch proposed to continue with the *Rundbogenstil* whose natural process of development -he argued- had been interrupted during the Middle Ages by the emergence of the Gothic. In his view "*es wird Jeder sogleich erkennen, daß der neue Styl am meisten Ähnlichkeit mit dem Rundbogen-Style erhalten muß - ja daß er im Wesentlichen der Rundbogen-Style ist, so wie dieser geworden wäre, wenn er sich ohne alle nachtheilige Rückerinnerung an den antiken Styl ganz frei und unbefangen hätte entwickeln können.*"¹³ He put into practice this theories in the designs of buildings like the church of St. Cyriacus at Bulach or the *Polytechnische Hochschule* in Karlsruhe.

¹¹Hübsch, op. cit., p. 8: "*So daß man aussprechen möchte, es gäbe wesentlich genommen nur zwei Original-Style -entweder mit horizontaler geradliniger oder mit gewölbter bogenförmiger Steinüberdeckung.*" English translation by Herrmann, op. cit., p. 68: "So that it may be said that essentially there are only two original styles: one with straight, horizontal stone architraves; the other with curved vaults and arches."

¹²Hübsch, op. cit., p. 4. English translation by Herrmann, op. cit., p. 66: "Style means something general, applicable to all buildings of a nation, whether intended for divine worship, for public administration, for education, etc."

¹³Hübsch, op. cit., p. 51. English translation by Herrmann, op. cit., p. 99: "Everyone will realize at once that the new style must come closest to the *Rundbogenstil* -that is, in fact, essentially the *Rundbogenstil* as it would have evolved had it developed freely and spontaneously, unimpeded by all harmful reminiscences of the ancient style." Many theorists in the nineteenth century felt obliged to give recommendations as which style would be the most appropriate one for their time. John Ruskin, for example, after contending that "we want no new style of architecture[...]But we want some style", suggested that "the choice would lie I think between four styles: 1. The Pisan Romanesque 2. The early Gothic of the Western Italian Republics 3. The Venetian Gothic. 4. The English earliest decorated." J. Ruskin, *The Seven Lamps of Architecture*, 1880, p. 208.

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8.3.3 Fundamental principles and individual creativity

In Hübsch's view, the *Grundgestalt* represented the objective component of architectural form. Once the generic forms that characterize a style existed, the architect was free to add to them the decoration and detailing, according to his own creativity: "Man begnüge sich, daß die Bildung der Hauptformen aus objectiven Grundsätzen hervorgeht, und lasse im Übrigen dem Geschmacke des Künstlers freies Feld."¹⁴

Hübsch's main concern, however, was with the fundamental principles of architecture, those that were independent from taste and individual expression: "Gegenwärtige Untersuchung befaßt sich also nur mit der allgemeinen Gestaltung und Zusammenstellung der architectonischen Elemente, nicht aber mit ihrer specielleren Gestaltung und Zusammenstellung nach der besonderen Bestimmung der Gebäude, worin hauptsächlich das Wirken des Künstlers besteht und worin sich sein Talent beurkundet. Und ihr Zweck geht nur dahin, dem Künstler seinen Gegenstand der Hauptsache nach klar zu machen, und eine sichere Basis für die Kritik zu geben, welche über Werke der Architektur deswegen so verschieden ausfällt, weil man hier wirklich noch nicht einmal über das A B C einig ist."¹⁵

The generic form that characterizes a style is therefore independent from the architect's creativity. In Hübsch's theory there is not place for concepts like 'personal style.'¹⁶ The basic form that determines the characteristics of the style has

¹⁴Hübsch, op. cit., p. 4. English translation by Herrmann, op. cit., p. 65: "We should be content that the formation of the main parts proceeds from objective principles and, for the rest, let the artist's taste have free rein."

¹⁵Hübsch, op. cit., p. 6. English translation by Herrmann, op. cit., p. 67: "The present investigation is, therefore, concerned only with the general form of architectural elements and their combination, not with their specific form and combination in relation to the functions of particular buildings, which is the artist's primary task and bears witness to his talent. This investigation aims at giving the artist an explanation of the essence of this subject and at providing a secure base for criticism, since in this sphere we differ so much that we do not even agree on the ABC's."

¹⁶The question whether a style can be the result of the individual work of an artist has given rise to opposing views among art historians and theorists. Some authors have been willing to identify style with the individual work of the artist. For example, the Comte de Buffon in his *Discours sur le style*, 1753, contended that "the style is the man himself." In 1783, Hugh Blair, defined style as "a characteristic expression of a writer's manner of thinking and peculiarity of temperament." Quoted in Collins, op. cit., p. 64. More recently, John Summerson has expressed a similar belief: "Architectural change occurs as the result of the irregular and incalculable incidence of men of genius-innovators. These men -involuntarily, very often- create schools, like pebbles dropped into a pond make rings." J. Summerson, *Heavenly Mansions, and other Essays on Architecture*, 1963, p. 210. Yet, there are other scholars who deny any validity to the idea of a "personal style." For example, Emil Kaufmann, who writes in this respect that: "Those who still believe in the 'creation' of styles by individuals appear to be wrong. Every artist is the servant and the exponent of the ideas of his time. The discovery of supra-individual 'styles' has been one of the most momentous achievements of our discipline. We should not go back to the more primitive concept of individual 'creators'. This must be said since many still cling to the obsolete view." E. Kaufmann, *Architecture in the Age of Reason*, 1955, p. 131.

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a supra-individual dimension and, as such, it can only be determined by cultural factors. Once the objective principles of a style -its basic form- exist, then the individual creativity of the artist can intervene. However, the scope of intervention of the architect is confined to the external forms, that is the decoration. As Hübsch declared at the end of the article, "*hiemit wäre das vorgesetzte Ziel erreicht und für den neuen Styl ein streng objectives Skelett aufgestellt, welches, wie ich glaube, bestimmt genug ausgebaut ist, daß der Künstler dasselbe durch seine Individualität beleben kann.*"¹⁷

Some critics thought that the differentiation between two different kinds of form proposed by Hübsch undermined the value of artistic creation. Rudolf Wiegmann, for example, criticized Hübsch's ideas in the following terms: "*Wäre es nicht eine höchst armselige Kunst, die über ein Paar Formen und Konstruktionen nicht hinaus dürfte? Dem Künstler bliebe dann nicht mehr für sein Genie übrig, als ein wenig Anordnen und Dekoriren, etwas der wahren Kunst und ihrer Idee sehr Untergeordnetes.*"¹⁸ Wiegmann rejected the notion, which he thought to be implicit in Hübsch's argument, that the application of rational principles of construction necessarily results in beautiful form. Against this assumption, Wiegmann argued that "*ist die Konstruktion, das Vernünftige vorgeschrieben, so werden freylich die daraus entsprungenen Werke vernünftig seyn; ist aber daran schon die Schönheit gebunden? Bey schönen Werken hingegen versteht sich das Vernünftige von selbst. Daß die Konstruktion nicht der Grund der plastischen Idee, sondern deren Folge ist, erweist die Kunstgeschichte.*"¹⁹

The criticism of Wiegmann, however, was to some extent justified, because the Idea, that the Renaissance had placed in the mind of the artist, becomes for Hübsch, an abstract principle determined by construction, material and other cultural factors; a principle that belongs more to the object than to the subject.²⁰

¹⁷Hübsch, op. cit., p. 51. English translation by Herrmann, p. 99: "We have now reached the goal that we tried to attain and have established a strictly objective skeleton for the new style, sufficiently articulated, I believe, for the artist to enliven with his own individuality."

¹⁸Rudolf Wiegmann, *Bemerkungen über die Schrift: In welchem Styl sollen wir bauen?* von H. Hübsch, 1829, *Kunst Blatt*, n.46, p. 182. English translation in Herrmann, op. cit., p. 110: "Would not be a very poor art that was not permitted to go beyond a few forms and types of construction? The only field left to the artist in which to show his originality would be a little arrangement and decoration-something very subordinate to the true idea of art."

¹⁹Rudolf Wiegmann, *Bemerkungen über die Schrift: In welchem Styl sollen wir bauen?* von H. Hübsch, 1829, *Kunst Blatt*, n. 45, p. 178. English translation by Herrmann, op. cit., p. 106: "If the construction, which is a rational matter, is prescribed, the resulting works will of course be rational. But will that make them beautiful? With beautiful works, on the other hand, rationality may be taken for granted. The history of art shows that construction is not the cause but the result of a formal idea."

²⁰With regard to Hübsch's article, Wiegmann thought that "*aus der ganzen Schrift schien die Ansicht hervorzuleuchten, daß die Materie, der Stoff den Geist beherrsche, welches dosch fast umgekehrt wahr ist.*" Wiegmann, op. cit., n. 45, p. 177. English translation by Herrmann, op. cit., p. 105: "The whole treatise seems to be pervaded by the notion that matter dominates mind, whereas

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Furthermore, the basic forms that Hübsch propounded as the basis for a style are not purely abstract forms, in the sense of abstractions created by the mind -like Laugier's *cabane*- but are associated to two concrete methods of construction. In this regard, Hübsch was advancing a thesis that would constitute a central argument for later authors like Viollet-le-Duc: that objective principles in architecture derive from the methods of construction.

8.4 Type, Style and art form: the theories of Gottfried Semper

Like other nineteenth century theorists, Semper was also concerned with issues like the existence of fundamental principles in the art of architecture, the lack of style in the architecture of his time and the influence of the material in architectural form. But a distinctive aspect of Semper's theory, that distinguishes him from other writers, stems from his awareness of the intellectual

almost the reverse is true." This materialistic view of architectural form, according to Wiegmann, pervaded Hübsch's notion of style: "*Dieser gibt dem Wort Styl fast durchgängig eine Bedeutung, die sich auf das Materielle, die Construction bezieht, während dies Wort dem Sprachgebrauch gemäß nur auf das Geistige angewandt wird. Nicht heißt Styl ein bestimmtes unabänderliches System der Construction und Verzierung; noch weniger bezeichnet es die beyden Richtungen ausschließlicly, die sich durch Bogenüberspannungen und gerade Ueberdeckungen unterscheiden; sondern es hat in der ästhetischen Sprache nur folgende zwey Bedeutungen: Erstens das Volks - und Zeitlebendige und charakteristisch Bedeutende, welches die Kunst, gleichviel welche, stets in ihren Werken spiegelt. (So sagt man griechischer, altdeutscher, raphaelischer Styl.) Zweytens aber wird darunter ein bestimmter Ausdruck, ein individueller Charakter verstanden. (In diesem Sinn sagt man leichter, erhabener, schwerer Styl.) In der Bedeutung hat es nun gar nichts mit der Construction zu thun; denn der leichte, erhabene und schwere Styl können alle sowohl durch Bogenconstruction, als gerade Ueberdeckung gebildet werden.*" Wiegmann, op. cit., n. 45, p. 177. English translation by Herrmann, op. cit., p. 105: "Throughout, he attaches to the term 'style' a meaning that relates to material and construction, whereas in everyday language it is used in a spiritual sense only. Style is not a definite and unalterable system of construction and decoration; even less does it exclusively signify two different approaches to spanning- the arch and the straight architrave. In aesthetics, style has only two possible meanings: first, the signal character of a nation and an epoch, which is always reflected in any work of art (one speaks, for instance, of the Greek style, the Old-German style, or the Raphaelite style); second, a distinctive mode of expression or specific quality (in this sense, one speaks of a light, a sublime, or a grave style). In the latter meaning, it has nothing at all to do with construction, since the light, the sublime, and the grave style can appear in an arch just as well as in a straight architrave." In spite of criticisms, Hübsch maintained his original view of style, which for him meant objective principles embedded in a few basic forms. In a later text, *Die verschiedenen Ansichten über Baustil gegenüber der heutigen Zeit*, 1847, he defended his conception of style and answered his critics by saying that "*Sie verwechseln den Stil mit der Produktion des Kunstwerks. Es ist aber, wie wir schon oben gesehen, mehr die letztere, d.h. die poetische Auffassung und besondere organische Entfaltung des konkreten Gegenstandes und die individuell-künstlerische Dekorierung, welche begeistert und ergötzt als der Stil, der bei dem Kunstwerke hauptsächlich nur die allgemeineren Eigenschaften enthält und eigentlich die kältere Logik ist.*" In *Die Architektur und ihr Verhältnis zur heutigen Malerei und Skulptur*, 1847, pp. 189-190. English translation by Herrmann, op. cit., p. 172: "They confuse style with the production of a work of art. Yet, as we have seen before, it is the poetic conception and organic presentation of the actual object and its artistic decoration that causes enthusiasm and delight, rather than the style, which concerns only the more general qualities of the work of art and in fact has to do with cold logic."

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developments that were taken place in other disciplines like, for example, biology and philology. In this connection, it can be said that behind Semper's preoccupation with the notion of Style lies a more generic concern: the attempt to elaborate a comprehensive theory of art form in the spirit of Goethe's morphology. In this theory, the concepts of Type and Style play a fundamental role. Much of the theoretical effort of Semper was directed to determine the specific meaning of each term in the context of his doctrine of artistic form.

8.4.1 Type and fundamental principles

The notion of Type, which for more than one century had been the fundamental paradigm of the natural sciences, played an important role in the early stages of the development of Semper's theory. Some of the most revealing thoughts of Semper regarding the question of Type can be found in a manuscript that presumably corresponds to a lecture, given in London in November 1853, when Semper was teaching at the Department of Practical Art.²¹

In the first pages of this manuscript, Semper reflects on the fact that the abundance of theoretical knowledge in his time was not being matched by a corresponding number of genuine works of art.²² In order to be able to deal with the "immense amount of learning which is our heritage of so many centuries"²³, Semper argued that it was necessary to reduce the mass of knowledge to a few fundamental principles by means of a system of classification, as biologists were doing. In this regard, he recalls his time in Paris, when he could admire the collection of animal fossils of Cuvier in the *Jardin des Plantes*, about which he writes [Semper's original English]: "In this magnificent collection, the work of Baron Cuvier, we perceive the types for all the most complicated forms of the animal empire, we see progressing nature, with all its variety and immense richness, most sparing and economical in its fundamental forms and motions; we see the same skeleton repeating itself continually, but with innumerable varieties, modified by gradual developments of the individuals and by the conditions of existence which they had to fulfil."²⁴ And he goes on drawing an analogy between the works of nature and the works of art: "Here we see some parts left out, some other parts only indicated, which are exceedingly developed on other individuals. If you observe this immense variety and richness of nature notwithstanding its

²¹MS 122, fols. 1-37, Semper Archiv, ETH Zürich.

²²He had already addressed this issue in a previous text, *Wissenschaft, Industrie und Kunst*, published in 1851. There he affirmed that "the abundance of means is the first great danger with which art has to struggle. This expression is illogical, I admit (there is no abundance of means but only an inability to master them); however, it is justified in that it correctly describes the inverted state of our conditions." Quoted and translated in Harry Francis Mallgrave and Wolfgang Herrmann, *The Four Elements of Architecture and Other Writings*, 1989, p. 135.

²³MS 122, fol. 2.

²⁴MS 122, fol. 4.

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simplicity may we not by analogy assume, that it will be nearly the same with the creations of our hands, with the works of industrial art?"²⁵

In his answer to this question, Semper appeals to the notion of Type, and says that [Semper's underlining]: "They [the works of art] are like those of nature, connected together by some few fundamental Ideas, which have their simplest expressions in types."²⁶ He then proposes to apply to the study of art a similar comparative method as the one used by Cuvier in biology and Humboldt in linguistics.²⁷ In his view, [Semper's underlining] "a method, analogous to that which Baron Cuvier followed applied to art, and especially to architecture would at least contribute towards getting a clear insight over its whole province and perhaps also it would form the base of a doctrine of Style."²⁸ Like other contemporary theorists, Semper hoped that from that understanding of the fundamental principles a truly new style would arise: "A sort of [...] Method how to invent, which may guide us, to find out the natural way of invention which would be more than could be allowed to the great Naturalist to do for his sublime science."²⁹

According to Semper, a comparative method like the one employed by Cuvier and Humboldt in their respective fields had not yet been applied to the study of architecture,³⁰ although Durand was the one who "has come nearest to it." Semper thought that Durand did not fully achieve his goal because the purpose of his books was "to set up a sort of 'compendium artis' for the students of the Ecole Polytechnique who were by no means artists."³¹ Nevertheless, Semper concludes

²⁵Ibid.

²⁶MS 122, fol. 5.

²⁷The source of Semper's ideas on form and evolution should be traced back to Goethe and Humboldt. According to Harry Francis Mallgrave, "Semper's use of the word type in his London lecture derives from the German romantic tradition of Humboldt and Goethe, as do such other expressions as *Stufengang der Ausbildung* (formative stage), *Normalformen* (normal form) and *Urformen* (prototypical forms)." Mallgrave and Herrmann, op. cit., p. 30.

²⁸MS 122, fol. 5.

²⁹MS 122, fols. 5-6. After this quote of Semper, Philip Steadman concludes that "this last sentence is particularly suggestive, in the way in which Semper sees such a procedure leading beyond just analytic classification, to provide a basis for synthetic methods for design." P. Steadman, *The Evolution of Designs*, 1979, p. 67. It could be inferred from the previous passages, that Semper's ultimate goal was to discover the 'natural mechanism' of form creation in art which could be applied to the creation of new art works.

³⁰In another manuscript, apparently an early draft of the November lecture in London, Semper wrote: "When I observed this variety of nature in its simplicity, I very often thought by myself that it may be possible to reduce the creations of man, and especially the works of architecture, to certain normal and elementary forms, which in a comparing method of contemplating them, analogous to that of Cuvier for natural history, will enable us to find out the elementary forms and the principles, of which all [of the] million appearances in art are but as much different modifications. It may be of consequence to search out these fundamental forms of architecture, and to follow them from the simplest to their highest expressions and even to their state [of] misformation." MS 123, fols. 3-4. Quoted in Mallgrave and Herrmann, op. cit., p. 32.

³¹What Semper could not accept was the extreme schematism of Durand and his lack of appreciation for the organic principles underlying the creation of art form. Thus, he writes: "He looses himself into tabular-formularies, he puts the things into rows and brings about a sort of alliance between them by

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that "in spite of this his[Durand's]books are remarkable for the comparing idea which they contain."³²

As with Durand, analysis and synthesis, science and art, are intimately connected in the theory of Semper. He thinks that the work of the architect is both analytical and synthetic. In much the same way as the scientist, the architect must reduce the complexity of existing architectural forms to a unique and original state: "*Das Abgeleitete und Zusammengesetzte auf das Ursprüngliche und Einfache zurückführt.*"³³ Then, the understanding of this original state will guarantee that the creations of the architect follow the same principle that the creations of nature: "*Nicht nur wird die Übersicht und das Verständniss des Vorhandenen dadurch erleichtert werden, es wird auch möglich seyn, eine architectonische Findungs- und Erfindungslehre darauf zu begründen, welche den Weg der Natur zeigt und gleich entfernt hält von Monotonie und Willkür.*"³⁴ In this context, Semper thinks of Type as a concept having both an artistic and scientific meaning.

8.4.2 The notion of Type in the theories of Semper and Quatremère

The idea of Type that Semper presents in the manuscript of the London lecture has still something in common with the one held previously by Quatremère. Both, Quatremère and Semper, think of Type as a fundamental principle embedded in the works of nature and both also think of Type as the link between the world of nature and the word of art. Similarly to Quatremère, Semper explicitly referred to Type as the nexus between analysis and synthesis; that is to say, as the link between the systematic understanding of precedent works and the creation of a new work of architecture.

But there are also differences between Quatremère and Semper's theories. First, Semper gave more importance to the issue of classification than Quatremère did. Following the influence of Cuvier's work, Semper understood Type to be the

mechanical ways instead of showing the organic laws by which they are connected together." MS 122, fol. 7. In other occasion, Semper was more critical about Durand (to whom he referred as the *Schachbrettkanzler*) contending that his method of composition could only create projects that "would arrange themselves in proper proportion and symmetry like a beautiful embroidery pattern for ladies." Quoted by Herrmann, *Gottfried Semper. In Search of Architecture*, p. 20.

³²MS 122, fol. 7.

³³*Vergleichende Baulehre*, fols. 1-13. Transcription in Wolfgang Herrmann, *Gottfried Semper. Theoretischer Nachlass an der ETH Zürich. Katalog und Kommentare*, 1981, p. 183. English translation by Herrmann, *Gottfried Semper. In Search of Architecture*, p. 194: "To reduce to its simplest expression the law that lies hidden within the artistic covering."

³⁴*Vergleichende Baulehre*. Transcription by Herrmann, *Gottfried Semper. Theoretischer Nachlass*, p. 184. English translation by Herrmann, *Gottfried Semper. In Search of Architecture*, p. 195: "Not only will the overall view and the understanding of what exists be made easier [for the architect] but it will also be possible to derive an architectural theory of design and inventiveness that shows how nature works and avoids equally both monotony and fancy notions."

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principle revealed through the systematic classification of individual cases. Quatremère, on the other hand, did not make much of the issue of classification.

Other differences between the theories of the two authors need to be found in the different value they assigned to the concepts of Type and Style. As we will see in the following sections, both concepts constitute the basis of Semper's theory of art form. But, unlike Quatremère, Semper was willing to give more importance to Style than to Type. As we have seen in a previous chapter, in Quatremère's theory the concept of Type played a central role, while Style was thought of as a secondary concept, a derivative of other concepts like *type* or *caractère*.

8.4.3 The elements of architecture

From the beginning of his theoretical work, Semper showed a clear aversion to the doctrine of the origins of architecture held by Vitruvius and his advocates. He thought that the theory of the derivation of the Greek temple from the wood structure was the expression of a 'materialistic way of thinking' which he rejected. He did not embrace either the theory formulated earlier by Quatremère, and supported by other writers, according to which the tent, the cave and the hut were the prototypes from which the different styles had derived.³⁵ Semper thought, that the similarity of external forms was not enough reason to postulate any relation between what he thought to be two different kinds of form: the primitive construction and the Greek temple.

In *Die vier Elemente der Baukunst*, 1850-51, Semper presented his own alternative theory of the origins of architectural forms. He thought that some primitive conditions (*Urzustände*) of human society had given rise to architectural form. Thus, he contended that the fireplace was the beginning of human settlement, a contention that, incidentally, was already formulated by Vitruvius. The hearth (*Herd*), therefore, was the "*erste und wichtigste, das moralische Element der Baukunst*"³⁶; and around it the other three elements were formed: the roof (*Dach*), the enclosure (*Umfriedung*) and the mound or terrace (*Erdaufwurf*); elements whose initial purpose was to protect the hearth. Like previous architectural theorists, including Vitruvius and Quatremère, Semper also appealed to 'necessity' as the original cause of architectural form. In this regard, he

³⁵In the chapter 10 of *Vergleichende Baulehre*, Semper criticized the British writer Hope who in his *Historical Essay on Architecture*, contended that the nomadic tent was the origin of the Chinese way of building. See Herrmann, *Gottfried Semper. In Search of Architecture*, p. 205.

³⁶*Die vier Elemente der Baukunst*. Transcription in Heinz Quitzsch, *Gottfried Semper, praktische Ästhetik und politischer Kampf*, 1962, p. 55. English translation by Mallgrave and Herrmann, op. cit., p. 102: "It is the first and most important, the *moral* element of architecture."

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contended that the *"vier Elemente frühester Baukunst entwickelten sich also aus den ersten nothwendigsten Bedürfnissen der Niederlassung."*³⁷

These four elements represent Semper's interpretation of the notion of Type.³⁸ The difference between Semper and Quatremère at this point is that while the three models of Quatremère -tent, cave and hut- still bear some resemblance with the architectural forms that, supposedly, derived from them, the four elements of Semper are not meant to resemble them. In fact, each one of the four elements represents a particular technique of form generation, as opposed to a concrete form. Thus, the hearth is a product of the art of ceramic; the enclosure derives from the weaving of mats and carpets (*Kunst der Wandbereiter*)³⁹; the roof from carpentry; and the mound or terrace from stone working. In this context, Harry Francis Mallgrave rightly contends that "the use of the term 'elements' (*Elemente*) in this regard is misleading. As is clear from his later theory, Semper conceived them not as material elements or forms, but as 'motives' or 'ideas', as technical operations based in the applied arts."⁴⁰

It can be argued that with the theory of the four elements, Semper attempted to do away with a theory of imitation that had prevailed since the time of Vitruvius. His four elements are, by definition, *formless*; they are the preconditions out of which architectural form emerged. As he declared later in the Prolegomenon to *Der Stil*, the theory of style (*Stillehre*) he was proposing *"sucht die Bestandtheile der Form die nicht selbst Form sind, sondern Idee, Kraft, Stoff und Mittel; gleichsam die Vorbestandtheile und Grundbedingungen der Form."*⁴¹ Essentially, Semper moved the origins of architecture one step backwards from where Vitruvius had placed them. Instead of a complete prototype -the wooden hut of Vitruvius- Semper proposes that the origins of architecture need to be found in four separate elements that originated in the practical arts; each element being an inextricable unity of material, technique and form: clay-ceramic-hearth, textile-weaving-enclosure, wood-carpentry-roof and stone-masonry-terrace.⁴²

³⁷*Vergleichende Baulehre*, MS 58, fols. 15-30. Translated by Herrmann, *Gottfried Semper. In Search of Architecture*, p. 199: "Thus, four elements of primitive building arose out of the most immediate needs."

³⁸H. W. Kruft, *Geschichte der Architekturtheorie*, 1991, p. 359, summarizes the relationship between Type and the four elements in these terms: "*Typen*' sind für Semper ursprüngliche von dem Bedürfnis vorgeschriebene Formen die er mit seinen vier Grundelementen identifiziert."

³⁹*Die vier Elemente der Baukunst*. Quitzsch, op. cit., p. 56.

⁴⁰Mallgrave and Herrmann, op. cit., p. 24.

⁴¹*Der Stil in den technischen und tektonischen Künsten*, 1860, vol. 1, p. vii. English translation by Mallgrave and Herrmann, op. cit., p. 183: "seeks the constituent parts of form that are not form itself, but the idea, the force, the task, and the means, in other words, the basic preconditions of form."

⁴²Nevertheless, and rather contradicting the ultimate purpose of his four elements, Semper, contended in *Vergleichende Baulehre* that there were *"zwei Gegensätze in der Art der Entstehung menschlicher Wohnungen. Erstens der Hof mit der sie umgebenden Mauer und den untergeordneten darin enthaltenen Schutzdächern, zweitens die Hütte, das freistehende Haus im engeren Sinne."* Transcription by Herrmann, *Gottfried Semper. Theoretischer Nachlass*, p. 188. English translation by Herrmann, *Gottfried Semper. In Search of Architecture*, p. 201: "Two basically different ways in

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8.4.4 Architectural forms and decorative forms

Semper also rejected the view in which the decorative arts (e.g. painting, sculpture) would have been created after architecture. Rather, he claimed that the opposite was true. For Semper, the first art forms were to be found in carpet walls, metal incrustations, vessels, shields, weapons and other kinds of artifacts. Thus, he claimed that *“die praktischen und industriellen Künste einen hohen Grad der Entwicklung erreicht hatten, bevor an die Architektur als selbständige Kunst gedacht wurde.”*⁴³ Furthermore, in a study on Assyrian architecture, he rejected the traditional argument whereby stucco and other kinds of coating were added to the solid wall. He contended the opposite, namely, that solid walls *“bildeten sie nur das unsichtbare Gerüste, versteckt hinter den wahren Repräsentanten der Wand, den bunt gewirkten Teppichen, denen sie zum Halt und zur Stütze dienen.”*⁴⁴ This conclusion anticipates what later became a central concept of his theory - the concept of *Bekleidung*: *“Die Bekleidung der Mauern war also das Ursprüngliche, seiner räumlichen, architektonischen Bedeutung nach das Wesentliche; die Mauer selbst das Sekundäre.”*⁴⁵

According to Semper's theory, therefore, the origins of architectural form should be found in the artifacts produced by different crafts, rather than in complete forms like the Vitruvian primitive huts. In this regard, one substantial difference between Vitruvius' and Semper's conception of architectural form should be pointed out. In Vitruvius' account of the origins of architecture, structure (i.e. structural form) was supposed to precede ornamental form (i.e. the orders). Semper, however, rejects the historical priority of structure with regard to ornament and contends that decoration was first, and that structural form came after.⁴⁶

which human dwellings arose. First, the courtyard with its surrounding walls and, within, some open sheds of minor importance, and second, the hut, the freestanding house in its narrower sense.”

⁴³*Theorie des Formell-Schönen*, MS 179, Semper Archiv, ETH Zürich. Transcription in Herrmann, *Gottfried Semper. Theoretischer Nachlass*, p. 220. English translation by Herrmann, *Gottfried Semper. In Search of Architecture*, p. 223: “The development of practical and industrial arts had reached a high level before architecture as an independent art had even thought of.”

⁴⁴*Vergleichende Baulehre*, MS 58, Semper Archiv ETH Zürich. Transcription in Herrmann, *Gottfried Semper. Theoretischer Nachlass*, p. 197. English translation by Herrmann, *Gottfried Semper. In Search of Architecture*, p. 206: “Were only the invisible structure hidden behind the true representatives of the wall, the colourful carpets that the walls served to hold and support.”

⁴⁵*Vergleichende Baulehre*, MS 58. Transcription in Herrmann, *Gottfried Semper. Theoretischer Nachlass*, p. 197. English translation by Herrmann, *Gottfried Semper. In Search of Architecture*, p. 206: “It was therefore the covering of the wall that was primarily and essentially of spatial and architectural significance; the wall itself was secondary.”

⁴⁶MS 25, fol. 107, Semper Archiv, ETH Zürich. Quoted and translated by Herrmann, *Gottfried Semper. In Search of Architecture*, p. 168: “The form of the hut[...]was adhered to even after the temple building had been further developed.”

8.4.5 Form and material

The emphasis that Semper puts on the unity of material and spiritual realms in the creation of the first artistic forms constitutes one of the most original contributions of his theory. Some critics, particularly Alois Riegl, attended only to one aspect of Semper's theory - the influence of material and technique in the development of artistic form. Consequently, those critics saw Semper an advocate of the materialist approach that characterized nineteenth century architectural theory.⁴⁷

In truth, Semper himself was especially critical of those 'materialists'⁴⁸ who defended the preponderance of material over form saying that *"sie trifft im Allgemeinen der Vorwurf die Idee zu sehr an den Stoff geschmiedet zu haben durch die Annahme des unrichtigen Grundsatzes, es sei die arch. Formenwelt ausschliesslich aus stofflichen konstruktiven Bedingungen hervorgegangen und liesse sich nur aus diesen weiter entwickeln; da doch vielmehr der Stoff der Idee dienstbar, und keineswegs für das sinnliche Hervortreten der Letztern in der Erscheinungswelt alleinig massgebend ist."*⁴⁹ Furthermore, he speaks about *"die gefährliche Idee, aus der Eisenkonstruktion, angewandt auf Monumentalbau, müsse für uns ein neuer Baustil hervorgehen, hat schon manchen talentvollen, aber der hohen Kunst entfremdeten Architekten auf Abwege geführt."*⁵⁰ Still, one more testimony of Semper's criticism of materialist thinking is his rejection of the definition of style given by Rumohr, who had defined style as "the accommodation of the artist to the intimate demands of the material in which the sculptor really forms his objects, and the painter represents them."⁵¹ In opposition to Rumohr, Semper believed that material is only one of the factors that determine the art form: *"Ich meine dass der 'derbe Stoff' nur einen der zahlreichen*

⁴⁷As Rykwert recalls, the view of Semper as an advocate of materialism was mainly due to the interpretation that Alois Riegl made of Semper's theory. Today, however, it is widely accepted that such a view is unjustified. Joseph Rykwert and Wolfgang Herrmann, among others, have rejected the materialist label that Semper was given in the past.

⁴⁸Semper might have been thinking of Metzger and Bötticher, who had defended the idea that a new style would emerge from the use of a new material like iron.

⁴⁹*Der Stil*, vol. 1, pp. xiv-xv. English translation by Mallgrave and Herrmann, op. cit., p. 190: "The materialists can be criticized in general for having fettered the idea too much to the material, for falsely believing that the store of architectural forms is determined solely by the structural and material conditions, and that only these supply the means for further development. The material, in fact, is subservient to the idea, and is by no means the *only* decisive factor for embodying the idea in the phenomenal world."

⁵⁰*Der Stil*, vol. 2, p. 550. English translation by Herrmann, *Gottfried Semper. In Search of Architecture*, p. 183: "The dangerous idea that out of iron construction, applied to monumental buildings, a new style was bound to arise had led many a talented[...] architect stray."

⁵¹Quoted and translated by Semper, in the manuscript MS 122, fol. 28. The same quote appears in the *Theorie des Formell-Schönen*, which is translated into English by Herrmann as: "He [Rumohr] regarded style as a habitual submission to the inner exigencies of the material out of which the sculptor actually forms his figures and with which the painter makes them visible." Herrmann, *Gottfried Semper. In Search of Architecture*, p. 243.

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*Momente bilde, in deren inneren Forderungen sich zu fügen, und sie nach Kräften geltend zu machen, Aufgabe des Künstlers sey.*⁵²

Rather than advocating the supremacy of material over form, as some of his critics wanted to believe, the idea that Semper tried to convey was that, in the very origins, the invention of art forms were intimately connected with technique, and that this unity was achieved first in the manual crafts. Seen in this light, Semper would have been advocating a return to the situation existing at the time of the Greeks when *technē* and *epistēmē*, making (*können*) and thinking (*wissen*), had not been yet separated. As Rykwert has contended, Semper's theory, "[being]conceived at the moment when thinking and doing were to be disastrously divorced, it may well contain a hint for their new reconciliation."⁵³ It was this original union between art and technique, between spiritual and material components in art, that Semper wanted to bring back to his own time.⁵⁴

8.4.6 Type and Style

As in Hübsch's theories, the distinction between Type and Style was also a critical issue in the theory of Semper.⁵⁵ As we have seen, a certain overlapping between

⁵²*Theorie des Formell-Schönen*, MS 179, Semper Archiv, ETH Zürich. Transcription in Herrmann, *Gottfried Semper. Theoretischer Nachlass*, p. 237. English translation by Herrmann, *Gottfried Semper. In Search of Architecture*, p. 243: "I believe that the 'crude material' is only one of several factors the inner exigencies of which the artist has to submit to and which it is his task to emphasize."

⁵³Joseph Rykwert, 'Gottfried Semper and the Problem of Style', 1981, p. 15.

⁵⁴He refers, for example, to the industrial arts as being the 'creations of our hands' (MS 122, fol. 4), and proclaims that the goal of education is the development of man's 'intellectual and bodily activities.' *Der Stil*, English translation, Mallgrave and Herrmann, op. cit., p. 186.

⁵⁵The question of the distinction between the concepts of Type and Style, with which Hübsch and, especially Semper, were confronted, has kept concerning later art historians and architectural theorists. Among the first, it stands out the proposal of a methodology for the history of art made by Erwin Panofsky. According to Panofsky, the study of a work embraces three different tasks simultaneously: 1. pre-iconographical description, whose object is the study of pure forms 2. iconographical analysis of the world of specific themes or concepts manifested in images, stories and allegories 3. iconological interpretation of the 'symbolical' values to which the art work gives expression. Each one of these three aspects in the study of the work of art needs a 'corrective principle of interpretation' derived from the history of tradition. Thus, the practical experience in the knowledge of the primary subject matter, the forms, has to be corrected "by an insight into the manner in which, under varying historical conditions, objects and events were expressed by forms," that is, by a *history of style*. The knowledge of the secondary subject-matter, the images or themes, "had to be corrected by an insight into the manner in which, under varying historical conditions, specific themes and concepts were expressed by objects and events", meaning a *history of types*. And finally, the synthetic intuition by which we are able to grasp the intrinsic meaning of content of the work must "be corrected by an insight into the manner in which, under varying historical conditions, the general and essential tendencies of the human mind were expressed by specific themes and concepts", meaning a *history of cultural symbols*. Style, type and symbol are three categories -ranging from the most concrete and tangible to the most generic and abstract- that the art historian applies to the study of a unique phenomena which is the work of art. See E. Panofsky, *Meaning in the Visual Arts*, 1993, pp. 51-67. Among architectural theorists, Christian Norberg-Schulz, has attempted the integration of both

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the notions of Type and Style takes place in the writings of Hübsch. Semper, on the other hand, tried to establish a distinction between the two terms and to integrate both into a unified theory of artistic form.

In *Wissenschaft, Industrie und Kunst*, Semper gave the following definition of style: "By style I mean the artistical treatment of the fundamental idea in a work of art, and of all inward & outward accessories [the word coefficients is crossed out] which have modified the embodiment of it."⁵⁶ In line with the 'form paradigm' that was current in biology, Semper thinks of Style as an ensemble made up of two elements: a basic form or idea (e.g. the four elements) and the outward factors that influence the development of form (e.g. climate, materials). According to this view of style as an ensemble form-context, the architectural forms characterizing the different styles would be the result of combining the basic elements in different ways: "*Je nachdem die menschlichen Vereine unter den verschiedensten Einflüssen der Climate, der Länderbeschaffenheiten, der Verhältnisse zu einander, und nach den Unterschieden in den Anlagen der Racen sich verschiedenartig ausbildeten, mussten die Combinationen, in welchen diese vier Elemente der Baukunst zusammengriffen, sich anders gestalten, und einzelne sich mehr entwickeln, andere in den Hintergrund treten.*"⁵⁷ The notion of Style being a function of the outward factors, was illustrated by Semper by means of a mathematical expression:

$$Y = F(x, y, z, \text{etc.})$$

concepts, Type and Style, in his structuralist theory of architecture. He contends that "the analysis of the architectural form is based upon the description of elements and relations. We have already suggested that the elements may be defined as 'space-cells', 'mass-forms' and 'bounding surfaces'. [...]When combining elements and relations we arrive at a formal structure, or in short, form. Frankl has used the terms 'row', 'group', and 'hierarchy' to designate some types of formal structures. We will try to carry this classification further. It is also important to examine the problem of the 'formal levels'. The building type, for instance, may be considered as one level[...]The style also belongs to the formal dimension[...]style is the most probable formal structure possible within the formal language in question[...]It is therefore more convenient to let the concept 'style' cover all the elements, relations and structures which form a meaningful system, with the qualification that they appear with a varying degree of probability. Thus the terms 'style' and 'formal language' are synonymous. The formation of types is closely connected with the more probable aspects of the style. The investigation of types and styles presupposes genetic studies, having the formal development as its subject-matter." For Norberg-Schulz then, style is a more generic category than type. C. Norberg-Schulz, *Intentions in Architecture*, 1963. p. 106.

⁵⁶ *Wissenschaft, Industrie und Kunst*, MS 89, fol. 12, Semper Archiv, ETH Zürich.

⁵⁷ *Die vier Elemente der Baukunst*. Quitzsch, op. cit., p. 55. English translation by Mallgrave and Herrmann, op. cit., p. 103: "According to how different human societies developed under the varied influences of climate, natural surroundings, social relations, and different racial dispositions, the combinations in which the four elements of architecture were arranged also had to change, with some elements becoming more developed while others receded into the background." Works of architecture are seen by Semper as a hybrid of the four kinds of elements he proposes. In the MS 122, fol. 35, after describing the four elements as classes of forms, he contends that "other formations are mixed, and of a composite character; this is namely the case with the works of Architecture, which are combinations of elements, belonging for their types to the four different classes which I mentioned above."

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Later, in the manuscript of his November lecture in London, Semper reformulated this notion of style as the ensemble composed of some elemental forms under the influence of outward factors. He uses now the terms *type* and *idea* to refer to the primeval forms from which a style originates: "The elementary Ideas on what the artist calls the motives of the things, and the early forms in which these fundamental Ideas have been clothed. These early forms are the Types of the Ideas."⁵⁸ These Types or Ideas constitute the first part of his theory of style, while "the second part of the Doctrine of Style comprehends .. local and personal influences such as the climate and physical constitution of a country, the political and religious institutions of a nation, the person or the corporation by whom a work is ordered, the place for which it is destined and[...]the individual personality of the artist."⁵⁹ Furthermore, he distinguished between two kinds of influences that condition the development of the Types or Ideas: "The first class comprises the exigencies of the work itself and which are based upon certain laws of nature and of necessity, which are the same at all times and under every circumstance. The second class comprises such vehicles, which we may call outward influences acting upon the performance of a work of art."⁶⁰ In the same manuscript, Semper refers also to the relation between Type and Style. He gives there the following definition of Type [Semper's underline]: "Types, as we have seen, are primitive forms prescribed by necessity but modified after the[...]materials, which were used in their embodiment. Now it has happened very often, that changes were introduced in the material and the manner of execution of these types. Then the secondary forms became plastic or pictorial treatment of the types. The Styles, which then resulted out of the secondary treatments were composite Styles, which partook on one hand of the types, and the conditions of Style, of the old materials employed by the latter, and on the other hand they partook of the Style which suits the new selected substance and manner of treatment."⁶¹

It can be contended that for Semper type preceded the emergence of a style, and that in artistic form there are some primitive forms 'prescribed by necessity' which should be distinguished from other forms, called secondary, that derive from them.⁶² These secondary forms constitute the distinctive characteristic of a style.

⁵⁸MS 122, fol. 17.

⁵⁹MS 122, fol. 30.

⁶⁰MS 122, fol. 17.

⁶¹MS 122, fol. 30.

⁶²At this point, a parallel can be drawn between the primitive and secondary form formulated by Semper and the distinction between *Kernform* and *Kunstform* proposed earlier by Bötticher. In particular, the primitive form determined by necessity that Semper postulates, recalls the notion of *Kernform* proposed by Bötticher. But there seems to be also a substantial difference between them, since Semper rejected Bötticher's contention that the *Kernform* had been 'conceived'. To Bötticher's contention that the *Kernform* had been conceived, Semper responded that it "was not conceived but arises out of necessity." For Semper, this form was the result of objective causes which he refers to as necessity. See Herrmann, op. cit., p. 141.

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However, and regardless of the changes that a style might undergo, the type remains an integral part of it.⁶³

Semper thinks of Style as forms in a process of continuous evolution, rather than as a fixed compendium of rules. Nevertheless, the forms created within an artistic style, like the individuals in a natural species, cannot go beyond the boundaries that characterize the species as a whole.⁶⁴ However, rather than transposing biological models to architectural theory, Semper was in fact continuing with a line of thought that can be traced back to Goethe's morphology. This eminently morphological character of Semper's doctrine of form reveals itself more clearly in another text, the *Theorie des Formell-Schönen*.

8.4.7 Natural Forms and Art Forms

The equation between natural and art forms is at the core of the theory of art form that Semper proposed in a text written in the last years of his stay in England, *Theorie des Formell-Schönen*, 1856-59. Prior to this text, he had compared natural and art forms on several occasions. For example, in *Vergleichende Baulehre*, he contended that "*die Baukunst schafft ursprüngliche Gebilde, die nicht durch fertige Naturformen bedungen sind, sondern die sich den Naturgesetzen und dem ordenenden Menschengesichte gemäss in dem Laufe der Zeiten historisch*

⁶³The distinction that is made in genetics between genotype and phenotype, seems to be valid also for Semper's theory. Genotype, is the genetic constitution of an organism or group or organisms, that is to say the genes that parents transmit to the offspring. It has to do with inner principles, with codified information contained in the genes. Phenotype, on the other hand, denotes the appearance of an organism resulting from the interaction of the type and the environment. It has to do with the observable constitution of an organism. Semper thinks of the primitive forms as a kind of genotype, while the phenotype would be the visible form that then becomes the visible attribute of the style.

⁶⁴"Die Kunst nun führt eine ähnliche Mannigfaltigkeit von Kombinationen auf wie die Natur, kann aber die Schranken der letzteren hierin nicht um einen Zoll überschreiten; sie muss sich in den Prinzipien formaler Gestaltung genau nach den Gesetzen der Natur richten." *Der Stil*, vol.1, p. xxxvii. English translation by Mallgrave and Herrmann, op. cit., p. 209: "Art, like nature, displays a similar variety of combinations but cannot exceed nature's bounds by an inch; its principles of formal configuration must be in strict accordance with the laws of nature." And in another part of the same text he wrote: "For although art has only to do with form and image and not with the essence of things, it cannot in creating its form do other than follow what the natural phenomenon shows, even if it only complies with the general law that prevails in every sphere of nature, sometimes undeveloped, sometimes in a more mature form." *Ibid.*, p. 197. Later, in *Über Baustyle*, 1869, Semper again defined style in the following terms: "Style is the accord of an art object with its genesis, and with all the preconditions and circumstances of its becoming." Mallgrave and Herrmann, op. cit., p. 269. To some extent, Semper's ideas foreshadow the ones of Henri Focillon, who in his *Vie des Formes*, 1934, wrote: "Forms obey their own rules -rules that are inherent in the forms themselves, or better, in the regions of the mind where they are located and centered- and there is no reason why we should not undertake an investigation of how these great ensembles, united by close reasoning and by coherent experiment, behave throughout the phases that we call their life." English translation, *The Life of Forms in Art*, 1989, p. 52. Focillon questioned the validity of the notion of Style as a closed and fixed system characterized by a formal unity. For him, Style meant basically "a state in the life of forms." *Ibid.* p. 62.

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ausgebildet und in gewisser Hinsicht fixirt haben."⁶⁵ Semper used the term *organisch* to refer to both kinds of form, natural and architectural: "Man nennt diese Gebilde *organisch*, wenn sie aus einer richtig gefassten Grundidee hervorgehen und bei ihrer Bildung die Gesetzlichkeit und innere Nothwendigkeit hervortritt, durch welche die Natur in allem, was sie schafft, stets bewunderungswürdig und vollkommen erscheint."⁶⁶ And in *Wissenschaft, Industrie und Kunst*, he contended that the forms of nature and the forms of art should be studied with equal interest: "Wir müssen daher jene einfachsten Werke der Menschenhand und die Geschichte ihrer Weiterbildung mit gleicher Aufmerksamkeit wie die Natur selbst in ihren Erscheinungen beobachten."⁶⁷

The theory of form developed in the *Theorie des Formell-Schönen* embraces all kinds of form, natural as well as artistic forms. At the beginning of this work, Semper introduces the term *Tektonik*,⁶⁸ by which he refers to the art forms that are created according to the model provided by nature: "Die Tektonik ist eine Kunst, deren Vorbild die Natur ist, nicht in ihren konkreten Erscheinungen, sondern in ihrer Gesetzlichkeit und Regel, wonach sie besteht und schafft, wonach sie uns, die wir in ihr existiren, als Inbegriff des Vollkommenen und Vernunftgemässen erscheint."⁶⁹ As with the issue of the primitive hut, Semper differentiates here between imitation based on visual similarity (e.g. resemblance) from imitation of the principles that underlie the external forms.⁷⁰

⁶⁵*Vergleichende Baulehre*, MS 55, fols. 9-10. Transcription in Herrmann, *Gottfried Semper. Theoretischer Nachlass*, p. 183. English translation in Herrmann, *Gottfried Semper. In Search of Architecture*, p. 194: "Architecture creates original formations, which are not contingent on fully finished natural forms but which have evolved historically according to natural laws and to the human mind's inclination toward order."

⁶⁶*Vergleichende Baulehre*, MS 55, fols. 9-10. Transcription in Herrmann, *Gottfried Semper. Theoretischer Nachlass*, p. 183. English translation in Herrmann, *Gottfried Semper. In Search of Architecture*, p. 194: "These formations are called organic if they spring from a correctly conceived basic idea and if they make evident the rule of laws and inherent necessity, the two qualities that make nature appear admirable and perfect in everything she creates."

⁶⁷*Wissenschaft, Industrie und Kunst*. Published in *Gottfried Semper. Wissenschaft, Industrie und Kunst*, 1968, edited by Hans M. Wingler, p. 41. English translation by Mallgrave and Herrmann, op. cit., p. 142: "We must therefore study the most primitive works of the hand of man and the history of their development with the same attentiveness that we study nature herself in her manifestations."

⁶⁸Herrmann has traced the use of the term tectonics by Semper, and observes that in *Theorie des Formell-Schönen*, the term tectonics comprised all technical arts, but "some time later, when revising the text, he eliminated the word 'tectonics' wherever he had used it in the wider sense and replaced it with words like 'fine arts' or simply 'arts.'" Herrmann, *Gottfried Semper. In Search of Architecture*, p. 151.

⁶⁹*Theorie des Formell-Schönen*, transcription in Herrmann, *Gottfried Semper. Theoretischer Nachlass*, p. 217. English translation in Herrmann, *Gottfried Semper. In Search of Architecture*, p. 219: "Tectonics is an art that takes nature as a model -not nature's concrete phenomena but the uniformity and the rules by which she exists and creates. Because of these qualities nature seems to us who exist in her to be the quintessence of perfection and reason."

⁷⁰Semper's aversion to deriving principles out of similarity of visual forms conforms to the spirit of the classificatory system developed by Cuvier. As Rykwert recalls, "the great innovation which Cuvier had introduced was to shift the emphasis from description by the identifiable members of an organism, and classification by description, to classification by the function performed: so that

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According to Semper, all forms, natural and artificial, possess similar qualities. There are basically four: symmetry (*Symmetrie*), proportionality (*Proportionalität*), direction (*Richtung*), and fitness of content (*Inhaltsangemessenheit*). Formal beauty is the result of the harmonious interaction of those qualities, which results into the unity of purpose (*Zweckseinheit*) that characterizes the forms of nature: "Aus dem harmonischen Zusammenwirken zwischen diesen verschiedenen Momenten, so dass das Ganze als Zweckseinheit erscheint, geht also das Schöne hervor, die Einheit im Vielseitigen, die Ruhe in der Bewegung."⁷¹

After exposing the premises of his theory of form, Semper goes on to demonstrate it with examples taken from the world of nature and art. He contends then that the forms of crystals are complete in themselves: "Bei ihnen ist Symmetrie und Proportion dasselbe, ihre Richtung ist allseitig radial und daher sind sie richtungslos"⁷²; that in the forms of plants, the direction coincides with the life direction (*Lebensrichtung*) and "die Symmetrie der Pflanzen als Gesamtheit betrachtet, ist planimetrisch, die Symmetrie des Crystalles ist stereometrisch nach allen Richtungen hin gesetzgebend"⁷³; and that in the forms of animals "ist die Lebensaxe mit der Richtungsaxe Eins, und beide sind in der Regel horizontal."⁷⁴ Next in the scale of natural forms comes the human body that is "die edelste freieste und reichste, zugleich diejenige, deren Schönheitsqualitäten sich den Sinnen am klarsten prinzipiell darlegen."⁷⁵

After having covered the whole scale of natural forms, Semper continues without interruption with art forms, which he thinks to be analogue to the human figure: "Ein grosser Theil der Werke menschlichen Kunstfleisses ist hierin prinzipiell der menschlichen Gestaltung analog, in so fern bei ihnen die drei Beziehungssachsen[...]gleichfalls vollkommen getrennt hervortreten."⁷⁶ By moving

resemblance was no longer the principal criterion of classification, but the working of the member within the organism." Joseph Rykwert, 'Gottfried Semper and the Problem of Style', in *On the Methodology of Architectural History*, Architectural Design Profile, 1981, p. 12.

⁷¹Theorie des Formell-Schönen, op. cit., p.226. English translation by Herrmann, *Gottfried Semper. In Search of Architecture*, p. 230: "Formal beauty -unity in variety and rest in movement- arises therefore from the harmonious interaction of these different factors, making the whole appear as unity of purpose."

⁷²Theorie des Formell-Schönen, op. cit., p. 226. English translation by Herrmann, op. cit., p. 230: "Symmetry and proportion are identical here, and direction is altogether radial -in other words, it does not exist."

⁷³Theorie des Formell-Schönen, op. cit., p. 227. English translation by Herrmann, op. cit., p. 231: "Looked as a whole, the symmetry is planimetric in contrast to that of crystals, which is stereometric and determinative in all directions."

⁷⁴Theorie des Formell-Schönen, op. cit., p. 228. English translation by Herrmann, op. cit., p. 232: "The life axis is identical with the axis of direction; both are as a rule horizontal."

⁷⁵Theorie des Formell-Schönen; op. cit., p. 229. English translation by Herrmann, op. cit., p. 232: "Is the noblest, freest, and grandest of all; it reveals its attributes of beauty most clearly."

⁷⁶Theorie des Formell-Schönen, op. cit., p. 229. English translation by Herrmann, op. cit., p. 233: "Are basically akin to the human form insofar that their three relational axes are also completely separate." Among the architectural forms, Semper showed a special consideration for the Greek temple, which he thought to be the closest to the creations of nature. Later he wrote in *Der Stil* that

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without discontinuity from the forms of nature to artistic forms, Semper is assuming then that every form, regardless whether this is a natural or an artistic form, can be equally studied from the point of view of symmetry, proportion, direction and unity of purpose.

To these four qualities of form, should be added the principle of formal beauty which Semper referred to as 'authority' (*Autorität*).⁷⁷ Authority means that in a particular form, each quality - symmetry, proportionality, direction and content - can dominate over the others. For example, when the life direction is the most important quality, as in the case of plants, then the other three qualities are subordinated to the main one. Semper could have derived this idea of 'authority' from the principle of 'subordination of character' introduced by Cuvier, according to which there are organs that play a more determinant role in the configuration of an organism, as compared to other organs that are the subordinated ones.⁷⁸

At some point, Semper attempted to integrate the concept of style within his theory of art form. He thought that the four qualities of formal beauty would constitute the fundamental characteristics of a style, those which are completely independent of outward factors, like material or climate. As we can see, Semper assigns to the formal qualities of beauty a similar role to the one given previously to the four elements. In both cases, Semper is assuming that there are some intrinsic properties of form (the four elements or the formal qualities) which are susceptible of change under the influence of external factors.

"aber in dem griechischen Tempel tritt die Zweckeinheit, analog wie bei dem Menschen, bei vollstem Reichthum und grösster Freiheit in reinster Harmonie hervor!" *Der Stil*, p. xliii. English translation by Mallgrave and Herrmann, op. cit., p. 214: "Yet in the Greek temple, in its most perfect splendor and great freedom, the unity of purpose stands out analogous to the way it does in man - in its purest harmony!" Other comments made by Semper with regard to the Greek temple stress the singularity of its forms. For example, and with regard to the distinction between core-form and art-form proposed by Bötticher, Semper contended that "the Greek style did not differentiate between core-and-art form, a distinction that unmistakably reveals a hierodulic-egyptianized thought." *Der Stil* 1, p. 444; English translation, Herrmann, op. cit. p. 142. What Semper tried to convey was that in the forms of the Greek temple, as in the forms of nature, it is not possible to distinguish form from decoration. There is nothing decorative in the forms created by nature, and so it is in the forms of the temple. In another occasion, he referred to the creation of the Greek temple as if would be a form directly created by nature herself: "Combinations and the cross-breeding of various architectural elements (some striking and new, others arbitrary and unjustified by strictly interpreted architectural laws) must have preceded the creation of the Greek temple." *Die vier Elemente der Baukunst*; English translation, Mallgrave and Herrmann, op. cit., p. 122.

⁷⁷Herrmann explains that "realizing that no equivalent expression exists in the German language for the Latin "auctoritas", Semper chose the literal translation *Autorität*." Herrmann, op. cit., p. 301, note 3.

⁷⁸About the influence of Cuvier's principle of subordination in Semper's theories, Steadman writes that "so far as I know neither Semper nor Viollet-le-Duc make explicit reference to the classificatory principle of the 'subordination of characters' or to Cuvier's use of it." But he rightly contends that "the fact is, though, that the analogy with the applied arts and architecture allows for the interpretation of this idea as much as it had for the correlation of parts." Steadman, however, does not mention Semper's concept of 'authority' as support for his assumption. Steadman, op. cit., pp. 67-68.

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In the prolegomenon of *Der Stil*, which was made up mostly with fragments taken from previous texts, Semper retook some of the ideas presented earlier in *Theorie des Formell-Schönen*. He refers to "diese Analogie zwischen dem allgemeinen Gestaltungsgesetz in der Natur und in der Kunst"⁷⁹ and contends that there is a general law of configuration (*Gestaltungsgesetz*) governing natural and art forms, and that this law is particularized or individualized in every form, according to the *principle of individualization*. In line with the ideas exposed in the *Theorie des Formell-Schöne*, he contends that a form acquires individual identity when each one of the three moments of configuration (*Gestaltungsmomente*) -symmetry, proportionality, direction- have been arranged to conform a complete unity (*Einheitlichkeit*).⁸⁰ For Semper, therefore, form is not a fixed, stable shape but a configuration or *Gestalt* in a permanent process of becoming (*werden*).⁸¹

This view of form as a *Gestalt* in a continuous process of becoming, makes Semper a continuator of Goethe's morphology. At some point, Semper believed that form could be studied scientifically and, accordingly, he applied mathematical formulas to study the forms of Greek slingshot missiles and dynamic principles to the study the forms of aquatic bodies. By proceeding this way, Semper was anticipating the later work of D'Arcy Thompson, who in his book *On Growth and Form*, 1917, explored "the inter-relations of growth and form, and the part which the physical forces play in this complex interaction", using "mathematical methods and mathematical terminology to describe and define the forms of organisms."⁸²

8.4.8 Objective principles and individual artist

Within the context of a science of form or morphology, a connection can be drawn between natural and art forms. In spite of this, Semper did not overlook the fundamental difference between them, namely, that art forms are the result of

⁷⁹*Der Stil*, vol. 1, p. xxiii. English translation by Mallgrave and Herrmann, op. cit., p. 197: "Analogy between the general law of configuration in nature and art."

⁸⁰Along the way, he comes up with his own definition of such Vitruvian terms like eurythmy and symmetry. He contends that "eurythmy consists of stringing together uniform segments of space to form an enclosure", while symmetry "is a fragment of an eurythmic whole." English translation, Mallgrave and Herrmann, op. cit., pp. 202-203.

⁸¹In the introduction to *Der Stil*, he declares that his theory "darf kein Handbuch der Kunstpraxis sein, denn sie zeigt nicht das Hervorbringen einer beliebigen Kunstform, sondern deren Entstehen; ihr ist das Kunstwerk ein Ergebnis aller bei seinem Werden thätigen Momente." *Der Stil*, vol. 1., p. vi. English translation by Mallgrave and Herrmann, op. cit., p. 183: "Will be no handbook for the practice of art, for it will not show the making of artistic form, but is becoming; it will take the work of art as a result of all the factors involved in its becoming."

⁸²D'Arcy Thompson, *On Growth and Form*, 1968, p. 1026. Thompson thought of his work as being a part of the 'science of form' that Goethe had called morphology: "Science of Form which deals with the forms assumed by matter under all aspects and conditions, and, in a still wider sense, with forms which are theoretically imaginable." *Ibid*.

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man's creative power, and natural forms are not: "Man bezeichnet sehr richtig die alten Monumente als die fossilen Gehäuse ausgestorbener Gesellschaftsorganismen, aber diese sind letzteren, wie sie lebten, nicht wie Schneckenhäuser auf den Rücken gewachsen, noch sind sie nach einem blinden Naturprozesse wie Korallenriffe aufgeschossen, sondern freie Gebilde des Menschen, der dazu Verstand, Naturbeobachtung, Genie, Willen, Wissen und Macht in Bewegung setzte."⁸³

Semper thought that works of architecture should express the 'idea' as clearly as this is expressed in the creations of nature. The idea, it should be noticed, is not a concept that lies in the mind of the artist, as the Renaissance theorists began to consider, but a principle inherent to the creations of nature. In *Vergleichende Baulehre*, he refers to the *Grundidee* as a property of nature's creations that the works of architecture should also possess: "Die Grundidee in der Mannichfaltigkeit der Gebilde durchblicken zu lassen, ein individualisiertes aber zugleich ein in sich selbst und mit der Aussenwelt in Einklang stehendes Ganzes darzustellen, darin besteht das grosse Geheimnis der Baukunst."⁸⁴ In this regard, Semper's *Grundidee* does not differ much from Quatremère's *type*, which was also thought to be an objective principle embedded in the creations of nature and art.

In much the same way as Quatremère, Semper also thought that the architect should study nature and the principles that govern her creations to apply them in his own works. For Semper, the 'idea' was a sort of principle inherent in nature, that the artist, like the scientist, could grasp through the systematic study of nature.⁸⁵ The task that Semper assigns to the architect then, is to reveal clearly the

⁸³Über *Baustyle*, 1869, MS 282, Semper Archiv, ETH Zürich. English translation by Mallgrave and Herrmann, op. cit., p. 268: "We can quite rightly describe the old monuments as the fossilized receptacles of extinct social organizations, but these did not grow on the backs of society like shells on the backs of snails, nor did they spring forth from blind natural processes, like coral reefs. They are the free creations of man, on which he employed his understanding, observation of nature, genius, will, knowledge, and power." Philip Steadman, after considering the hypothesis that Semper might have wanted to advocate a method of design based on what he calls the biological fallacy (that is, the belief that forms in architecture are the direct result of the environmental factors that act upon them) concludes that "it is thus very debatable whether Semper himself can be finally accused of perpetrating any biological fallacy in this respect. What can be argued is that the evolutionary analogy is certainly conducive to the kind of materialist bias which is undeniably to be found in Semper's system, whatever Semper's own reservations and qualifications might have been." See Steadman, op. cit., pp. 192-193. In this connection, it is understandable then, that after having read Darwin's *The Origin of Species*, Semper "stressed certain parallels to his own theories, without however wishing to transfer Darwin's method altogether to the arts." L. D. Ettlinger, 'On Science, Industry and Art: Some Theories of Gottfried Semper', p. 58; quoted in Steadman, op. cit., p. 73. At that point, Semper might have realized of the limits of the theory of formal beauty he was proposing.

⁸⁴*Vergleichende Baulehre*. Transcription in Herrmann, *Gottfried Semper. Theoretischer Nachlass*, p. 184.

⁸⁵"For as everything, every phenomenon has its origin, so its inquiry and investigation is and remains in all fields of knowledge the absolute source of truth, the alpha and omega of all learning. This urge

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'idea' in the forms he creates: "*Aber es darf Aufgabe des denkenden Architecten seyn, die der Baukunst innewohnenden Grundideen in ihrem Entstehen aufzusuchen, auf ihrem Entwicklungsgange zu verfolgen, und das Gesetz, welches in der künstlerischen Verhüllung derselben verborgen liegt, auf seinen einfachsten Ausdruck zurückzuführen.*"⁸⁶

Even though Semper vindicates the role played by the individual artist in the creation of art forms, he nevertheless rejected the opposite theory, according to which an artist alone can produce a new style; a possibility which more than one theorist in the nineteenth century had speculated. Semper considered that the birth and development of a style is something that involves a whole society, and that what the artist does is to give artistic expression to certain preconditions that the society as a whole has established.⁸⁷ It can be contended, that in his theory of art form, Semper attempted to reconcile what in principle are two antagonistic components of a doctrine of artistic style: on the one hand, objective rules and principles; on the other, the individual creativity of the artist.

8.5 The rationalistic approach to form: Viollet-le-Duc

The work of Eugène Viollet-le-Duc is the most clear expression of the rationalistic approach that characterized nineteenth century architectural theory. Architecture is for Viollet-le-Duc essentially a rational affair. In his analysis of the buildings of the historical styles of the past, Viollet-le-Duc was always willing to find a 'reason' that explains the forms of buildings.

8.5.1 The origins of architecture

Like other prominent writers of the nineteenth century, Viollet-le-Duc was also critical of Vitruvius' account of the origins of architecture. Viollet-le-Duc thought that Vitruvius could not have contended that the Doric temple had derived from the primitive wood constructions because, in his view, there was no resemblance whatsoever between those two kinds of building. He argued, that unlike the Greek temple, the primitive houses that Vitruvius describes are composed of "*une série*

to trace the cause of things is innate to man and guides him also in his *creative activity*." See Mallgrave and Herrmann, op. cit., p. 265.

⁸⁶op. cit., p. 183. English translation by Herrmann, *Gottfried Semper. In Search of Architecture*, p. 194: "But the task of an intelligent architect should be to seek and pursue the rise and development of basic ideas and to reduce to its simplest expression the law that lies hidden within the artistic covering."

⁸⁷"A decisive and lasting change in architecture will hardly ever be brought about by new materials and their use in methods of construction, and even less through the simple power of a genius who has dreamed up his so-called new style." *Der Stil*, 1859, MS 205, p. 7; English translation by Herrmann, *Gottfried Semper. In Search of Architecture*, p. 161.

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de troncs d'arbres, dont les pieds sont plantés sur un cercle et dont les sommets sont réunis en cône"⁸⁸(Figure 8.1).

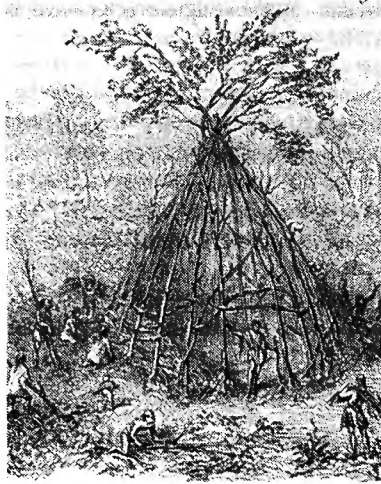


Figure 8.1. Viollet-le-Duc. The first house. From *Histoire de l'habitation humaine*.

In *Histoire de l'habitation humaine*, Viollet-le-Duc provided his view about the origins of the first house in the form of a legend.⁸⁹ The necessity to get protection against rain, wind and beasts, prompted a man, Épergos, to build the first house. He came up with the idea to tie up the upper part of two nearby trees. Then, he asked other people to bring more trees and to tie them together in a similar way. The trees were tied up with branches and the whole structure was covered with mud. Finally, the door was placed in the side protected from the action of wind and rain.

The account of the first house offered by Viollet-le-Duc cannot but remind us of the primitive dwellings described by Vitruvius. As a matter of fact, the conical form of the house described by Viollet-le-Duc corresponds to one of the two models described by the Roman author, the one built by the Phrygians. But apart from this coincidence, there are some significant differences between the descriptions of the primitive house provided by Vitruvius and Viollet-le-Duc; differences that reveal the different conception of architecture that both authors had. For Vitruvius, the primitive house was more a creation of nature than of man. Viollet-le-Duc, on the other hand, emphasizes the rationality of the men who built the first house. Furthermore, Viollet-le-Duc assumes that the

⁸⁸E. Viollet-le-Duc, *Entretiens sur l'Architecture*, 1863, vol. 1, p. 34.

⁸⁹E. Viollet-le-Duc, *Histoire de l'habitation humaine*, [1978], pp. 4-6.

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construction system itself has its own logic, and that this logic determines the architectural forms. Hence, the conical form was the result of a technique consisting in fastening the trees in their upper part. The form of the hut, therefore, was not an idea first conceived by a man, but the consequence of the logical construction technique. Furthermore, the idea of the first house is associated with the structural form, which for Viollet-le-Duc constitutes the essence of architectural form.

8.5.2 The wooden construction and the Doric temple

In *Histoire de l'habitation*, Viollet-le-Duc refuted every argument which had been previously raised to prove that, as Vitruvius suggested, the Greek Doric temple was an imitation of a primitive wooden hut. With regard to the capital, Viollet-le-Duc contends that *"il est bien évident que le chapiteau dorique, avec son échine courbe et son abaque carré, n'a nul rapport avec la forme qu'on peut tirer d'un morceau de bois."*⁹⁰ The arguments he provides to support this contention are that the wooden capital was not symmetrical with regard to two axes, as the stone capital is, but had one direction more predominant than the other. In a wood structure, Viollet-le-Duc contends, the cantilever of the capital in the direction of the beam is larger than in the perpendicular direction, so that the beam can have a larger area of support. In a stone construction, the capital cannot be extended as much from the column shaft because the stone has less resistance to tension forces than the wood. Therefore, the wooden capital could not have been the model for the squared stone capital. Similarly, Viollet-le-Duc refutes the hypothesis according to which the architraves would have been made first out of wood before they were made of stone. If this would have been the case -Viollet argued- then the intercolumniation would have been larger. But the fact is that the distance between columns in a Doric temple is relatively short because otherwise, he thinks, the stone architraves would break. And he raised similar objections against the belief that the frieze would have had its origins in a wood construction. To refute this thesis, Viollet-le-Duc argued that, if this would have been the case, then the triglyphs and metopes would be only on two sides of the temple, frontal or lateral, but not in all four sides. Only with regard to the cornice, is Viollet-le-Duc willing to admit the influence of a previous wooden model.

In each one of the previous refutations to the theory imitation of a primitive wooden model, Viollet-le-Duc was assuming that the wooden hut was endowed with an inner logic that stemmed from the adequacy of the material and technique to the form. At this point, we should recall Quatremère's contention -to which we have referred in a previous chapter- according to which 'the school of carpentry in itself could make a reasoned art out of Architecture.' Both Viollet and Quatremère

⁹⁰Viollet-le-Duc, *ibid.*, p. 198.

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attributed to the timber construction an inner, rational logic that determines architectural form, more precisely, the structural form.

For Viollet-le-Duc, the rational causes that give rise to form are not confined to material and technique, but include also function. In his view, the forms of the Greek temple were nothing more than the response to functional and structural demands. Thus, he asks: "*D'abord, quel est le programme?. Il s'agit de bâtir une cella, une salle fermée, de l'entourer de portiques autant pour la protéger que pour se mettre à couvert. Rien n'est plus simple. Quatre murailles percées de portes; à l'entour, des points d'appui portant des plates-bandes, protégées elles-mêmes par une corniche saillante; sur le tout, des pentes pour faire écouler les eaux pluviales des deux côtés dépourvus d'entrées. La raison seule trace ce programme.*"⁹¹ Thus, the logic of the constructive system and the dependency of form with regard to function make it unnecessary to appeal to a first model as the origin of architectural form, as Vitruvius had done. In Viollet-le-Duc's conceptual framework, what is relevant are the causes that give rise to form, more than form itself.

But the necessity of finding always a reason or cause to explain the forms of buildings, sometimes obliges Viollet-le-Duc to come up with the most imaginative arguments. A point in case is the account he gives of the cylindrical form of the columns in the Greek temple. He contends that "*ce sont les nécessités de l'exploitation qui lui font tout d'abord adopter pour les blocs les plus volumineux la forme cylindrique comme étant celle qui se prête le mieux au transport.*"⁹² Obviously, in view of this sort of 'rational' explanations of the causes that are behind architectural form, we can only become aware of the intrinsic limitations of a purely deterministic view of architectural form, such as the one adopted by Viollet-le-Duc.

8.5.3 Structure and art form

The separation of architectural form into structure and ornament was, implicitly rather than explicitly, present in Vitruvius' comparison between the wooden construction and the Greek temple. For Vitruvius, the forms of the orders came after some basic forms (the structural skeleton of the wooden hut) had been established.

This distinction between structural form and ornament is more explicit in Viollet-le-Duc's theory. In the *Dictionnaire Raisonné*, he defined architecture as being "*la structure revêtue d'une forme d'art.*"⁹³ The structure of a building

⁹¹E. Viollet-le-Duc, *Entretiens*, vol. 1, p. 43.

⁹²*Ibid.*, p. 45.

⁹³E. Viollet-le-Duc, *Dictionnaire Raisonné*, vol. 8, p. 490.

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exemplifies for Viollet-le-Duc the logical component of architectural form; it is the result of the application of scientific, objective principles. But Viollet-le-Duc is also aware that logic and construction alone cannot completely explain architectural forms. Besides something else is necessary. This is when art comes into play. At this point, the concern with light takes over the previous concern with materials and technique, and the rationality of the builder gives place to the intuition of the artist.

According to Viollet-le-Duc, once the logic of the construction and the material has given rise to the overall composition of masses of the Greek temple, the artistic sensitivity of the artist comes into play to refine the forms, that is to say, to give them artistic expression: "*L'artiste observe bientôt que les piles cylindriques de son temple paraissent plus grosses à leur sommet qu'à la base par suite d'une illusion d'optique; sa raison s'en choque aussi bien que son oeil; de ces cylindres il en fait des cônes tronqués.*"⁹⁴ Viollet-le-Duc, nevertheless, does not give up completely the possibility that pure constructive requirements could have produced a similar formal result: "*Le besoin de stabilité lui avait déjà, peut-être, imposé cette diminution des fûts.*"⁹⁵ A similar reasoning is offered to explain the flutes of columns. He thinks that after observing the column "*l'artiste cependant n'est pas encore satisfait, les colonnes paraissent plates en face de la lumière, molles et indéçises dans l'ombre; il recoupe longitudinalement dans la hauteur de leur fût des pans droits, puis bientôt il creuse ces pans et forme ainsi des cannelures assez profondes pour accrocher la lumière oblique sur les arêtes.*"⁹⁶ But, again, Viollet-le-Duc cannot avoid to let his restless functionalist spirit come through, and says that the flutes in a column need to be not too deep, otherwise they could "*offrir un obstacle et blesser les gens qui passent le long des colonnes.*"⁹⁷

As we have seen in the previous exposition of the theories of Heinrich Hübsch, the German architect had proposed to distinguish between two kinds of form in architecture: one purely objective, determined by the logic of construction, which he called *Grundgestalt*; the other, subjective, confined to the external decoration and exclusively dependent on the artist's will. Viollet-le-Duc is less willing to accept that art forms, as opposed to the structural forms, are purely subjective. Even though he accepts that the sensitivity of the artist plays a role in the creation of architectural form, he still thinks that this sensitivity has a certain logic, the logic of perception: "*L'architecte grec possède les qualités ou les faiblesses du raisonneur; il tient à démontrer aux yeux de tous que les divers membres de son monument ont une fonction utile, nécessaire; il ne veut pas qu'on puisse l'accuser d'avoir sacrifié au caprice; il ne lui suffit pas que son monument soit solide, il*

⁹⁴Viollet-le-Duc, *Entretiens*, vol. 1, p. 48.

⁹⁵*Ibid.*, pp. 48-49.

⁹⁶*Ibid.*, p. 49.

⁹⁷*Ibid.*

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prétend le faire paraître tel."⁹⁸ Hence, for Viollet-le-Duc there are two kinds of logic. First, the logic that is derived from the material, technique and functional demands. This is the sort of logic that the architect can learn from the observation of natural laws. Second, there is the logic of perception, which is the logic of reason as directed by the senses.

An example of this logic of the perception is the explanation of the channelling of the triglyphs that Viollet-le-Duc proposes. He contends that the eye sees that the triglyph is submitted to vertical forces in much the same way as the column is. Therefore, if the column is fluted, the eye expects a similar treatment for the triglyph, since both forms, the flutes in the column and the channelling in the triglyphs, have a similar purpose: they carry the vertical loads of the elements located above them. In Viollet-le-Duc's view, this congruency between the logic of the structure and the logic of perception is what makes of the Greek Doric temple a unique architectural achievement.⁹⁹

In the architecture that Viollet-le-Duc postulated, the logic of the art form should not be in contradiction with the logic of the structural form (in its physical sense). Viollet-le-Duc criticized precisely Roman architecture on this point, for having used the forms of the Greeks simply as 'decoration'. The fundamental difference between Greek and Roman architecture is, according to Viollet-le-Duc, that "*chez les Grecs, la construction et l'art ne sont qu'une seule et même chose, la forme et la structure sont intimement liées*", while in the case of the Romans "*il y a la construction, il y a la forme dont se revêt cette construction, qui souvent est indépendante de celle-ci.*"¹⁰⁰ It should be noticed, that Viollet-le-Duc uses the term *forme* to refer to the visible, external form, while he uses *structure* to refer to an inner form or principle that derives from the logic of the construction.

The admiration that Viollet-le-Duc had for Greek architecture (e.g. the Greek temple) was only surpassed by his enthusiasm for the Gothic (e.g. the Gothic cathedral). He saw these two styles (or rather, these two buildings, the Greek temple and the Gothic cathedral) as the expression of the same notion of architectural form: one in which structure and decoration are so intimately united that it is impossible to separate them. Hence, he says about the Gothic forms the same as he says about the forms of the Greeks: "*il est impossible de séparer la*

⁹⁸Ibid., pp. 49-50.

⁹⁹By considering the temple as a ensemble of masses under the effect of light, and appealing to the logic of the eye, Viollet-le-Duc was paving the way for Le Corbusier's later interpretation of the Parthenon. More eloquently than Viollet-le-Duc, Le Corbusier would refer later to the visual effect of the forms of the temple, and their conformity with the laws of optic: "*Les Grecs ont créé un système plastique actionnant directement et puissamment nos sens: colonnes, cannelures des colonnes, entablement complexe et lourd d'intentions, gradins qui contrastent et qui lient à l'horizon. Ils ont appliqué les plus savantes déformations, apportant à la modénature une adaptation impeccable aux lois de l'optique.*" Le Corbusier, *Vers une architecture*, 1923, p. 170.

¹⁰⁰Viollet-le-Duc, *Entretiens*, vol. 1, p. 102.

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forme de l'architecture du XIII^e siècle de sa structure."¹⁰¹ From the point of view adopted by Viollet-le-Duc, Greek and Gothic were not opposites, as they were for other theorists. The two 'styles' were for him expressions of one and the same principle. To this principle, Viollet-le-Duc gave the name *style*.

8.5.4 Style and styles

Viollet began the entry '*Style*' in his *Dictionnaire Raisonné*, proposing a distinction between *style* and *styles*. In the history of architecture, he argues, it is common to use the word *style* to refer to the Greek, Roman or Gothic styles. But he thinks that, in those cases, it would be more appropriate to speak of *formes* rather than *styles*: "*Il eût été plus vrai de dire: la forme grecque, la forme romane, la forme gothique, et de ne pas appliquer à des caractères particuliers de l'art le mot style.*" In his view, there cannot be many styles, but only *one* style; one that is common to every true architecture of the past. His definition of style is then the following: "*C'est, dans une oeuvre d'art, la manifestation d'un idéal établi sur un principe.*" Therefore, even though the *formes* of different periods were different, their underlying principle could only be one: *style*.

This principle that constitutes the fundament of Viollet-le-Duc's notion of style, is none other than the principle that rules nature's creations. All the forms created by nature have *style* because they follow one universal principle: "*Si donc nous pénétrons quelque peu dans la connaissance des grands principes de l'ordre universel, nous reconnaissons bien vite que toute création se développe suivant une marche logique, et que, pour être, elle se soumet à des lois antérieures à l'idée créatrice.*" At this point, the notion of *style* held by Viollet-le-Duc reminds us of the concept of *type* formulated earlier by Quatremère. Despite the different terms used by the two authors, both invoked a generic principle inherent in nature that the architect must imitate: *style*, in the case of Viollet, *type* in the case of Quatremère.

In accordance with his rationalistic creed, for Viollet-le-Duc nature meant logical and rational procedures. For him nature and reason were not opposites. Rather they were the same thing: the reason of nature was the reason of man and vice versa. Architecture, then, should proceed with the same logic as nature: "*L'art de l'architecture est une création humaine; mais telle est notre infériorité, que, pour obtenir cette création, nous sommes obligés de procéder comme la nature dans ses oeuvres, en employant les mêmes éléments, la même méthode logique; en observant la même soumission à certaines lois, les mêmes transitions.*"¹⁰² In sum, "*l'architecture, cette création humaine, n'est donc, de fait, qu'une application de principes qui sont nés en dehors de nous et que nous nous approprions par*

¹⁰¹Ibid., p. 284.

¹⁰²E. Viollet-le-Duc, *Dictionnaire Raisonné*, vol. 8, p. 476.

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l'observation."¹⁰³ When the architect proceeds according to natural (i.e. rational) principles his works will have *style*, as the works of nature: "*Il s'agit d'autre chose que de faire saisir les grands principes, les principes les plus simples à l'aide desquels le style pénètre les oeuvres d'architecture.*"¹⁰⁴

This principle, that constitutes the basis of a genuine creation of architecture, is not only discovered in nature; it can also be deduced from those architectural works of the past that possess *style*. However, the architect should not confine himself to copy the appearances of past styles, that is to say, their *formes*, for the same reason that he should not just copy the appearances of nature. What the architect has to do -according to Viollet- is to understand the intrinsic principles that govern the formation of the historical styles, and then apply those principles to his own work. Thus, with regard to the study of Greek architecture, Viollet-le-Duc contends that this is "*indispensable pour un architecte*", but "*indispensable à la condition que cette étude ne s'arrêtera pas à ces formes, mais qu'elle ira chercher le principe, qui est le principe de tous les arts.*"¹⁰⁵ There is, therefore, an analytical work that precedes the creative work of the architect. Viollet-le-Duc himself put into practice this inductive-deductive approach when he tried to apply the principles he had derived from the study of the Gothic to the creation of new and original designs. The quality of Viollet-le-Duc's designs, however, has not been unanimously acknowledged. John Summerson, for example, has written about those designs that "it is all marvellously clever, but I think you will agree that the result is not very moving. It does lack style. It is rather like a language invented ad hoc; a sort of esperanto evolved from the salient characteristics of other languages but lacking the vital unity which any one language possesses."¹⁰⁶ Indeed, by stretching 'rationality' too far, Viollet-le-Duc might have neglected the most enigmatic aspects of the form-making process of architecture.

8.5.5 *Style and unité*

What Viollet-le-Duc understands by *style* overlaps with another concept which he presumably took up from Quatremère: the concept of *unité*. In the entry '*Unité*' of the *Dictionnaire Raisonné*, Viollet-le-Duc makes a contention that recalls one made in the article on style. Now he says that there is only one *unité* in the different styles of the past; there is not a Greek *unité* and a Roman *unité*, but only one single principle with different formal expressions.

For Viollet-le-Duc, both terms, *style* and *unité*, mean basically one thing: form. Not form in the external sense -for that purpose, he uses the word *forme*- but form

¹⁰³Ibid.

¹⁰⁴Ibid., p. 477.

¹⁰⁵Viollet-le-Duc, *Entretiens*, vol. 1., p. 55.

¹⁰⁶J. Summerson, *Heavenly Mansions, and other Essays on Architecture*, 1963, pp. 157-158.

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as inner form or principle. This meaning of *unité* as form, becomes particularly evident when Viollet-le-Duc summarizes his notion of *unité* as being "*la création, c'est l'unité; le chaos, c'est l'absence de l'unité.*"¹⁰⁷ He sees the evolution of architectural styles in much the same way as a naturalist could see the evolution of natural forms.¹⁰⁸ According to Steadman, *unité* would not refer only to the internal coherence of forms but encompass also the environmental conditions that influence the development of form. Furthermore, Steadman thinks that the ideas of Viollet-le-Duc represent the architectural counterpart of similar notions developed earlier by Cuvier, in particular the connection he established between 'the conditions of existence' and 'the correlation of parts' in an organism, that is to say, between the environmental conditions and the internal structure. In Viollet-le-Duc's application of this biological analogy to architecture, the environmental conditions would refer to the functional and constructive requirements that the form has to fulfill, while the internal structure would correspond with the physical structure that supports the building.¹⁰⁹

According to Viollet-le-Duc, the principle that gives unity to building forms is contained in the structure: "*C'est donc sur la structure, d'abord, qu'en architecture la loi d'unité s'établit.*"¹¹⁰ Thus, structural form has for Viollet-le-Duc a double meaning, both of them are simultaneously true: as the physical support of the building, and as the inner principle that gives unity to a form, architectural and non-architectural.¹¹¹ It is precisely the sense of unity, present in the forms of nature as well as in the buildings of the historical styles, which Viollet-le-Duc misses in

¹⁰⁷E. Viollet-le-duc, *Dictionnaire Raisonné*, vol. 9, p. 341.

¹⁰⁸In *Histoire de l'habitation*, Viollet-le-Duc establishes a comparison between the history of architecture and the geological evolution. He thinks that in both cases, there is a continuous process of evolution, which makes difficult to isolate a particular moment without considering also what happened before and after: "*Il faut tout fouiller, tout scruter, tout analyser, tout classer; on a vu bientôt qu'on ne peut pas étudier une antiquité coupée dans l'inventaire humain, que toutes les époque s'enchaînent et se transforment par une série de transitions et d'influences; de même qu'en géologie on ne peut étudier un terrain, sans savoir ce qu'il y a au-dessous et au-dessus.*" Viollet-le-Duc, *Histoire de l'habitation*, p. 369.

¹⁰⁹Peter Collins, whose chapter dedicated to 'The Biological Analogy' in *Changing Ideals* constitutes a departure point for Steadman's work, credits Louis Sullivan, instead of Viollet-le-Duc, as the first to apply the biological analogy to architecture. According to Collins, "the French Rationalists were in fact more interested in the idea that form follows structure (which they found quite intelligible without the use of elaborate analogies), so that there can be little doubt that it was Sullivan who first made biological analogies the foundation of a total architectural creed." Collins, op. cit., p. 155. It seems to us, that Collins' interpretation is strongly biased by his belief that Rationalism and structural form (in its physical sense) are one and the same thing. However, even though Viollet-le-Duc was willing to identify the inner principle that gives unity to forms with the physical structure, a reading of the entries 'Style' and 'Unité' in his *Dictionnaire* reveals the influence of biological paradigms in his thought, as Steadman suggests.

¹¹⁰E. Viollet-le-Duc, *Dictionnaire Raisonné*, vol. 9, p. 340.

¹¹¹Steadman, has proposed a parallel between the principle of *unité* of Viollet-le-Duc and the theories of the biologist George Cuvier. According to Steadman, the notion of *unité* of Viollet-le-Duc could be applied both to "animal anatomy and architectural structure." Steadman, op. cit., p. 61.

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the architecture of his own time.¹¹² He sees the contemporary buildings as an amalgam of separate pieces borrowed from past styles, failing to express the unity of purpose within *one* single form.

8.6 Le Corbusier: Form without Style

As has often been contended, some of the ideas of Viollet-le-Duc found a continuation in the writings of the architects of the Modern Movement, particularly of Le Corbusier. In *Vers une architecture*, Le Corbusier assigned to the machines the same value that Viollet-le-Duc had given to the natural forms. In effect, he saw in the contemporary artifacts, like planes, cars and ocean liners, the same unity of form and function that Viollet-le-Duc had seen in the forms of nature. But Le Corbusier was not so much attracted by the machines *per se*, as by the procedures by which engineers were able to create novel forms that responded to functional demands. He believed that the application of similar procedures in architecture would free architects from the tyranny of traditional styles.

8.6.1 Engineering forms versus architectural forms

In a commentary on Le Corbusier's *Vers une architecture*, Reyner Banham wrote that in the book "two main themes can be distinguished at once, and can be roughly labelled Academic and Mechanistic."¹¹³ In Banham's view, Le Corbusier was not so much interested in defending a strict Mechanistic, or functionalist, view of architecture as he was in reconciling two different views: a classical one, respectful of the architectural tradition, and a modern one, that gave the highest value to the novel forms of the machines produced by engineers.

But, if there is a main subject-matter in Le Corbusier's text, this has to do with Form, more precisely, with the conception of architectural form. Le Corbusier admired the way in which engineers created forms that did not depend from inherited styles. It is for that reason that he thinks that "*la leçon de l'avion n'est pas tant dans les formes créées*", rather "*la leçon de l'avion est dans la logique qui a présidé à l'énoncé du problème et à la réussite de sa réalisation.*"¹¹⁴ He believed that the engineer began the creative process by formulating precisely the problem to solve, and then giving form to the functional requirements. In spite of this

¹¹²The eclecticism that characterized his epoch represented for Viollet-le-Duc the opposite to the *unité* that characterized the buildings of the historical styles, like the Greek temple for example: "*Vous voyez que cette structure est très-simple, que chaque partie remplit une fonction et que, si rien ne manque, il n'est aucun membre que l'on puisse retrancher comme inutile. Il paraît donc que tout, ici, a été combiné en raison de la matière mise en oeuvre: la pierre.*" Viollet-le-Duc, *Histoire de l'habitation*, p. 201.

¹¹³R. Banham, *Theory and Design in the First Machine Age*, 1960, p. 223.

¹¹⁴Le Corbusier, *op. cit.*, p. 83.

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belief, Le Corbusier was far from advocating a deterministic view of architectural form, in the sense that this is the mere consequence of function. Aesthetics played also a role in the creation of forms, even in the forms designed by engineers: "*Les ingénieurs font de l'architecture, car ils emploient le calcul issu des lois de la nature, et leurs oeuvres nous font sentir l'HARMONIE. Il y a donc une esthétique de l'ingénieur, puisqu'il faut, en calculant, qualifier certain termes de l'équation, et c'est le goût qui intervient. Or, lorsqu'on manie le calcul, on est dans un état d'esprit pur et, dans cet état d'esprit, le goût prend des chemins sûrs.*"¹¹⁵

Le Corbusier thought that architects, unlike engineers, had not been able yet to formulate precisely the nature of the problems they were supposed to give a formal solution. Hence the following contention: "*Le problème de la maison n'est pas posé.*" At this point, Le Corbusier's reasoning must have been the following: had the problem 'housing' been properly stated, architects would have produced houses whose forms would be original and, at the same time, responsive to the requirements of modern living. It follows then, that if architecture is to create original forms, no longer dependent on past styles, the architect has to proceed like the engineer: he has to identify the nature of the problem to solve and then find the most suitable form. But, Le Corbusier thought that instead of doing this, architects had become prisoners of forms that were created in other times for other purposes. Ultimately, the glorification of the work of engineers becomes an attack on the notion of style. Engineers do not need styles because the forms of artifacts that they produce are not borrowed by tradition but come directly from the direct confrontation with the problem at hand. Therefore, in order to achieve a new architecture, an architecture that creates novel forms, like the forms of airplanes and cars, it is necessary to get rid of styles: "*L'architecture n'a rien à voir avec les 'styles'.*"

In spite of the tribute that Le Corbusier pays to the work of engineers, it would wrong to think that he was advocating a strict functionalism in architecture. Le Corbusier's discourse does not deny the fact that the goal of architecture is the creation of aesthetically meaningful form. Thus, after praising the work of engineers, he writes: "*Il nous sera enfin agréable de parler ARCHITECTURE après tant de silos, d'usines, de machines et de gratte-ciels. L'ARCHITECTURE est un fait d'art, un phénomène d'émotion, en dehors des questions de construction, au delà.*"¹¹⁶ By the same token, Le Corbusier's buildings cannot be interpreted only in terms of functionalism. The forms of the Villa Savoye, for example, are not only functional but they are also perceptually meaningful and have a symbolic meaning. In fact, Le Corbusier's great achievement was to be able to integrate the different natures of architectural form in a new original manner.

¹¹⁵Ibid., p. 7.

¹¹⁶Ibid., p. 9.

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8.6.2 Engineering forms versus natural forms

Classical theorists, from Vitruvius to Alberti, had praised the harmonic relation between the parts and the whole that existed in the creations of nature. Later theorists, like Quatremère de Quincy and Viollet-le-Duc, considered that there was nothing superfluous nor decorative in the forms created by nature.

The architects of the Modern Movement saw in the forms of machines similar qualities to the ones that previous theorists had attributed to natural forms.¹¹⁷ In an essay published in *Der Andere* in 1909, Loos had compared the engineer to the architect in a similar way as Le Corbusier did later. Loos equated the peasant who builds his house in the countryside with the engineer who builds a railway along the lakeside, and compared both to the architect who builds a house. According to Loos, the peasant and the engineer know, each one in his own way, the rules that govern nature. For that reason, their constructions will fit 'naturally' into the landscape. But, Loos contends, the architect who builds a house, regardless he is a good or bad architect, will always impact the lakeside. This occurs because the architect, unlike the peasant and the engineer, has no 'culture', meaning by culture "that harmony (*Ausgeglichenheit*) between the inner and the outer man which alone guarantees sensible thinking and acting."¹¹⁸

In the view of modern architects like Loos or Le Corbusier, the goal so often expressed in the writings of architectural theorists, of understanding the principles of nature in order to apply them in the creation of new forms, has been achieved by the engineer. As Le Corbusier put it, "*l'ingénieur, inspiré par la loi d'économie et conduit par le calcul, nous met en accord avec les lois de l'univers.*"¹¹⁹

8.6.3 The evolution of forms: type as standard

In the section dedicated to '*Les Autos*' in *Vers une architecture*, Le Corbusier introduces a theory of the form-making process which is purely Darwinistic. He thinks that planes had to go through a process of trial and error until they attained their standard forms. The early planes, whose forms were not the most appropriate for flying did not 'survive', according to the law of natural selection. Then, the standard form of a plane was the result of a process of evolution whose aim was to achieve the fitness between the form and the functional requirements. Once the appropriate form of the plane was found, this became the *standard*. This standard, we must notice, is a concrete exemplar, rather than an abstract principle (e.g. type).

¹¹⁷As Banham has written, prior to Le Corbusier, Marinetti and Loos had already elevated "the engineer to the status of a noble savage." Banham, op. cit., p. 228.

¹¹⁸A. Loos, *Gesammelte Schriften*, pp. 302-303, vol.1, 1962. Quoted and translated in Rykwert, *On Adam's house*, p. 27.

¹¹⁹Le Corbusier, op. cit., p. 3.

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Once he has made his case about the evolution of the forms of planes, Le Corbusier extrapolates this 'theory of form evolution' to architecture. In particular he thinks that "*le Parthénon est un produit de sélection appliquée à un standart établi. Depuis un siècle déjà, le temple grec était organisé dans tous ses éléments.*" But, we should observe that a comparison between the evolution of two sorts of forms, the forms of planes and the Greek temple, can hardly be sustained, because while the form of the plane has to fulfill one basic function -to fly- there is no comparable function for a temple. Nevertheless, Le Corbusier insists on seeing the Parthenon as the result of an evolutionary process, as a gradual transformation from construction to architecture: "*Petit à petit, le temple se formule, passe de la construction à l'architecture. Cent ans plus tard le Parthénon fixera le point culminant de l'ascension.*" For Le Corbusier, the *standard* is not the starting point of the process of form development (e.g. the type or primitive form) but it represents the culmination of a process of evolution.

8.7 Conclusions

In the nineteenth century, a shift of 'form paradigm' takes place with regard to the previous century: System replaces Type. Laugier and Quatremère had thought of a primitive form or type as the origin of all architectural forms. This 'form paradigm' -type as a primitive form- was perhaps a valid explanation of the evolution from the primitive hut to the Greek temple, but it failed to deal with the diversity of styles. The adoption of System (i.e. the ensemble form-context) as a new 'form paradigm' or 'conceptual model', allowed architectural theorists to overcome this limitation. Type, the primitive form, was still seen as a principle but this time in a continuous interaction with outwards factors. This view of form, eminently 'biological', was transposed by Semper to architectural theory. In his doctrine of artistic form, Type was meant to be a primitive form under the influence of outward factors, like material, and social and cultural conditions. Similarly, Viollet-le-Duc's concept of *unité* can be understood as an ensemble 'form-context' in which the element 'form' would correspond to what he called *style*.

The theories of Semper and Viollet-le-Duc can be seen as an attempt to provide an abstract model of the process by which architectural form comes to being. In the case of Semper, this abstract model or 'system' is based on the combinations of the four elements. For Viollet-le-Duc, the system is based on the relation form-function, according to which a form would be the direct response to functional demands. However, for both theorists the idea of a system that reproduces the process of form creation in architecture is a purely speculative one. They did not want to systematize and depersonalize that process, as Durand might have sought. Viollet-le-Duc and Semper were operating at the level of speculative theories, and

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both were aware that an explanation of the process of artistic creation cannot be proposed at the expense of excluding the participation of the individual artist.

The emergence of System as a predominant 'form paradigm' in architectural theory, did not do away completely with previous notions of Type. For Viollet-le-Duc, as for Hübsch, the structural form epitomized the objective form or principle from which architectural styles derive. This principle was for Hübsch the *Grundgestalt*, and for Viollet-le-Duc the *structure*. Both authors assumed that construction techniques and material have their own inner logic, a logic that stems from having to comply with the natural laws. They also thought that the individual creativity of the artist had no share in the creation of this objective, structural form. The architect would only intervene to transform the objective form into an art form. Hübsch thought that the architect could be free to decorate the structural form with details. Unlike Hübsch, Viollet-le-Duc thought that even in the creation of art form, the artist was not absolutely free but was following the 'reason of the senses', and he assigned to the artist the task to express the logic of the structural form in the art form.

With regard to the notion of Type, there is a basic difference between the theories of Laugier and Quatremère and the theory of Semper. For Laugier, the *cabane* meant a structural form -in the conceptual sense. The *cabane* was the basic form or outline that a viewer abstracts from a Greek temple. Quatremère's notion of *type* began to break the link between inner principle and external appearance that pervaded in Laugier's *cabane*. *Type* and *modèle* were two different things: the first was the '*raison originaire de la chose*', an abstract principle. The second was its sensible appearance, the '*chose complète*'. However, the break between inner principle and appearance was not yet complete since Quatremère thought of the *type* - '*ce principe élémentaire*'- as being '*toujours visible, toujours sensible au sentiment et à la raison*'. The separation of inner principle (e.g. abstract form or type) from visual appearance (e.g. sensible form) was consummated in Semper's theory. He contended that the fundamental principle did not have to resemble the architectural forms that derive from it. Thus, he dismissed the idea of a primitive form as a concrete model or image, suggested in Vitruvius' theory, and proposed instead four formless principles -the four elements- as the primitive causes of architectural form.

Chapter 9

Art Theory and Psychology of Form: The Identity of Conception and Perception

9.1 Introduction

In the last decades of the nineteenth century, the concern with the understanding of the inner causes that give rise to form, was replaced by a new interest in the perception of space and form. While at the beginning of the nineteenth century, biology had been the leading discipline that provided the models of thought for other fields, one century later psychology played a similar role. In effect, the concern with form perception in artistic theory cannot be dissociated from the birth of experimental psychology in the middle of the nineteenth century. At that time, a number of German-speaking writers, among them Konrad Fiedler, Adolf Göller, and August Schmarsow shared a similar concern with issues of perception. The most conspicuous example of the influence of psychology in artistic theory was the theory of empathy (*Einfühlung*), developed by Theodor Vischer, Theodor Lipps, as well as by Wilhelm Worringer.

The investigations initiated by experimental psychology reached a culminating point with the advent of Gestalt psychology at the beginning of the twentieth century. About the same time, Adolf Hildebrand published *Das Problem der Form in der bildenden Kunst*, 1893, a book that exerted a notable influence in the later works of Alois Riegl, Paul Frankl and Heinrich Wölfflin. Later architectural historians, like Sigfried Giedion and Emil Kaufmann, also considered works of architecture as expression of a mode of perception. The notion of space-time postulated by Giedion represented the mode of perception peculiar to modern art and architecture. For Kaufmann every artistic period is a manifestation of a Gestalt-Ideal that is peculiar to a particular time.

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But it is in the works of Rudolf Arnheim and Ernst Gombrich, where a connection between the psychology of perception and art has been more consciously pursued. Both authors assumed that there was no substantial difference between perception and conception. They considered that perception is basically a creative activity involving the creation of visual concepts, which Arnheim referred to as 'structural skeleton' and Gombrich as 'schema'.

A similar equation of perception with conception is at the core of modern architecture. In this connection, the architecture of the Modern Movement can be seen as the culmination of a process that would have begun in the Renaissance, when theorists began to postulate the identity between the idea in the mind of the artist and the concept that arouses in the beholder's mind.

9.2 Form perception and art theory

9.2.1 Hildebrand: *Fernbild-Nahbild, Daseinsform-Wirkungsform*

In the preface of the third edition of *Das Problem der Form in der bildenen Kunst*, Adolf Hildebrand summarized the two major subjects of his work: 1. the relation between nature and art, and 2. the exploration of the common characteristics shared by painting, sculpture and architecture. In Hildebrand's view, the task of the artist is to create a form which stands as an autonomous creation as do the creations of nature. He refers to this art form with the generic name *Architektur*, a term that is not confined to architectural works but it is applicable to any art form (*Formensprache*): "*Architektur fasse ich dann nur als Bau eines Formganzen, unabhängig von der Formensprache. Ein Drama, eine Symphonie hat diese Architektur, diesen inneren Bau, ist ein organisches Ganze von Verhältnissen, ebenso wie ein Bild, eine Statue, wenn die verschiedenen Künste auch in ganz verschiedenen Formenwelten leben.*"¹ With this notion of *Architektur*, Hildebrand wanted to overcome the classical doctrine of imitation that considered that painting and sculpture are, in opposition to architecture, imitative arts. In Hildebrand's view, this distinction between two kinds of art, imitative and representational, was irrelevant: "*Diese Bezeichnung drückt nur das Unterscheidende aus und läßt das Gemeinsame außer Acht.*"²

The connection between sensible and abstract perception, between the sense of touch and the sense of sight, plays a crucial role in Hildebrand's theory of form. In this connection, Hildebrand offers an alternative view to the philosophical dilemma of the split between sensible and abstract realms. He contends that the sense of touch and the sense of sight are intimately united in the act of perception:

¹A. Hildebrand, *Das Problem der Form in der bildenden Kunst*, 1910, p. viii.

²*Ibid.*, p. vii.

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"Durch diese herrliche Natureinrichtung treten die zwei Funktionen [tastender Körper, sehende Augen] des nämlichen Organs [das Auge] und seine Erfahrungen in so enge und reiche Wechselbeziehung, wie dies an getrennten Organen nicht möglich wäre."³ Therefore, "es muß gelingen, zwischen den beiden Polen unseres Seins, dem sinnlich Wahrnehmbaren und dem inneren geistigen Vorgange, den klaren Zusammenhang darzulegen."⁴

Indeed, this quest to overcome the split between sensible and intellectual realms, was at the core of the theories developed by Gestalt psychology. But Hildebrand's text not only points to the most recent ideas that were being forged in his time but to the past as well, in particular to Goethe's morphology. Thus, when Hildebrand speaks of the "*Erscheinungsvariationen über ein Thema*" that nature offers "*ohne jemals dasselbe an sich zu geben*"⁵, he is echoing the previous notion of Gestalt postulated by Goethe.

Hildebrand contends that by the comparison of appearances (*Erscheinungen*) the mind is able to distinguish invariants from accidents and thus arrive at a conception of the real form: "*Denn die Formvorstellung ist ein Fazit, welches wir aus dem Vergleich der Erscheinungsweisen gezogen haben, und welches das Notwendige vom Zufälligen schon gesondert hat.*"⁶ Most significant, however, is that this process of deduction of the invariances from the appearances is not simply an inductive process. According to Hildebrand, the mind contributes with its assumptions to the creation of a *Formvorstellung*, so that only a few stimuli from the external world are necessary for the mind to grasp the real form.⁷ In other words, in form perception every particular appearance is thought as a particular case of a general principle: "*Alle Naturerscheinung als Einzelfall muß in einen allgemeinen Fall umgesetzt werden, muß zu einem Gesichtsbild werden, welches als Ausdruck der Formvorstellung eine allgemeine Bedeutung hat.*"⁸

A comparison between the theory of vision that Hildebrand postulates, and the ones previously formulated in the field of architectural theory, particularly by Vitruvius, is revealing. Vitruvius, following the practice of Greek sculptors, had recommended the architect make optical corrections so that the visual image conforms to the real form. He was assuming then that the beholder had no capacity to derive the real form from the appearance. Hildebrand, on the other hand, assumes that the beholder can grasp the real form from the visual image,

³Ibid., p. xii.

⁴Ibid., pp. xii-xiii.

⁵Ibid., p. 2.

⁶Ibid.

⁷"Da wir der Erscheinung zu unserer räumlichen Orientierung im gewöhnlichen Leben nur wenige Anhaltspunkte zu entnehmen brauchen, so kommt es uns nicht zum Bewußtsein, wie viel die jeweilige Erscheinung an tatsächlicher Anregungskraft für die Raum- und Formvorstellung enthält, wie viel wir uns dazu ergänzen." Ibid., pp. 2-3.

⁸Ibid., p. 15.

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since he thinks that the perception of a real form is based on the congruence between the senses and the perceived object.

Some of the most innovative contributions of Hildebrand stem from the distinction he made between *Fernbild* and *Nahbild*, far image and close image. According to Hildebrand, when a viewer stands far away from the object of perception, he gets an overall two-dimensional image or *Fernbild*. As the viewer moves closer to the object, he loses the overall picture, being able to get only partial glimpses of it. The image thus perceived is not purely visual but also tactile. The *Nahbild*, therefore, conforms better to the reality of the object because a matching occurs between the movement of the eyes tracing the object and the object's real form. This unity between the two senses is achieved in the plastic arts: *"Die bildende Kunst allein stellt die Tätigkeit dar, in der sich das Bewußte nach dieser Richtung hin entwickelt, und welche die Kluft zwischen der Formvorstellung und den Gesichtseindrücken aufzuheben und beide zu einer Einheit zu gestalten sucht."*⁹

The distinction between *Fernbild* and *Nahbild* is associated with another pair of concepts, *Daseinsform* and *Wirkungsform*, real form and effective or apparent form. The *Daseinsform* is independent from the multiplicity of appearances of the object - *"unabhängig vom der Erscheinung"*- and only depends on the object itself: *"Wir erkennen sie als denjenigen Faktor der Erscheinung, welcher vom Gegenstand allein abhängt."*¹⁰ In contrast to the *Daseinsform*, the *Wirkungsform* is influenced by factors alien to the intrinsic characteristics of the object, like the illumination, the environment and the changing view points. There is, therefore, a close relationship between, on the one hand, the *Daseinsform* and the *Nahbild*, and on the other, the *Wirkungsform* and the *Fernbild*: *"Wir müssen deshalb die Fälle unterscheiden, wo wir vermöge der Wahrnehmung aus der Nähe direkt die Daseinsform erkennen und wo wir nur eine Wirkungsform, also ein ferneres optisches Bild erhalten, aus dem wir dann auf die Daseinsform schließen."*¹¹

Incidentally, it must be noticed that in spite of the reference to a real or objective form (i.e. the *Daseinsform*) Hildebrand was not postulating that perception is a purely objective phenomenon. On the contrary, he emphasized that *"der Eindruck eines Objektes, sei es Natur oder Kunstwerk, ist aber ganz bedingt von der Begabung und der Sinneskultur der Rezeptiven. Die Bewertung des Eindruckes, den ein anderer hat, hängt ganz von dem Vertrauen ab, welches man der Begabung und der Sinneskultur des anderen schenkt. Das ganze Gedankengebäude steht damit auf einem sehr subjektiven Boden."*¹²

⁹Ibid., p. 12.

¹⁰Ibid., p. 16.

¹¹Ibid., p. 132.

¹²Ibid., pp. 142-143.

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It can be contended then, that the idea of art being imitation of an objective reality was rejected by Hildebrand. He considered that the artist does not simply create a copy of the appearance of nature, but rather he reproduces the *Wirkungsform* by him perceived. In a work of art, therefore, the *Daseinsform* exists only as *Wirkungsrealität*, but it is never reality itself. The sense of reality that derives from the work of art depends on the successful integration by the artist of the necessary perceptual cues in a particular *Wirkungsform*. As Hildebrand contends, "*indem Natur und Bild diesen Anreiz üben, gelangen sie zu einem gleichen Resultat für die Vorstellung. Die Parallele zwischen Natur und Kunstwerk wäre also nicht in der Gleichheit ihrer faktischen Erscheinung zu suchen sondern darin, daß ihnen beiden zur Erweckung der Raumvorstellung die gleiche Fähigkeit innewohnt.*"¹³ This means, therefore, that art can never be considered as a photographic (i.e. mechanic) reproduction of reality: "*Das Sehen ist ja eben kein mechanischer Akt allein, sondern die Erfahrung der Vorstellung ist es.*"¹⁴

Hildebrand's ideas were highly influential in his own time, and their impact can be detected in some of the most important works on art and architectural theory published in the early twentieth century. For example, in the distinction between haptic (tactile) and optic introduced by Riegl in his *Spättrömische Kunstindustrie*; in the concept of mental image (*Vorstellung*) introduced by Frankl in the *Die Entwicklungsphasen der Neueren Baukunst*, and in the five categories of beholding proposed by Wölfflin in *Kunstgeschichtliche Grundbegriffe*.

9.2.2 Wölfflin's modes of beholding

In his doctoral thesis of 1886, *Prolegomena zu einer Psychologie der Architektur*, Heinrich Wölfflin began to show an interest in the application of psychological concepts to the study of art. He was concerned then with the notion of empathy or *Einfühlung*, according to which perception would be based in the accord between the human body and the perceived objects.

Later, in *Renaissance und Barock*, 1888, Wölfflin opposed the two styles in terms of the perceptual qualities of the forms. The forms of the Renaissance were calm, the ones of the Baroque were always in continuous movement. The

¹³Ibid., p. 37. The equation of natural forms and art forms, which Semper, among others had advocated, is rejected by Hildebrand, who points out that both are essentially two different things: the unity of the artistic image has nothing to do with the organic unity of nature or her processes. In this regard Hildebrand writes that "*wir erkennen auf diese Weise die Möglichkeit eines Zusammenhanges mit einer Einheit in einem Bilde, die mit dem Zusammenhange der Natur als organischer Einheit oder als Einheit eines Vorganges nichts zu tun hat.*" Ibid. p. 33. He writes also that "*eine Einheit der Erscheinung, welche nichts gemein hat mit der organischen oder der Vorgangseinheit in der Natur.*" Ibid., p. 35.

¹⁴Ibid., p. 25.

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centralized church of the Renaissance was the expression of a complete, self-sufficient being, while the longitudinal church of the Baroque expressed movement: *"Die Zentralanlage gibt sich mit einem Mal, ganz und vollständig. Sie stellt sich dar als ein absolut Vollkommenes, das nichts Weiteres will, sondern nur des ruhigen Daseins sich freut. Das Longitudinale hat dagegen eine bestimmte Richtung und scheint sich in dieser Richtung fortwährend zu bewegen."*¹⁵ At this point in the development of Wölfflin's theory, the notion of empathy was still the predominant idea: *"Überall legen wir ein körperliches Dasein unter, das dem unsrigen konform ist. Nach den Ausdrucksprinzipien, die wir von unserem Körper her kennen, deuten wir die gesamte Außenwelt."*¹⁶ According to the principle of empathy, he projected onto the buildings the qualities that living organisms have: *"Während die Renaissance den Körper ganz durchfühlte und in enganliegender Kleidung seinen Umriß sich beständig gegenwärtig hielt, schwelgt der Barock in undurchdrungenen Massen. Man fühlt mehr den Stoff als die innere Struktur und Gliederung. Das Fleisch ist von geringerer Konsistenz, weich, haltlos, nicht die straffe Muskulatur der Renaissance."*¹⁷

In *Renaissance und Barock*, Wölfflin had used the expression *Malerisch*, or painterly, as a critical term that could be applied to all arts -architecture, painting, sculpture and also music. Later, in *Kunstgeschichtliche Grundbegriffe*, 1915, the concept of *Malerisch* became part of a conceptual system composed of five pairs of opposites, that altogether represented a method for the study of the works of art of a given period. These five polarities, or modes or beholding (*Formen der Anschauung*) were: linear and painterly, plane and recession, closed form and open form, multiplicity and unity, and absolute and relative clarity of the subject. At some point, presumably under the influence of Hildebrand's work, Wölfflin began to think that the history of art could be understood as a history of the modes of perception, a history of seeing. The parallelism between Wölfflin's categories of beholding and the ideas already developed by Hildebrand is manifest in the following description of the polarity linear-painterly: *"Alles umfassend bedeutet die Entwicklung vom Linearen zum Malerischen den Fortschritt von einer tastmäßigen Begreifung der Dinge im Raum zu einer Anschauung, die sich dem bloßen Augeneindruck anzuvertrauen gelernt hat, mit andern Worten, den Verzicht auf das Handgreifliche zugunsten der bloß optischen Erscheinung."*¹⁸

¹⁵H. Wölfflin, *Renaissance und Barock*, 1925, p. 90.

¹⁶*Ibid.*, p. 78.

¹⁷*Ibid.*, p. 80.

¹⁸H. Wölfflin, *Kunstgeschichtliche Grundbegriffe*, 1915, p. 247. English translation in *Principles of Art History*, 1950, p. 229: "The development from the linear to the painterly, comprehending all the rest, means the progress from a tactile apprehension of things in space to a type of contemplation which has learned to surrender itself to the mere visual impression, in other words, the relinquishment of the physically tangible for the sake of the mere visual appearance."

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A main issue in the work of Wölfflin was the understanding of the connection that exists between artistic forms and the cultural forces that give rise to them; in short, with style. According to Wölfflin, every style, whether the style of an individual, a nation or a period, is the expression of something: the temperament of the artist, the racial character of the nation or the *Zeitgeist* of a particular period. In this light, the work of art is seen mainly as a vehicle for expression of the cultural forces of the time in which was created. Thus, he says that *“die Säulen und Bogen der Hochrenaissance reden so vernehmlich von dem Geist der Zeit wie die Figuren Raffaels, und eine Barockarchitektur gibt die Vorstellung von dem Wandel der Ideale nicht minder deutlich, als wenn man die breit ausladende Gebärde Guido Renis mit der edlen Getragenheit und Größe der Sixtinischen Madonna vergleicht.”*¹⁹ In this context, the purpose of the history of art is, according to Wölfflin, to develop the appropriate methods to decipher the meanings that are embedded in the artistic productions of a particular time.

In Wölfflin's theory, the mode of perception becomes one of the stylistic factors that contributes to the understanding of the artistic production in a particular time. In the past, it was thought that a style was determined by the material, the technique or by spiritual and religious forces. Now, Wölfflin suggests that among the conditions that a period imposes upon the artist it must be considered the system of representation -the five categories or modes of beholding- that determine what the artist sees and, therefore, represents: *“Jeder Künstler findet bestimmte ‘optische’ Möglichkeiten vor, an die er gebunden ist.”*²⁰ Nevertheless, the duality of permanent and contingent factors which we have already observed in Semper's notion of style, persists in Wölfflin's. The forms of beholding are pre-existing categories in a given time, but *“ob und wie sie zur Entfaltung kommen, hängt von den äußeren Umständen ab.”*²¹ This means that *“nicht alles ist zu allen Zeiten möglich.”*²² The history of art becomes then a history of the modes of visions: *“Das Sehen an sich hat seine Geschichte, und die Aufdeckung dieser ‘optischen Schichten’ muß als die elementarste Aufgabe der Kunstgeschichte betrachtet werden.”*²³

¹⁹Ibid., p. 9. English translation in *Principles of Art History*, p. 9: “The columns and arches of the High Renaissance speak as intelligibility of the spirit of the time as the figures of Raphael, and a baroque building represents the transformation of ideals no less clearly than a comparison between the sweeping gestures of Guido Reni and the noble restraint and dignity of the Sistine Madonna.”

²⁰Ibid., p. 11. English translation in *Principles of Art History*, p. 11: “Every artist finds certain visual possibilities before him, to which he is bound.”

²¹Ibid., p. 247. English translation in *Principles of Art History*, p. 230: “Whether and how they come to development depends on outward circumstances.”

²²Ibid., p. 11. English translation in *Principles of Art History*, p. 11: “Not everything is possible at all times.”

²³Ibid., pp. 11-12. English translation in *Principles of Art History*, p. 11: “Vision itself has its history, and the revelation of these visual strata must be regarded as the primary task of art history.” Wölfflin's pursue to identify style with modes of perception has not fallen into oblivion. Some recent works are still grounded on similar premises. In a work of art and perception, Parker and Deregowski declare that the purpose of their investigation “will be the eye and its relation to observable variations in artistic style.” Their approach, however, is closer to the interests of

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A consequence of Wölfflin's theory of artistic perception is that there cannot be a fixed, immutable reality that the artist imitates. As Wölfflin put it, "*es ist ein Fehler, daß die Kunstgeschichtsschreibung so unbedenklich mit dem stumpfen Begriff der Naturnachahmung operiert: als ob es sich dabei um einen gleichartigen Prozeß zunehmender Vervollkommnung handelte.*"²⁴ The classical notion of art being a mirror of a fixed world, is at odds with the theory according to which every epoch sees a different reality: "*Die Anschauung ist eben nicht ein Spiegel, der immer derselbe bleibt, sondern eine lebendige Auffassungskraft, die ihre eigene innere Geschichte hat und durch viele Entwicklungsstufen durchgegangen ist.*"²⁵ Therefore, if reality varies according to the different modes of perception, the idea of art as imitation needs also to be questioned. For the artist, there cannot be an eternal reality nor an eternal beauty: "*Die Vorstellung vom Wirklichen hat sich ebenso verändert wie die Vorstellung vom Schönen.*"²⁶ Considering the theories of Hildebrand and Wölfflin, it can be contended that from the point of view of the artistic theory of the early twentieth century, art could no longer be the mirror of reality. On the contrary, it was thought that art makes reality 'visible'.

9.2.3 Frankl: architecture as mental image

Paul Frankl was sympathetic to Wölfflin's system of opposing modes of perception, although he thought that Wölfflin's categories were more appropriate for the study of painting and sculpture than they were for architecture. In his *Die Entwicklungsphasen der neueren Baukunst*, 1914, Frankl proposed an alternative conceptual system composed of four different categories that, unlike the modes of beholding of Wölfflin, were specific to architecture.²⁷ The four categories were: spatial composition; treatment of mass and surface; treatment of light, color, and other optical effects; and relation of design to social functions. As important as the

Gestaltpsychologie than to art history: "The concepts of primal, by which we mean the minimum 'skeletal' characteristics necessary to convey recognition of an object or feature, and secondary characteristics, by which we mean shading, texture, colour, etc. may prove useful in describing styles of art." D. M. Parker, and J. B. Deregowski, *Perception and artistic style*, 1990.

²⁴Wölfflin, op. cit., pp. 13-14. English translation in *Principles of Art History*, p. 12: "It is a mistake for art history to work with the clumsy notion of the imitation of nature, as though it were merely a homogeneous process of increasing perfection."

²⁵Ibid., p. 243. English translation in *Principles of Art History*, p. 226: "Beholding is just not a mirror which always remains the same, but a living power of apprehension which has its own inward history and has passed through many stages."

²⁶Ibid., p. 246. English translation in *Principles of Art History*, p. 229: "The idea of reality has changed as much as the idea of beauty."

²⁷In the foreword to the English edition, James Ackerman has traced the origins of the categories of Frankl's system. The first category, spatial composition, was an innovation of German criticism at the turn of the century, and was formulated by historians like Brinckmann, Riegl and especially Schmarsow. The second category, mass and surface, should be traced back to Wölfflin studies on the difference between Renaissance and Baroque. The third, optical effects, belongs to the same strand of thought as the ideas of Hildebrand, Fiedler and Riegl. The fourth category, purposive intention, is for Ackerman, a contribution of Frankl. See Paul Frankl, *Principles of Architectural History*, 1968, pp. vi-ix.

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categories are the historical divisions that Frankl proposes. He divided the period going from the fifteenth to the nineteenth centuries in four phases: the phase between 1420-1550, what could be considered the Renaissance; the phase between 1550-1700, which embraces mainly the Baroque; the eighteenth century, that Frankl associates almost exclusively with the Rococo; and the nineteenth century.

With the third category -visual form- Frankl wanted to vindicate the uniqueness of the perceptual experience in architecture, which according to him was different to the one of painting and sculpture. He thought that in architecture, unlike in painting, it is never possible to attain a complete view of a building, and that this complete view can only emerge as a result of gathering in the mind a series of discrete three-dimensional images. This is the notion of architecture as a 'mental image' (*Vorstellung*) that constitutes one of the major contributions of Frankl's book: "*Architektur sehen heißt die Reihe von dreidimensional gedeuteten Bildern, die sich im Abschreiten der Innenräume und im Umschreiten der äußeren Schale ergeben, zu einer einzigen Vorstellung zusammen beziehen. Wenn ich vom architektonischen Bilde rede, so meine ich diese eine Vorstellung.*"²⁸

Frankl analyzed the architecture of each one of the four phases from the point of view of the concept of 'mental image'. He says that "*in der ersten Phase [e.g. the Renaissance] genügen erstaunlich wenig Standpunkte, um die Vollständigkeit des architektonischen Bildes zu erobern; das architektonische Bild ist hier ein einmaliges Bild; von soviel Seiten man es auch ansieht, es ist immer dasselbe, es deckt sich mit der tatsächlichen Gesamtform.*"²⁹ As an example, Frankl mentions Bramante's S. Pietro in Montorio. In this building, he says, the viewer does not have to move around much in order to grasp its form, since "*das Auge übersieht sofort die Situation, von einem einzigen, von jedem beliebigen Standpunkt aus ist das Bild -das architektonische Bild- fertig gegeben; nichts lockt uns, um das Gebäude herumzugehen, weil wir sofort sehen, daß es keinerlei Überraschung geben kann.*"³⁰ Therefore, he concludes, "*die Architektur der ersten Phase ist einbildig.*"³¹

²⁸P. Frankl, *Die Entwicklungsphasen der neueren Baukunst*, 1914, pp. 125-126. English translation in *Principles of Architectural History*, 1968, p. 142: "To see architecture means to draw together into a single mental image the series of three-dimensionally interpreted images that are presented to us as we walk through interior spaces and round their exterior shell. When I speak of the *architectural image*, I mean this one *mental image*."

²⁹*Ibid.*, p. 127. English translation in *Principles of Architectural History*, p. 144: "It suffices for us to view a building from surprisingly few points to gain a complete architectural image. The architectural image here is unique; it is always the same no matter whether it is seen from many different angles. It is identical with the actual complete form."

³⁰*Ibid.*, p. 127. English translation in *Principles of Architectural History*, p. 144: "The eye takes in the situation at a glance. There is no temptation for us to walk round the building because we realize at once that it can offer us no surprises."

³¹*Ibid.*, op. cit., p. 130. English translation in *Principles of Architectural History*, p. 146: "The architecture of the first phase presents only one image."

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Frankl contends that what distinguishes the architecture of the first phase (i.e. Renaissance) from the one of the second phase (i.e. Baroque), is that *“die Architektur der zweiten Phase ist vielbildig.”*³² In contrast to Renaissance architecture, the architecture of the Baroque does not lend itself to a single image. While the form of a building like San Pietro can be grasped from a single viewpoint, a Baroque building obliges the spectator to move around, always acquiring in the process new images and impressions that cannot be easily condensed into a unified form: *“Das architektonische Bild, d.h. die Vorstellung der gesamten optischen Erscheinung des Bauwerks bleibt wohl eine Einheit, aber sie schließt eine Vielheit von Teilbildern in sich.”*³³ This multiplicity of images is even larger in the third phase (e.g. Rococo): *“Die dritte Phase unterscheidet sich von der zweiten nur darin, daß sie die Zahl der Teilbilder so weit als möglich steigert, um den Eindruck unerschöpflich vieler, unendlich vieler Bilder zu erzeugen.”*³⁴

As we have seen, an opposition of the Renaissance and Baroque styles in terms of static-dynamic forms had already been proposed by Wölfflin. In particular, the architecture of the Baroque was described by Wölfflin in the following terms: *“Natürlich rechnet alle Architektur und Dekoration mit gewissen Bewegungssuggestionen: die Säule wächst empor, in der Mauer sind lebendige Kräfte wirksam, die Kuppel hebt sich und die bescheidenste Ranke im Ornament hat ihr Teil von bald schleichenäer, bald lebhaft sich werfender Bewegung. Aber bei all dieser Bewegung bleibt in der klassischen Kunst das Bild dasselbe, während die nachklassische Kunst den Schein erweckt, als müßte es sich unter unseren Augen verändern.”*³⁵ But, in spite of the similarities between Wölfflin and Frankl's appreciation of the differences between Renaissance and Baroque, there is a difference between both interpretations. In effect, while Wölfflin's comparison between Renaissance and Baroque was based on projecting onto a building the sensible impressions that the beholder receives from it, Frankl compares the two styles in terms of the quantity of 'mental images' that the forms of buildings of each style arise in the spectator.³⁶ In other words, while Wölfflin thinks of the

³²Ibid., op. cit., p. 136. English translation in *Principles of Architectural History*, p. 151: "The architecture of the second phase presents many images."

³³Ibid., op. cit., p. 136. English translation in *Principles of Architectural History*, p. 151: "The architectural image -our conception of the total optical appearance of the building- certainly remains a unit, but it now contains a multiplicity of partial images."

³⁴Ibid., op. cit., p. 136. English translation in *Principles of Architectural History*, p. 152: "The third phase is distinguished from the second only because in the later period the number of partial images is increased as much as possible to create the effect of infinitely more images."

³⁵Wölfflin, *Kunstgeschichtliche Grundbegriffe*, p. 68. English version in *Principles of Art History*, p. 63: "Of course, all architecture and decoration reckons with certain suggestions of movement; the column rises, in the wall, living forces are at work, the dome swells upwards, and the humblest curve in the decoration has its share of movement, now more languid, now more lively. But in spite of that movement, the picture in classic art is constant, while post-classic art makes it look as though it must change under our eyes."

³⁶Rudolf Arnheim, had already mentioned this fact, not with regard to Frankl but in reference to his own theory: "Wölfflin and Lipps were obviously aware of the expressive qualities inherent in

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Baroque buildings as having their own tension and movement, as if they were living forms, Frankl translates that movement to the spectator's mind, in the form of a multiplicity of images.

The characterization of architecture in terms of one image (*Einbildig*) or many images (*Vielbildig*), distinguishes Frankl's theories from previous ones formulated by Wölfflin and Hildebrand. As Frankl acknowledges, the notion of *Einbildig* and *Vielbildig* could correspond to what Wölfflin had called before *Plastisch* and *Malerisch*. But Frankl refused to use Wölfflin's terms because he thought they carried connotations that were specific to sculpture and painting. Similarly, he criticized Hildebrand for having used the term *Architektonisch* as a category that encompasses painting, sculpture and architecture. In Frankl's view, Hildebrand's notion of 'architectural' cannot be applied to architecture itself because the interior space of a building cannot be seen as a *Fernbild*, since space cannot be perceived in terms of front and back (*vorn nach hinten*), as Hildebrand contended, but as all around (*im Kreise herum*).³⁷

In spite of Frankl's interest in distancing himself from the previous authors, it is difficult not to see that there is a common strand of thought connecting the notion of *Daseinsform* of Hildebrand, and the concept of *Vorstellung* or 'mental image' that Frankl proposes for architecture. In fact, each one of the discrete images that, according to Frankl, the spectator perceives while moving around and inside a building could be assimilated to the *Erscheinungsform* of Hildebrand, while the mental image or *Vorstellung* in which the discrete images are condensed could be compared to the *Daseinsform*. Thus, both Hildebrand and Frankl, think of perception as the act by which the beholder grasps the real form of an object or building. But, this parallel notwithstanding, there would still be some differences between Frankl and Hildebrand. For Frankl the images from which the mental image is derived are three-dimensional, while Hildebrand thinks of the *Fernbild* as a two-dimensional image.

9.2.4 Kaufmann: the Gestalt-Ideal

In his book *Architecture in the Age of Reason*, 1955, Emil Kaufmann attempted to explain the transition from Renaissance to Neoclassicism. Unlike Wölfflin and Frankl, Kaufmann saw no fundamental distinction between Renaissance and Baroque. For him, both periods are part of the same 'architectural system', a

architectural shapes, but in keeping with the psychological theory current in their day they interpreted them as projections of the observer's own muscular sensations. As I have shown elsewhere, the primary effect of visual expression is more convincingly derived from, and controlled by, formal properties of the visual shapes themselves, and muscular responses can best be understood as secondary reactions to the primary visual dynamics." Arnheim, *The Dynamics of Architectural Form*, p. 212.

³⁷Frankl, op. cit., p. 140.

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expression that he prefers to the term 'style'. By 'architectural system', Kaufmann means a continuous process of transformation, which he opposes to the notion of style as a fixed, idealized form. In the Renaissance and Baroque the same architectural system dominated: one whose aim was to achieve the harmonic integration of the parts within the whole. Thus, Kaufmann contends that "concatenation, integration, and gradation were the fundamental principles which made the Renaissance and the Baroque one system in spite of all differences between the two stages."³⁸

Kaufmann contends that this system began to be abandoned at the beginning of the eighteenth century. By that time, architects felt it necessary to invent new patterns to replace the old ones. In order to do that, they had first to break apart the coherent forms they had inherited and to re-compose them in original ways. As a result, the harmonic wholes that had characterized the architecture of Palladio gave place to compositions consisting of strongly differentiated elements. Then, Kaufmann thinks the increasing geometrization of architectural form in the eighteenth century to be a consequence of this desire to stress the individuality of the parts within the whole since, according to him, a geometric figure always appears as self-sufficient element.

According to Kaufmann, the architectural system of a given period, is characterized by a mode of perception that he refers as the 'Gestalt-Ideal'. He thinks that "each architect is guided in his work by a leading compositional ideal, an architectural Gestalt-Ideal, which he shares with his contemporaries. We may speak of any period of time as being of one and the same artistic epoch as long as the very same ideal of configuration dominates. The arrangement of the parts of every single work, and quite particularly their relationship to the whole, derives from the compositional ideal of the era. The 'architectural system' is the visualization of the particular Gestalt-Ideal."³⁹ The Gestalt-Ideal is something other than the external forms that give unity to a particular style. For Kaufmann, it is the Gestalt-Ideal, as opposed to the external forms, which gives unity to the artistic creations of a certain period: "The unity of an epoch in the visual arts results from the predominance of an immanent idea, but not from the recurrence of single forms. It may be controversial whether configuration (Gestalt) comes first in perception. It most certainly comes first in artistic creation. The most irreconcilable opponents of that immanent idea are tradition, practical exigencies, the nature of the materials, and, worst of all, the contradictions in the system itself." The Gestalt-Ideal has, therefore, a twofold dimension: perceptual and conceptual. It stands for the mode of beholding that characterizes an epoch and, at the same time, it serves as a general pattern that guides the artists of a particular time in their creations.

³⁸E. Kaufmann, *Architecture in the Age of Reason*, 1955, pp. 11-12.

³⁹*Ibid.*, p. 11.

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Kaufmann defends the possibility of the autonomy of form, which he thinks as independent from temporal and historical conditions. Furthermore, he thinks that “man does not forget completely the forms his ancestors have devised. They recur time and again. There always have been ‘revivals’, and there always will be.”⁴⁰ The same forms then can be used by different architectural systems, or, as he says: “Forms recur; systems don’t.”⁴¹

9.2.5 Arnheim: structural skeleton

Frankl’s notion of the ‘mental image’, was later adopted by Rudolf Arnheim who thought of it as the actual form of a three-dimensional object or building.⁴² Arnheim considered that a viewer derives the ‘actual form’ of an object from the two dimensional views received by the eye. He thought that “from the multiplicity of views the mind synthesizes an image of the sculpture’s or building’s objective three-dimensional form. Synthesis is aided by the fact that these various views do not come unrelated, as might a series of photographs from which one tries to form an idea of a building. Rather, as the viewer moves around and object, or the object turns in front of his eyes, he receives an orderly sequence of gradually changing projections. The coherence of this sequence greatly facilitates the identification of the object, to which all the particular views refer.”⁴³ Furthermore, he thought that “it is a remarkable achievement of the mind to derive an image of the objective shape from discrete views.” It should be noticed, though, that Arnheim thinks of the images that the mind synthesizes in the actual form as two-dimensional ‘projections’. Frankl, as we have already mentioned, thought that those images were ‘three-dimensional’.

The explanation that Arnheim offers of the process by which the viewer conceives the real form from the two-dimensional images runs as follows. Referring to the perception of a cube, he says that “many people can picture a cube in its completeness with some precision, and this even though no more than three of the cube’s sides can ever be visible at the same time.” This does not mean that

⁴⁰Ibid., p. 76.

⁴¹Ibid.

⁴²Arnheim makes explicit mention of Frankl’s theory of the mental image: “A work of architecture, therefore, is an object that never has and never will be seen in its entirety by anybody. It is a mental image synthesized with greater or lesser success from partial views. How easy or difficult is to obtain that image depends on the shapes used by the architect. Paul Frankl has referred to this difference in distinguishing the architectural style of the period 1420 to 1550 from that of later buildings. In the earlier period, he says, ‘it suffices for us to view a building from surprisingly few points to gain a complete architectural image’. This image is the same, no matter from what angle the building is looked at, and it corresponds to the ‘actual form’.” Arnheim, *op. cit.*, p. 111.

⁴³Arnheim, *op. cit.*, pp. 110-111. Gyorgy Kepes had postulated a similar theory of vision: “Sight is more than pure sensation, for light rays reaching the eye have no intrinsic order as such. They are only a haphazard, chaotic panorama of mobile, independent light-happenings. As soon as they reach the retina, the mind organizes and molds them into meaningful spatial units. We cannot bear chaos -the disturbance of equilibrium in the field of experience.” G. Kepes, *Language of Vision*, 1947, p. 31.

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Arnheim thinks that a cube, or by the same token, any geometric figure, is a concept with which the mind is endowed from birth and, as such, it does not have to be inferred from sensorial images. Quite the opposite, Arnheim thinks that the process of perception consists in deriving a concept from the sensorial images. Thus he contends that "such a mental picture is necessarily derived from partial views, none of which is contained in the 'objective' shape of a symmetrical, regular, rightangular cube. Nor is this objective image given in any of the projective views obtainable from the physical object."⁴⁴

A fundamental characteristic of Arnheim's theory of perception is the belief that every percept (i.e. the organized visual information received by the senses) carries in itself the norm, pattern or 'structural skeleton' that the beholder understands as the essential form of the object. Without the apprehension of that form, Gestalt or 'structural skeleton', perception would not be possible. In *Art and Visual Perception*, 1954, Arnheim discussed the notion of 'structural skeleton' with regard to two-dimensional shapes. In conformity with the tenets of Gestalt psychology, he defined the structural skeleton of a shape as "the simplest structure obtainable with the given shape."⁴⁵ The structural skeleton is then a pattern which "consists primarily of the framework of axes"⁴⁶, a representation of a system of visual forces inherent to a particular shape. In the case of the perception of three-dimensional objects, Arnheim distinguished between the 'structure of the visual concept' and the 'structural skeleton' of the two-dimensional projections. The matching between both 'structures' makes perception of three-dimensional objects possible. Both 'structures', the 'visual concept' of a form and the 'structural skeleton' of a shape, are "characterized by structural symmetries, which are brought out most directly by certain aspects of the object."⁴⁷

In a later text, *The Dynamics of Architectural Form*, 1977, Arnheim expanded the notion of 'structural skeleton' to the perception of buildings. He defines the 'structural skeleton' as being "the carrier of the building's principal meaning, which the viewer must grasp if he is to understand the design as a whole."⁴⁸ This structural skeleton, or theme, can only be constructed in the mind of the beholder when this perceives the different parts of a building as an integrated whole. Then, the beholder will be unable to perceive the theme of the building when there is a disorder among the parts, that is to say, "a discord between partial orders, [brought about] by the lack of orderly relations between them."⁴⁹ The internal order of the parts does not necessarily imply that the building has to be symmetrical and their parts intimately connected. Buildings which are not symmetrical, and whose parts are strongly differentiated can also convey a sense of order resulting from the

⁴⁴Arnheim, op. cit., p. 111.

⁴⁵R. Arnheim, *Art and Visual Perception*, p. 94.

⁴⁶Ibid., p. 95.

⁴⁷Ibid., p. 109.

⁴⁸Arnheim, *The Dynamics of Architectural Form*, p. 270.

⁴⁹Ibid., p. 171.

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balance among the opposing visual forces. However, in this second case what the beholder might be missing is the existence of the underlying scheme (e.g. the structural skeleton) that holds together the different parts.

In sum, it can be said that Arnheim's 'structural skeleton' bears a strong resemblance with the concept of *Daseinsform* defined by Hildebrand, as well as with the 'mental image' of Frankl. In spite of the differences that exist among the concepts formulated by the three authors, it is assumed in every case that the mind creates a conceptual form from the sensible images (two-dimensional images in the case of Hildebrand and Arnheim; three-dimensional in the case of Frankl). If there is a difference between the theories of perception held by these three authors, it is that for Arnheim, simplicity has an aesthetic value that does not have for other authors.

9.2.6 Gombrich: conceptual schema

In the introduction to *Art and Illusion*, 1959, Gombrich acknowledged the importance of Arnheim's *Art and Visual Perception*, although he also pointed out that "for the historian and his problems of style, on the other hand, the book [Arnheim's] yields less."⁵⁰ Later, in the preface to the second edition of *The Sense of Order*, 1979, he insisted on the uniqueness of his approach as compared to Arnheim's. On this occasion, he contended that Arnheim's theories "stress the tendency of perception towards simple form, while my interpretation of the facts (influenced by the philosophy of Karl Popper and the techniques of information theory) has led me to a radically different emphasis. I believe that in the struggle for existence organisms developed a sense of order not because their environment was generally orderly but rather because perception requires a framework against which to plot deviations from regularity."⁵¹

Popper had questioned the validity of the inductive method in science, according to which theories are derived from the observation of facts. Rather, he contended that theories come always first and that in a second step they are corroborated by the facts. Gombrich believes that the paradigm of the 'generate-test cycle', that Popper applied to science, can be extended to perception and to art criticism. He thinks that perception is a process of matching a simple visual scheme (the counterpart of the scientist's hypothesis) with the sensory images: "Without some initial system, without a first guess to which we can stick unless it is disproved, we could indeed make no 'sense' of the millions of ambiguous stimuli that reach us from our environment."⁵²

⁵⁰E. Gombrich, *Art and Illusion*, p. 22.

⁵¹E. Gombrich, *The Sense of Order*, 1984, p. xii.

⁵²Gombrich, *Art and Illusion*, p. 231. In the case of painting this means that there cannot be such a thing as a direct copy of nature. In order to depict nature faithfully, a painter needs to have first the schema in his mind. Thus, the artist "begins not with his visual impression but with his idea or

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A corollary of this theory of perception held by Gombrich, is that there cannot be such a thing as an 'innocent eye'; meaning that there can be no eye that passively records the impressions received from the sensory world. To this 'traditional' notion of perception, Gombrich answers that the eye is not passive but selective. Furthermore, he thinks that the viewer is in possession of certain schemata (e.g. 'stereotype', 'conceptual image' or 'schema') that are necessary to impose order upon the indiscriminate array of impressions.⁵³

In spite of Gombrich's attempt to draw a line between his theories and the ones of Arnheim, the ultimate source for both is the same, namely, the field of Gestalt psychology. In fact, there is no fundamental difference between Gombrich's 'schema' and Arnheim's 'structural skeleton': both are mental constructions that make perception possible.⁵⁴ But, in another regard, there is a substantial difference between the theories of perception held respectively by Arnheim and Gombrich. For Arnheim, as we have seen, the mental image that arises in the mind of the viewer is derived from the sensual images. Gombrich, on the contrary, stresses the priority of the conceptual schema, and contends that without a first visual hypothesis it would not be possible to make sense of the sensible impressions. In line with the Gestalt psychologists -and with Popper- Gombrich thinks of the 'schema' as an a priori concept: "The simplicity hypothesis cannot be learned. It is, indeed, the only condition under which we could learn at all."⁵⁵ In short, while Arnheim considers that the 'structural skeleton' exists a priori in the object, Gombrich thinks that the 'schema' exists a priori in the mind. The different positions taken by Arnheim and Gombrich can be summarized saying that Arnheim's theory of perception is more Aristotelian than Platonic (the percept contains the norm, the Gestalt), whilst Gombrich's is more Platonic than Aristotelian (the 'schema' as the eternal Idea).⁵⁶

concept." Ibid., p. 62. In other words, "every artist has to know and construct a schema before he can adjust it to the needs of portrayal." Ibid., p. 99. This conceptual schema, Gombrich argues, can be assimilated to the geometric line drawings with which the painter begins his work. It is a well-established drawing technique, that by which the artist begins to draw a simple scheme composed of a few geometric figures, and then proceeds to add detail to it. Incidentally, this is basically the same scheme or *partie* we have seen in Durand's method of composition discussed in chapter seven.

⁵³Gombrich compares this mental stereotype with a blank formulary that has to be filled in. Similarly, in perception, the sensible impressions are the information that fill in the empty slots which are prepared beforehand as a mental stereotype. Ibid., p. 63.

⁵⁴As a matter of fact, Gombrich considered the possibility of using the word structure instead of schema: "For in a way our very concept of 'structure', the idea of some basic scaffolding or armature that determines the 'essence' of things, reflects our need for a scheme with which to grasp the infinite variety of this world of change." *Art and Illusion*, p. 133.

⁵⁵Ibid., p. 231.

⁵⁶As Gombrich states, his notion of schema is the equivalent to the notion of universals: "What I have called the 'schema' refers to universals." Ibid., p. 131.

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The relation of the stereotype, schema or motif with style, is a critical issue in Gombrich's theories. As can be derived from the following passage, Gombrich thinks that style is the most generic category and that the selection of motifs (e.g. types) by the artist is conditioned by the limits imposed by the style: "The artist will be attracted by motifs which can be rendered in his idiom. As he scans the landscape, the sights which can be matched successfully with the schemata he has learned to handle will leap forward as centres of attention. The style, like the medium, creates a mental set which makes the artist look for certain aspects in the scene around him that he can render."⁵⁷ However, as Gombrich compares styles with languages, the difference between what he refers as motif, schema or stereotype, and what he understands as style begins to blur. On the one hand he says that "styles, like languages, differ in the sequence of articulation and in the number of questions they allow the artist to ask; and so complex is the information that reaches us from the visible world that no picture will ever embody it all."⁵⁸ But, on the other hand, Gombrich resorts to the same analogy with language to refer to the schema or stereotype through which the artist perceives nature: "The artist, no less than the writer, needs a vocabulary before he can embark on a 'copy' of reality."⁵⁹ At this point, schema, stereotype, and style stand all of them for the same idea: without a restricted formal vocabulary artistic creation could not be possible.

The limitations imposed by the style notwithstanding, Gombrich avoids a too deterministic view that would totally neglect the participation of the artist in the creation of a style. Rather, the theory of style that Gombrich envisions aims at reconciling objective facts and individual creativity: "Thus, while we must give up the search for the laws of history which could explain every stylistic change, we are still entitled to watch out for sequences and episodes which we can hope to explain in terms of the logic of the situations. For though a non-deterministic account must restore to the individual artist his freedom of choice between various rational options, this choice need not therefore be random. The aims of competition on which attention has become focused at any particular moment may certainly influence his choice of a novel modification."⁶⁰

⁵⁷Ibid., p. 73.

⁵⁸Ibid., p. 78.

⁵⁹Ibid., p. 75.

⁶⁰Gombrich, *The Sense of Order*, p. 213.

9.3 Architectural theory and psychology of form

At this point, we are in the position to draw certain parallels between the ideas discussed by the art theorists who, at the turn of the twentieth century, were concerned with form and space perception, and some of the ideas formulated earlier by some architectural theorists. This parallelism focuses on three issues: 1. the question of the architectural origins and the primitive model 2. the existence of an objective component in artistic form and 3. the notion of Type as expression of the epistemological meaning of Form.

The origins of architecture

In light of the theories of form perception we have referred to in the preceding sections, the perennial question of the origins of architecture, which had occupied architectural theorists since Vitruvius, can be seen now from a different perspective. Vitruvius had assumed that the Greek artist who built the temple needed a model to imitate, and that this model was the wooden hut. From the point of view of the theories of form perception, we could interpret Vitruvius' primitive model as a materialistic version of what Kaufmann calls the Gestalt-Ideal and Gombrich the conceptual schema. We have already anticipated this conclusion in our discussion of Laugier's *cabane*, in Chapter 6, where we have contended that the *cabane* is more a conceptual structure than a structure in the sensible, physical sense. Now, after having studied the different theories of form perception, it is possible to contend that what Vitruvius and Laugier tried to convey with their respective primitive models was nothing other than the notion of conceptual schema, an abstract form that guides the artist in his creation.

In fact, a similar interpretation of Vitruvius' theory was advanced by Gombrich. With regard to the theory of imitation of Vitruvius, Gombrich writes that "if he was right, which it is hard to doubt, the origins of the classical tradition in architecture lie in 'mimicry'-only this time it is the more expensive but more durable material of marble which is used to simulate the traditional timber structure."⁶¹ But, Gombrich also suggests another reading of Vitruvius' text: "Can it have been anything but the tenacity of perceptual habits which had come to expect certain structural elements?"⁶² What Gombrich seems to imply with this comment is that if the Doric temple was an imitation of the wooden hut, was not so much the material, physical hut what was being imitated as the conceptual schema of the hut that existed in the minds of the builders.⁶³

⁶¹Ibid., p. 176.

⁶²Ibid.

⁶³Gombrich tries to give expression to the phenomenon of the persistence of form, by which some forms in art remain active long after the original causes that brought them about have disappeared: "The familiar will always remain the likely starting point for the rendering of the unfamiliar; an existing representation will always exert its spell over the artist even while he strives to record the truth." Gombrich, *Art and Illusion*, p. 73.

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Arnheim has also explicitly referred to the work of previous architectural theorists, in particular to Laugier. According to Arnheim, Laugier's *cabane* represents "the Platonic *eidōs* of the building."⁶⁴ Arnheim's contention cannot be uncritically accepted though. Probably, the identification of the primitive hut with the Platonic *eidōs* is more true for Vitruvius than for Laugier. As we have seen in Chapter 3, Vitruvius' theory can be seen as an adaptation of the Platonic doctrine of imitation to architecture. But in the case of Laugier, however, the contention that the *cabane* stands for the Platonic *eidōs* would be more difficult to support since the *cabane* is more an abstraction of the mind than an eternal Idea. It is surprising, though, that Arnheim has not proposed a closer connection between his 'structural skeleton' and the *cabane* of Laugier; a connection that is much more justified than the one he proposes between Laugier's *cabane* and the Platonic *eidōs*.

Objective form

The possibility that there is an objective component in every artistic form, which transcends the subjectivity of the artist, has been considered by art and architectural theorists at different times. In the Renaissance, this objective form was the idea that the viewer was supposed to perceive in the building. In the eighteenth century, the objective form was associated with the geometric solids. For the theorists in the nineteenth century, there was in every style an inner, objective form that should be distinguished from the outer, subjective forms. The *Grundgestalt* of Hübisch, the *structure* of Viollet-le-Duc and the *Vier Elemente* of Semper represented this objective component of art form.

Similarly, most of the theories of form perception that emerged at the turn of the twentieth century, assumed that there is an objective form that makes perception possible. Concepts like real form (*Daseinsform*), mental image (*Vorstellung*), structural skeleton and conceptual schema, convey the notion of an objective content of thought, or simply a *form*, that can be related with the notion of form-type that we have postulated in the previous chapters.⁶⁵ Indeed, all of those concepts have something in common: they appeal to notions that, though conceived by the mind, transcend the individual subject. The form of a cube, for example, is a concept shared by different beholders; it is a universal, as Gombrich claims, but in the formal sense. By the same token, the form of a central plan building, can also be thought as an objective form that exists independent of the architect's will.⁶⁶

⁶⁴Arnheim, *The Dynamics of Architectural Form*, p. 249.

⁶⁵An opposite view has been held by Rasmussen, who thought that there cannot be any objective idea in perception: "There is no objectively correct idea of a thing's appearance, only an infinite number of subjective impressions of it." S. E. Rasmussen, *Experiencing Architecture*, 1959, p. 36.

⁶⁶This objectivized form, that pervades the theories of form perception, is also a constituent part of contemporary art. In this connection, it is not surprising that from the readings of Arnheim and others, one has the impression that the works of contemporary art are mere illustrations of the theories of perception. The following commentary by Yve-Alain Bois on a painting by De Stijl painter Vilmos

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In accordance with the law of *Prägnanz* formulated by Gestalt psychology, most theorists who have studied art from the point of view of perception, have also assumed that the conceptual scheme that arises in the beholder's mind has to be the simplest possible form.⁶⁷ The idea of simplicity, that eighteenth century writers considered an attribute of the creations of nature, re-emerges now, in the theories of form perception, as a characteristic of the intellectual creations of the mind.

It is in the theories of Boullée, however, where the most manifest correspondence between the artistic theories based on the psychology of form perception and the previous body of architectural theory can be observed. As we have seen in Chapter 5, in his *Essai sur l'art* Boullée had referred to the analogy of the perceived objects '*avec notre organisation*'. Hildebrand, used the same word, *Organisation*, to advocate a similar correspondence between nature and man: "*Diese Grundrichtungen der äußeren Naturerscheinung entsprechen denen, die in unserer Organisation liegen, d.h. die wir von ihnen empfinden.*"⁶⁸ Other ideas expressed by Boullée are likely to be found among the texts of the theorists of perception. Boullée had manifested a predilection for simple geometric forms on the basis that they are the ones that better conform to our organisation, and therefore, can be more easily apprehended. A similar contention is made by Gombrich. For Gombrich, the geometric solids are the 'visual hypothesis' that make perception possible. When we perceive a geometric solid -Gombrich argues- it is not necessary to go through multiple cycles of generation of visual hypothesis and corroboration with visual impressions. A cube is immediately perceived as a cube, because the impressions match the visual hypothesis: "Take any regular body, a plain cube or a sphere; walking around it or merely turning it in our hands we have no difficulty in anticipating the aspects which will come into view." Although, with different arguments, Gombrich, like Boullée, thinks that the real form of simple geometric solids can be immediately apprehended, at a single glance.

The opposition between forms that are easily apprehensible and forms which are not, is a recurrent topic in the texts of theorists who have studied art from the point of view of the psychology of perception. Wölfflin had resorted to such opposition to distinguish between Renaissance and Baroque, while Frankl formulated it in terms of *Einbildig* and *Vielbildig* forms. Arnheim and Gombrich have also invoked a similar distinction between forms that are easily apprehended and forms that the mind cannot grasp easily. A similar distinction was already

Huszar is a point in case: "In one of his most successful works, a black and white linocut published in *De Stijl*, it is impossible to discern the figure from the ground"[my italics]. Y. A. Bois, *Painting as Model*, 1993, p. 105.

⁶⁷The law of *Prägnanz* formulated by Gestalt psychology, says that "psychological organization will always be as 'good' as the prevailing conditions allow", where 'good' "embraces such properties as regularity, symmetry, simplicity and others." K. Koffka, *Principles of Gestalt Psychology*, 1935, p. 110.

⁶⁸Hildebrand, op. cit., p. 52.

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made in the past by architectural theorists who had opposed the classic architecture of the Renaissance to the Gothic. Palladio, for example, rejected Gothic architecture on the grounds that their forms lend to 'confusion', and Francesco Milizia also criticized Gothic on similar grounds.⁶⁹

Type as epistemological form

In previous chapters we have referred to the differences between the Platonic Idea and the Renaissance Idea proposed by Panofsky: the first would be an eternal essence that exists in its own distant world, while the second would be a concept in the mind of the artist. Also, with regard to the distinction between the Renaissance Idea and the notion of Type that emerged in the eighteenth century, we have maintained that while the Renaissance Idea still has some metaphysical connotations, the notion of Type stands basically for the epistemological meaning of Form.

In the theories of the psychology of perception postulated at the beginning of this century, the epistemological meaning of Form continued being predominant. A point in case is the following example offered by Gombrich. He considers three different stone constructions, two irregular ones (the 'cyclopean wall' and the 'crazy paving'), and a regular one made up of rectangular blocks arranged in a grid pattern. Then he asks himself why a lover of irregularity would find the regular pattern dreary or monotonous, and he answers: "Is it not because it can be taken in so easily that it leaves our perceptive process without enough work to do, while the crazy pavement presents so much variety that we could never fully grasp it, let alone memorize it?"⁷⁰ Like other architectural theorists did before, Gombrich is assuming that perception has mostly an epistemological meaning, and that the value that the viewer assigns to the object is in relation to the mental effort necessary to apprehend the object's form.⁷¹

⁶⁹The distinction between forms that are easily apprehended and forms which are not, is not confined to architectural forms but can be applied to all kinds of forms. Thus, it can be contended that there are basically two kinds of form. First, there are forms that, by lending themselves towards comparison and generalization, can be assimilated into a simple scheme, amenable to geometric description. The forms of classical buildings would belong to this category, since they give rise to the idea of order and unity among the parts. Certain forms of nature also belong to this class like, for example, minerals. These are the sorts of form that we are likely to identified with Type. Second, there are forms that, because of their intrinsic complexity cannot be grasped by the mind and, therefore, cannot be assimilated to a geometric pattern, schema or type. In architecture, the forms of the Gothic, the Baroque or the Art Nouveau, would correspond to this second class, and among the natural forms, the form of a tree is an example of a non-apprehensible form. As Gombrich says "how much can we tell about the spatial relations of its tree branches[...]One would have to ask a number of observers to make a wire model of the trees concerned to bring out the different readings of the same image." Gombrich, *Art and Illusion*, pp. 223-224.

⁷⁰Gombrich, *The Sense of Order*, p. 8.

⁷¹It should be noticed though, that Gombrich is assuming that there are viewers for whom the contemplation of a regular and symmetrical form might be uninteresting. Boullée, we should remember, had dismissed the possibility that irregular forms could ever arouse pleasure in a viewer.

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The emphasis on the epistemological or cognitive aspects of form perception, however, does not necessarily exclude the aesthetic experience. As Roger Fry has contended, the notion of a generic, abstract form that transcends the individual cases, has a meaning in art as well as in science: "The particularising and the generalising [aspects of science] have their counterparts in art. Curiosity impels the artist to the consideration of every possible form in nature: under its stimulus he tends to accept each form in all its particularity as a given, unalterable fact. The other kind of intellectual activity impels the artist to attempt the reduction of all forms, as it were, to some common denominator which will make them comparable with one another. It impels him to discover some aesthetically intelligible principle in various forms, and even to envisage the possibility of some kind of abstract form in the aesthetic contemplation of which the mind would attain satisfaction – a satisfaction curiously parallel to that which the mind gets from the intellectual recognition of abstract truth."⁷² This 'abstract form', that Fry is referring to, bears strong similarities to the notion of Type that we have been advocating in the preceding chapters. In this connection, it can be contended that this epistemological meaning of Form that the notion of Type stands for, is not strictly scientific. Rather, it is more appropriate to say that the notion of Type is neither scientific nor artistic but resides in a territory in which the dividing line between art and science is difficult to establish.

9.4 Representation as reality

In light of the new theories of perception, some of the tenets of Platonic philosophy, like the strict separation of the world of reality and the world of appearance started to be questioned. From a contemporary perspective, the two worlds of Plato's system, the world of Ideas and the world of Images, no longer suffice to explain the existence of contemporary art and science. The two-world system of Plato (Idea-Image) has now been replaced by a three-world system in which the world of Representation transcends the two divided realms of Subject and Object (Figure 9.1). Nevertheless, this three-world system -popularized by Karl Popper- should be seen as an update of the Platonic system rather than a rejection of Plato's philosophy.⁷³

⁷²R. Fry, *Vision and Design*, 1920, p. 56.

⁷³Popper has described his three-world model in the following terms: "We may distinguish the following three worlds or universes: first, the world of physical objects or of physical states; secondly, the world of states of consciousness, or of mental states, or perhaps of behavioural dispositions to act; and thirdly, the world of objective contents of thought, especially of scientific and poetic thoughts and of works of art." He acknowledges then the relationship between his model and the one of previous thinkers, including Plato: "Thus what I call 'the third world' has admittedly much in common with Plato's theory of Forms or Ideas, and therefore also with Hegel's Objective Spirit, though my theory differs radically, in some decisive aspects, from Plato's and Hegel's. It has more in common still with Bolzano's theory of a universe of propositions in themselves and of truth in themselves, though it differs from Bolzano also. My third world resembles most closely the universe

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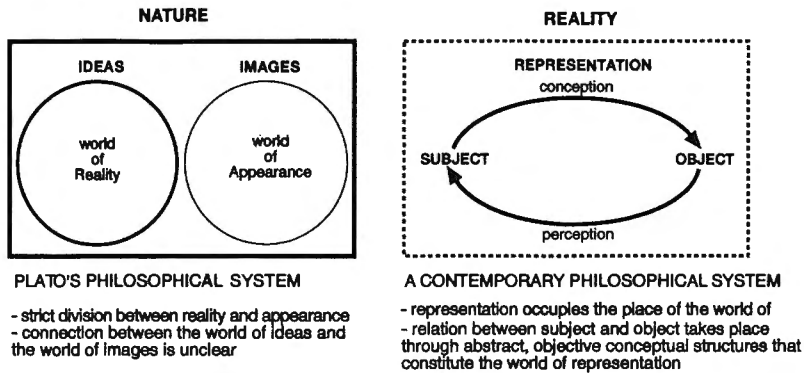


Figure 9.1. Plato's philosophical system versus a contemporary system.

In Plato's system, the connection between Ideas and Images (i.e. the intellectual and sensible world) was never clearly solved, partly because in his system the mind did not play an active role in bridging the gap between the two opposite worlds. In later philosophical systems, the opposition Idea-Image gave place to the split Subject-Object. After Kant questioned the existence of a 'thing in itself' (*Ding an sich*), the relation between subject and object started to become problematic.⁷⁴ At the current stage of development of Western thought, the realm of Representation (the realm of 'objective contents of thought' for Popper) has become the ultimate reality, playing a similar role as the world of Ideas played in Plato's system. It is to this realm to which the notion of Type ultimately belongs.⁷⁵

Another of the tenets of Plato's doctrine, the notion of art as imitation, has also been put under scrutiny. After the invention of photography and the advent of abstract art, it has become no longer possible to maintain that reality can be passively imitated. In this light, Plato's *mimēsis* has come to be interpreted more as 'representation' than as 'imitation'. Ernst Gombrich has been a leading advocate of this review of the traditional notion of art as imitation. In *Art and Illusion* he wrote that "the more we think about Plato's famous distinction between making and imitating, the more these border lines become blurred[...]In other words, there is a smooth and even transition, dependent on function, between what Plato called

of Frege's objective contents of thought." K. Popper, 'Epistemology Without a Knowing Subject', in *Objective Knowledge*, 1972, p. 106.

⁷⁴As Panofsky had contended, "we believe to have realized that artistic perception is no longer faced with a 'thing in itself' than is the process of cognition." Panofsky, *Idea*, p. 126.

⁷⁵As Hildebrand put it, "ob wir in der Natur einen derartigen für uns einheitlichen Typus vorfinden, oder ob der Künstler ihn schafft, ist einerlei; in beiden Fällen hat er für uns die gleich Realität." Hildebrand, op. cit., p. 80.

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'reality' and what he called 'appearance'.⁷⁶ Nelson Goodman has also contributed to a reconsideration of the doctrine of imitation. For Goodman, resemblance is not necessary condition for a picture to represent something: "The plain fact is that a picture, to represent an object, must be a symbol for it, stand for it, refer to it; and that no degree of resemblance is sufficient to establish the requisite relationship of reference. Nor is resemblance necessary for reference; almost anything may stand for almost anything else."⁷⁷

At this point, we should ask how architecture is affected by these changes taking place in the context of the history of ideas. It is a fundamental assumption of this work that architecture participates of the changes that take place in the history of ideas, and that these changes have their counterpart in the conception of architectural form. Thus, as Plato's two-world system has been redefined, architectural form has accordingly changed. In a Popperian three-world system, architecture loses the privilege position it had in Plato's system, namely, as the art that, unlike painting and sculpture, belongs to the world of Ideas. Now, architecture, painting and sculpture, as well as language and scientific theories, are all part of the same realm: the realm of Representation. It is precisely within this conceptual realm of Representation where the modern conception of architectural form has been forged.

⁷⁶Gombrich, *Art and Illusion*, p. 84.

⁷⁷N. Goodman, *Languages of Art*, 1976, p. 5. After the abandonment of figuration in painting and the rise of abstract art, it has become clear that there cannot be sensible imitation in art, and that all imitation is abstract imitation, including naturalistic representation. In the terms expressed by Nelson Goodman, art can be seen now a sort of language where "representations, then, are pictures that function in somewhat the same way as descriptions. Just as objects are classified by means of, or under, various verbal labels, so also are objects classified by or under various pictorial labels." Ibid. p. 29. The resemblance between the sensible world and a picture is no longer a determinant of the realism of the picture: "Realism is a matter not of any constant or absolute relationship between a picture and its object but of a relationship between the system of representation employed in the picture and the standard system." Ibid. p. 38. In other words, Goodman contends that "realistic representation, in brief, depends not upon imitation or illusion or information but upon inculcation. Almost any picture may represent almost anything; that is, given a picture and object there is usually a system of representation, a plan of correlation, under which the picture represents the object." Ibid. Furthermore, "that nature imitates art is too timid a dictum. Nature is a product of art and discourse." Ibid. p. 33.

9.5 The perceptual nature of architectural form

9.5.1 Perception as conception

In the theories of vision postulated by eighteenth century philosophers, it was assumed that sensations and ideas were two different things: the first were impressions coming from the outside world, the second were creations of the mind. Gestalt psychology questioned such a view, eminently inductive, of perception. A Gestalt exemplifies the intimate connection that exists between sensory images and abstract concepts. Also, in contrast to previous theories, the modern theories of perception have emphasized the creative dimension of the perceptual activity. Perception is no longer the passive reception of impulses coming from the outside world. Rather, it is now believed that the very fact of seeing something already implies the existence of a concept in the mind.

Most of the writers who have been concerned with the application of the psychology of perception to art and artistic theory, have acknowledged the eminently creative dimension of perception. We have already referred to the creative value that Kaufmann assigns to the Gestalt-Ideal, i.e. the concept that guides the creations of artists at a given time. For Arnheim, a building is the embodiment of a concept: "Since all human thoughts must be worked out in the medium of perceptual space, architecture, wittingly or not, presents embodiments of thought when it invents and builds shapes."⁷⁸ Arnheim, also gives his 'structural skeleton' a double significance: from the point of view of perception, the 'structural skeleton' is the pattern that the viewer derives from the percept; from the point of view of conception, it corresponds to the idea, theme or germ from which the creative process in the architect's mind begins. Referring to the notion of 'structural skeleton', Arnheim writes: "I have described it as the carrier of the building's principal meaning, which the viewer must grasp if he is to understand the design as a whole. We need to add here that this basic theme is also the germ of the idea that guides the architect in developing his design."⁷⁹

⁷⁸Arnheim, *The Dynamics of Architectural Form*, p. 274.

⁷⁹Ibid., p. 270. Arnheim does not want to imply with this, that both creative process, the conceptual and perceptual are exactly alike: he admits that the creative process of the architect can be more chaotic and disorganized than the corresponding creative process carried out by the beholder. In another part, he writes that "this does not necessarily mean that in the actual chronological course of events every architect starts with this relatively simple core concept and proceeds gradually to more and more detail. In actual practice, the first spark of an invention may come from the specific image of a particular aspect, from which one may work one's way back to the central theme. More often than not, the creative process moves fairly erratically back and forth between conceptions of the whole and of the parts. Only when one surveys the process in its entirety does one become aware of the logical order that leads from the basic theme to its final embodiment." Ibid., p. 270.

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Other authors, among them Rasmussen and Gombrich, have postulated a direct correspondence between both creative process, the conceptual and the perceptual one. According to Rasmussen, perception is essentially a creative activity, by which the spectator “re-creates the phenomena he observes in his effort to form a complete image of what he has seen.”⁸⁰ Therefore, in order to grasp the concept embedded in the building, the viewer has to carry out a creative effort which is essentially the same as the one that before took place in the architect’s mind: “The mental process that goes on in the mind of a person who observes a building in this way is very much like that which goes on in the mind of an architect when planning a building.”⁸¹ Similarly, Gombrich has contended that “it is only by reconstructing in our mind the possible sequence of operations which resulted in the final design that we may come nearer to an understanding of this aspect of craftsmanship.”⁸²

9.5.2 The perceptual nature of architectural form

This equivalence of perception and conception, that the psychology of form has brought to light, has a special relevance for architecture, and particularly, for the understanding of the modern conception of architectural form. If there has been a continuous line of evolution in the architecture of the last five hundred years, this has to do with the search for an identity of the perceptual and conceptual realms. In the Renaissance, architects were already concerned with the effect that the building has on the spectator. Palladio designed buildings with the expectation that the beholder would grasp their idea (i.e. their beauty). In the time that passed between the Renaissance and the emergence of the Modern Movement, the desire to achieve the complete intelligibility of architectural form continued, in spite of different interludes (Baroque, Rococo, eclecticism, Art Nouveau).

It is our contention that this trend, whose goal was to achieve the complete identity of conceptual and perceptual form, began with Palladio, continued with Boullée and culminated with Le Corbusier (see Chart 9.1). Palladio had already pursued the identity between *form-as-conceived* and *form-as-perceived*, but in his buildings the classical forms still played a decisive role. Boullée equated architectural form with geometric solids and relegated classical forms to a secondary role. In this way, he came closer than anybody else before to attaining the identity of conceptual and perceptual form. With Le Corbusier, a complete identification of conceptual and perceptual realms is finally achieved: in his buildings, the classical forms have completely disappeared, while the formal vocabulary consists exclusively of geometric forms.

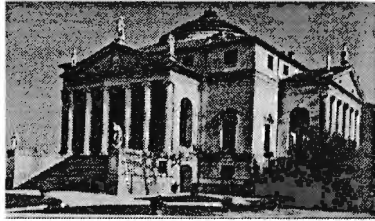
⁸⁰Rasmussen, op. cit., p. 35.

⁸¹Ibid., p. 44.

⁸²Gombrich, *The Sense of Order*, p. 75.

THE GEOMETRIZATION OF ARCHITECTURAL FORM

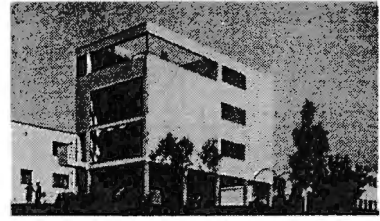
Palladio



Boullée



Le Corbusier



THE IDENTITY OF CONCEPTION AND PERCEPTION

- a viewer must grasp the harmonic relations between the parts of the building

- the form of the building must conform to the organization of the beholder's mind

- a building is conceived and perceived as solids

- the form of geometric solids can be grasped at a single glance

Renaissance *Modern Movement*

PERCEPTION AND ARCHITECTURAL FORM

- integration of geometric and classical forms into a unified building form

- geometric solids are the primary elements of composition

- geometric form as architectural form

- geometric form is mostly an invisible, conceptual form

- geometric form stands for the visible, sensible building form

- classical forms have been eliminated

- classical forms become secondary

Chart 9.1. The geometrization of architectural form.

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9.5.3 Le Corbusier: the identity of conception and perception

Paul Zucker, in his article 'The Paradox of Architectural Theories at the Beginning of the 'Modern Movement'', 1951, contended that at the time when the Modern Movement was being born, art and architectural theorists, particularly those belonging to the German tradition, were not addressing the issue at the root of the new developments of art, which according to Zucker, was functionalism. Instead, those theorists would have concentrated their interest on perception. Zucker maintained that "the basic theoretical concepts in Germany seem to contradict the prevailing trends of the creative architects then at work."⁸³

In our view, there was no such disagreement between the prevalent artistic theories in the beginning of the century and the ideas that inspired the architecture of the Modern Movement. The identity of the conceptual and perceptual realms, advocated by the psychology of perception, finds its architectural counterpart in Le Corbusier's *Vers une architecture*. This does not mean, obviously, that the relation between form and function was not a fundamental issue in the development of the Modern Movement. We have already analyzed the functionalist side of *Vers une architecture* in our previous chapter. Now, we will concentrate on the perceptual side of Le Corbusier's text. As we will see in the following discussion, references to issues related to perception are so abundant in Le Corbusier's text, that it would be no exaggeration to contend that perception, more than functionalism, is the main subject-matter of the book.

The conceptual dimension of architecture

Architecture is for Le Corbusier an intellectual production of the mind. Almost paraphrasing Boullée, he contends that architecture is a '*pure création de l'esprit*'.⁸⁴ In his particular account of the origins of architecture, Le Corbusier emphasizes the intellectual aspects involved in the creation of architectural form: "*L'homme primitif a arrêté son chariot, il décide qu'ici sera son sol. Il choisit une clairière, il abat les arbres trop proches, il aplanit le terrain alentour; il ouvre le chemin qui le reliera à la rivière ou à ceux de sa tribu qu'il vient de quitter; il force les piquets qui retiendront sa tente. Il l'entoure d'une palissade dans laquelle il ménage une porte. Le chemin est aussi rectiligne que le lui permettent ses outils, ses bras et son temps. Les piquets de sa tente décrivent un carré, un hexagone ou un octogone. La palissade forme un rectangle dont les quatre angles sont égaux, sont droits. La porte*

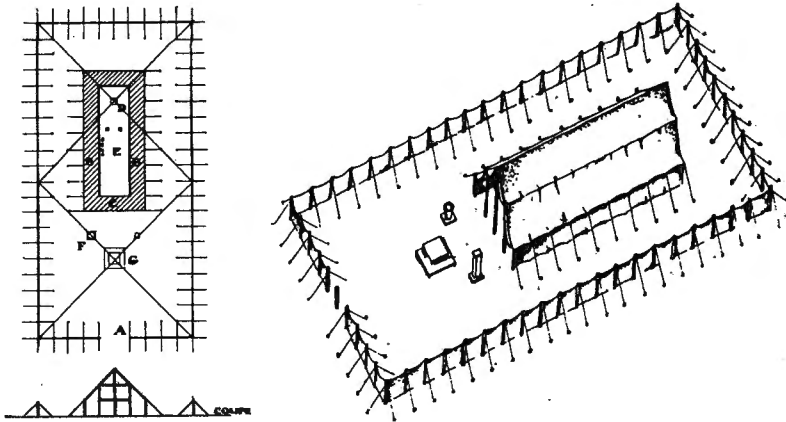
⁸³P. Zucker, 'The Paradox of Architectural Theories at the Beginning of the 'Modern Movement'', 1951.

⁸⁴There seems to be no evidence though, that Le Corbusier had read the *Essai sur l'art* from Boullée, since his *Essai* was only published in 1953, after being hidden for more than a century. Werner Oechslin has suggested that Charles Blanc's 'Grammaire des Arts du dessin' would have been the missing link between both, Boullée and Le Corbusier. See Oechslin, 'Emouvoir-Boullée and Le Corbusier', 1988.

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de la hutte ouvre dans l'axe de l'enclos et la porte de l'enclos fait face à la porte de la hutte"⁸⁵(Figures 9.2, 9.3).

Le Corbusier's description of the *temple primitif* is basically the description of the first architectural thought: "Il n'y a pas d'homme primitif; il y a des moyens primitifs. L'idée est constante, en puissance dès le début."⁸⁶ Architecture did not originate in the wooden house, neither were architectural forms copied from the forms of nature, as Vitruvius had contended. For Le Corbusier, architecture was, from the very beginning, a conscious act of intellectual creation made with the conceptual tools with which the mind is equipped, namely, geometry and mathematics. The most relevant aspect of the primitive house are the geometric figures, the square, hexagon or octagon; symbols of the '*mathématique primaire*'.



Figures 9.2, 9.3. Le Corbusier, the *temple primitif*. From *Vers une architecture*.

This explicit reference to the conceptual tools of the mind (geometry, mathematics) distinguishes Le Corbusier's rendition of the origins of architecture from those of Vitruvius and Laugier. Laugier, and also Vitruvius, take for granted that their primitive constructions are rectangular, but they do not make any explicit mention to geometric figures as mental constructs. Still, one more aspect distinguishes Le Corbusier's primitive construction from the primitive hut of Laugier: this has to do with the relation between architecture and nature. Laugier's hut fits naturally into his settings; it is almost part of nature. The hut of Le Corbusier does not fit 'naturally' (in every sense of the word) into the settings: the site has to be flattened and the trees need to be cut. While Laugier thinks of the primitive hut as a creation of nature, Le Corbusier contends the opposite: that the first construction is more the product of man than of nature.

⁸⁵Le Corbusier, *Vers une architecture*, 1923, p. 53.

⁸⁶*Ibid.*, p. 53.

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If nature plays any role in Le Corbusier's account of the origins of architecture, this has to do with instincts. Le Corbusier asks: "*La plupart des architectes n'ont-ils pas oublié aujourd'hui que la grande architecture est aux origines mêmes de l'humanité et qu'elle est fonction directe des instincts humains?*"⁸⁷ We must recall that Vitruvius had also appealed to instincts in order to explain the origins of the primitive house. But, Vitruvius and Le Corbusier have different meanings for 'instincts'. Vitruvius considers that men behaved in an instinctive way when they piled up the logs to build the primitive houses, in the same way as swallows did to build their nests. Therefore, instincts are for Vitruvius what human beings have in common with other beings created by nature. In contrast to Vitruvius' view, instincts are for Le Corbusier what separates humans from nature. He considers that the conceptual mechanisms with which the mind is endowed, basically, geometry and mathematics, are part of the human instinct. Thus, he writes that "*mais en décidant de la forme de l'enclos, de la forme de la hutte, de la situation de l'autel et de ses accessoires, il a été d'instinct aux angles droits, aux axes, au carré, au cercle.*"⁸⁸

The perceptual nature of architectural form

The importance that Le Corbusier assigns to the perceptual nature of architectural form, makes him a direct follower of Boullée and, in general, of all those architects and theorists who in the past advocated the intelligibility of architectural forms. In a statement that Boullée could have made his, Le Corbusier praises simple volumes because "*les formes primaires sont les belles formes parce qu'elles se lisent clairement.*"⁸⁹ Like Boullée, Le Corbusier is also attracted to geometric solids because he thinks that they can be easily apprehended. Similarly, the following account of the perception of architectural form, could also have been subscribed by Boullée: "*L'oeil du spectateur se meut dans un site fait de rues et de maisons. Il reçoit le choc des volumes qui se dressent à l'entour. Si ces volumes sont formels et non dégradés par des altérations intempestives, si l'ordonnance qui les groupe exprime un rythme clair, et non pas une agglomération incohérente, si les rapports des volumes et de l'espace sont faits de proportions justes, l'oeil transmet au cerveau des sensations coordonnées et l'esprit en dégage des satisfactions d'un ordre élevé: c'est l'architecture.*"⁹⁰ Finally, one more point of contact between Boullée and Le Corbusier has to do with their references to light. In particular, the following statement included in *Vers une architecture* could have been written by Boullée as well: "*Les cubes, les cônes, les sphères, les cylindres ou les pyramides sont les grandes formes primaires que la lumière révèle bien; l'image nous en est*

⁸⁷Ibid., p. 55.

⁸⁸Ibid., p. 54.

⁸⁹Ibid., p. 13.

⁹⁰Ibid., p. 35.

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*nette et tangible, sans ambiguïté. C'est pour cela que ce sont de belles formes, les plus belles formes."*⁹¹

As some previous theorists, Le Corbusier was also critical with Gothic architecture. We have already referred to Palladio and Milizia, who had dismissed the Gothic on the grounds that its forms could not be easily apprehended by the eye and, therefore, produced confusion in the beholder. In the twentieth century, another art theorist, Worringer, went even further in his rejection of Gothic contending that "Gothic has nothing to do with beauty."⁹² In much the same way as Worringer, Le Corbusier was willing to expel Gothic from the realm of aesthetic experience. He contended that the forms of the Gothic do not have a 'plastic' quality, meaning that they cannot be seen in terms of primary solids: "*L'architecture gothique n'est pas, dans son fondement, à base de sphères, cônes et cylindres....Une cathédrale nous intéresse comme l'ingénieuse solution d'un problème difficile, mais dont les données ont été mal posées parce qu'elles ne procèdent pas des grandes formes primaires. La cathédrale n'est pas une oeuvre plastique; c'est un drame: la lutte contre la pesanteur, sensation d'ordre sentimental.*"⁹³ In contrast to the forms of the Gothic, Le Corbusier thought that the forms of others styles lend themselves to an interpretation in terms of simple geometric figures: "*L'architecture égyptienne, grecque ou romaine est une architecture des prismes, cubes et cylindres, trièdres ou sphères: les Pyramides, le Temple de Louqor, le Parthénon, le Colisée, la Villa Adriana.*"⁹⁴

For Le Corbusier, therefore, the most important value of architectural form is 'perceptual', or 'plastic', as he puts it. The 'perceived form' is for him more real than the 'actual form' of the building. When he describes the Parthenon, he does not 'see' the actual columns; he sees instead cylinders [underline mine]: "*La lumière étend son impression au dehors par les cylindres (je n'aime pas dire colonnes, c'est un mot abîmé) des péristyles ou les piliers*" ⁹⁵(Figure 9.4).

⁹¹Ibid., p. 16.

⁹²Worringer: "Gothic has nothing to do with beauty[...].Let us therefore rid Gothic of any connection with the term aesthetic." In *Abstraction and Empathy, a Contribution to the Psychology of Style*, p. 11; (English translation of *Abstraktion und Einfühlung, ein Beitrag zur Stilpsychologie*, 1908). Quoted by D. Watkin, *The Rise of Architectural History*, 1983, p. 15

⁹³Le Corbusier, op. cit., p. 19.

⁹⁴Ibid., pp. 16-19.

⁹⁵Ibid., p. 150.

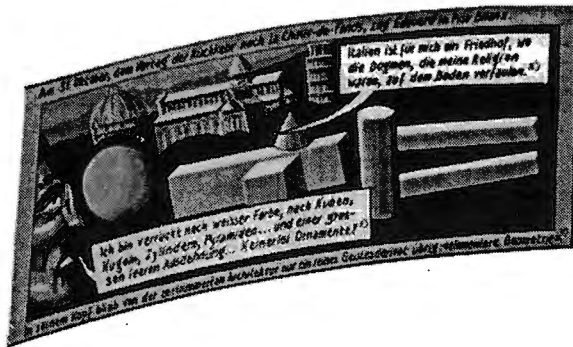


Figure 9.4. Le Corbusier's world of perceptual figures. From Sambal Oelek, *Jünglingserwachen*.

What distinguishes Le Corbusier from other architects who had previously expressed similar thoughts regarding the perceptual nature of architectural form, is that for Le Corbusier the 'mode of perception' has also a conceptual value. In the architecture of Le Corbusier, conception and perception become equated: when he sees the Parthenon or the Coliseum he thinks of cylinders and spheres, and when he conceives his buildings he thinks in terms of composition of solids. Architectural forms do not only have to appear as geometric solids; they *are* geometric solids. It is understandable then that Le Corbusier admired buildings like silos, whose forms not only look like cylinders but *are* in fact cylinders.

Tracés régulateurs: the link between conception and perception

The exchangeable role that conceptual and perceptual realms have for Le Corbusier is manifested in the idea of the *tracés régulateurs*. The *tracés* are geometric diagrams that Le Corbusier draws over the elevations of some memorable buildings of the past, like Notre Dame in Paris or the Capitolium at Rome. This sort of geometric diagrams, superimposed on the elevations of buildings, are part of a tradition related to the classical doctrine of proportions.

Presumably, Le Corbusier found inspiration for the *tracés* in the illustrations of Auguste Choisy's *Histoire de l'Architecture*. Choisy already thought that this sort of diagrams could have a double meaning, perceptual and conceptual. He thought that they could be seen as tools for analysis of historical works but also as instrument for design: "*Les proportions des édifices sont-elles régies par ce vague sentiment de l'harmonie qu'on nomme le goût, ou bien résultent-elles de procédés de tracé définis et méthodiques?*"⁹⁶(Figure 9.5). The question that Choisy was raising here was whether these geometric diagrams, representing certain

⁹⁶A. Choisy, *Histoire de l'Architecture*, [1954], vol. 1, p. 48.

proportions, were in fact a design mechanism that would secure a pleasing effect on the viewer.

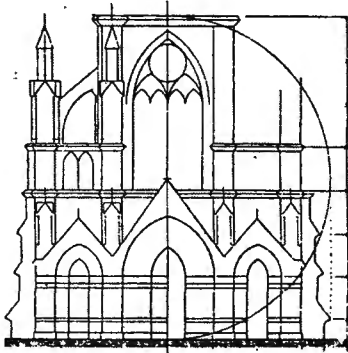


Figure 9.5. A. Choisy. *Les rapports simples* in a Gothic facade of the XIIIth century.

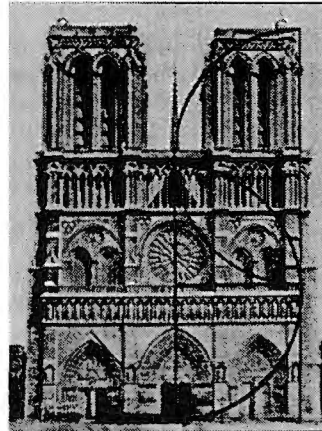


Figure 9.6. Le Corbusier. *Les tracés régulateurs* superimposed to a photograph of Notre-Dame.

Similarly to Choisy's diagrams, Le Corbusier's *tracés* also had a perceptual and conceptual meaning. In its perceptual sense, the *tracés* are the outline that the eye recognized in a well-proportioned building. In this regard, he thinks that "*le tracé régulateur est une satisfaction d'ordre spirituel qui conduit à la recherche de rapports ingénieux et de rapports harmonieux. Il confère à l'oeuvre l'eurythmie.*"⁹⁷ But he also thinks that the *tracés régulateurs* have a conceptual value since they are an instrument that guarantees a correct design, or as he says, they are "*une assurance contre l'arbitraire.*"⁹⁸ The *tracés*, therefore, are the link between two realms, perceptual and conceptual: "*Le tracé régulateur apporte à l'oeuvre cette mathématique sensible qui nous donne la perception bienfaisante de l'ordre*"⁹⁹(Figure 9.6).

Perception and representation

Paradoxically, while Le Corbusier defends the use of mechanisms like the *tracés régulateurs* in the design of a building, he criticizes the artificiality of the *Beaux-Arts* method of composition. He thinks that "*les axes de L'Ecole des Beaux-Arts sont la calamité de l'architecture. L'axe est une ligne de conduite vers un but. En architecture, il faut un but à l'axe. A l'Ecole on l'a oublié et les axes se croisent en étoiles, tous vers l'infini, l'indefini, l'inconnu, le rien, sans but. L'axe de l'Ecole est*

⁹⁷Le Corbusier, op. cit., p. 57.

⁹⁸Ibid.

⁹⁹Ibid.

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une recette, un truc."¹⁰⁰ The two kinds of axis to which Le Corbusier refers to in the previous passage denote two different conceptions of geometry: one strictly abstract, the other partly sensible. When geometry is thought in purely abstract terms, the lines become basically 'lines on a piece of paper', as in the *Beaux-Arts*. In this case, lines are an abstraction having no relation whatsoever with the viewer's perception of the building. But when geometry is considered as the link between the sensible and abstract worlds, as in Roman architecture, lines become lines of vision and movement (as opposed to purely abstract entities) that make space intelligible.

Le Corbusier criticizes all those architectural examples that are based exclusively on abstract geometry, but neglect its perceptual dimension. He criticizes, for example, the star-like plan of Versailles as well the radial plan of Karlsruhe saying that, in those plans, the axes, tending towards the infinite, cannot be perceived by the eye, and that the star-like form of the plans can only be seen from a bird's eye but not from the eye level. Therefore, star-like forms only make sense in the drawing, but they have nothing to do with the experience of architecture. They are an example of what he calls the '*illusion des beaux plans*'. Le Corbusier reminds then that "*l'homme voit les choses de l'architecture avec ses yeux qui sont à 1m.70 du sol*"¹⁰¹, meaning that the forms of buildings should appear intelligible to the viewer, and not only to the architect that draws the plan on a piece of paper.

While advocating both dimensions of geometry, abstract and sensible, Le Corbusier was in fact reminding us that the two components that are part of architectural form: conceptual and perceptual.

The identity of the sensible and the abstract worlds

The interweaving of conceptual and perceptual realms that characterizes Le Corbusier's thought, reaches its most clear expression in his already classical definition of architecture: "*L'architecture est le jeu savant, correct et magnifique des volumes assemblés sous la lumière.*"¹⁰² According to this definition, it is no longer possible to establish a clear distinction between the world of senses and the world of intellect. In effect, in Le Corbusier's definition we find that a '*volume*',¹⁰³ that in principle is an abstract concept, is illuminated by the '*lumière*', a sensible phenomenon. But the same definition could also be interpreted in a different way, in which the abstract/conceptual character of the words *volume* and *lumière* is

¹⁰⁰Ibid., p. 151.

¹⁰¹Ibid., p. 143.

¹⁰²Ibid., p. 16.

¹⁰³In English translations, 'volume' has been often rendered as 'masses'. Reyner Banham, for example, provides the following translation: "Architecture is the masterly, correct and magnificent play of masses brought together in light." R. Banham, *Theory and Design in the First Machine Age*, p. 224.

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reversed. Thus, it is possible to think of '*volume*' as a perceived form, while '*lumière*' is understood in a figurative sense, as an 'enlightenment' associated with the act intellectual understanding. The fact that both interpretations are possible, only confirms the exchangeability of the conceptual and perceptual realms in Le Corbusier's thought.

9.6 Conclusions

One of the most relevant contributions made by the psychology of perception at the turn of this century has been the recognition of the conceptual character of perception. In the past, the emergence of an 'idea' in the mind had been explained in purely inductive terms; it was an abstract form that the sensory impressions imprint in the mind. In contrast to this 'passive' view of perception, the Gestalt approach aims at overcoming the distinction between ideas and impressions. Both, concepts and percepts, have a distinctive form or Gestalt; and the goal of perception is to achieve a match between concept and percept. Accordingly, the idea or form that arises in the mind is seen as the result of the interaction between the conceptual structures of the mind and the sensorial impressions received from the external world.

We have referred to different terms that have been proposed by different art theorists to name this concept or form that the mind conceives in the act of perception: *Daseinform*, *Gestalt-Ideal*, mental image (*Vorstellung*), structural skeleton and conceptual schema, among others. What these terms have in common is that they refer to a simple, abstract form, that emerges in the mind in the course of the perceptual experience. Each one of those terms, therefore, stands for a concept that is the result of a creative process. But there are differences between those concepts too. The 'structural skeleton' of Arnheim is an attribute of the object that the viewer needs to grasp, while Gombrich's 'conceptual schema' is more an a priori form, a category of the mind.

The equation of conception and perception, propounded by the psychology of form, finds its architectural counterpart in the architecture of the Modern Movement, more precisely, in the ideas and buildings of Le Corbusier. A building of Le Corbusier is an invitation to the viewer to reproduce in his mind the process of formal invention that the artist has first carried out. This way, the perception of a building becomes an act of re-creation. In this context, what determines the failure or success of the aesthetic experience is the possibility to reproduce the process of form invention in the beholder's mind.

Chapter 10

Type and Modern Architecture: From Type to Formal Language

10.1 Introduction

The pioneers of the Modern Movement, in their desire to revitalize architecture, postulated the break with tradition. Architecture needed to be liberated from the influence of historical styles and from inherited form-types. For that reason, style, type and also form, were seen with suspicion by modern architects. Furthermore, some of the pioneers of modern architecture adopted a more radical position and claimed that the new architecture had to be *formless*. In spite of these claims, the work of architects like Wright or Le Corbusier shows still the influence of tradition.

Whereas the notion of form-type had been condemned by the Modern Movement, an opposite reaction took place as soon as modern architecture entered in crisis in the 1960's. At that time, a renewed interest in the architectural tradition brought with it a revitalization of Quatremère's notion of Type. Architects like Aldo Rossi understood Type as an epistemological category with which it would be possible to build a scientific basis for the discipline of architecture. For the advocates of typology, Type was the link between tradition and modernity: it was an abstraction derived from existing architectural works which, in turn, would serve as generative principle for new ones.

Another line of thought present in the development of modern architecture, has to do with the emergence of the notion of formal language as an alternative to the notion of Type. The idea of formal language was already present in the projects of Mies van der Rohe, and it has later been at the core of Peter Eisenman's theory. Eisenman has advocated, at the theoretical and practical level, the abandonment of

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the notion of Type and its substitution by a systematic design process based on the idea of formal language. Eisenman contends that the 'preconceived image' (e.g. type) restricts the creativity of the architect. In his view, a systematic design process would make such 'preconceived image' unnecessary.

10.2 Modern architecture: Type and the break with tradition

In the first decades of this century, avant-garde artists were convinced that a new art and architecture could only emerge after breaking completely with tradition. For some of them, like Le Corbusier, tradition was synonymous with styles: "*Les 'styles' sont un mensonge,*" he proclaimed in *Vers une architecture*. For others, like Theo van Doesburg, tradition meant both style and form-types. At the beginning of his manifest *Towards a plastic architecture*, 1924, he declared: "Form. Elimination of all concept of form in the sense of a fixed type is essential to the healthy development of architecture and art as a whole. Instead of using earlier styles as models and imitating them, the problem of architecture must be posed entirely afresh." For Van Doesburg, modern architecture had to be essentially *formless*: "The new architecture is *formless* and yet exactly defined; that is to say, it is not subject to any fixed aesthetic formal type. It has no mould." Therefore, in order to achieve a genuinely modern architecture, it was necessary to get rid of types: "In contradistinction to all earlier styles the new architectural methods know no closed type, no *basic type*."¹

To liberate architecture from the tyranny of form was the goal shared by every master of modern architecture. Also Mies van der Rohe expressed his repulse against form, or formalism. In a text published by *De Stijl* in 1923 he declared: "We reject all aesthetic speculation, all doctrine and all formalism."² Later, in an article published in *Die Form*, 1927, he reinforced this rejection to formalism: "I do not oppose form, but only form as a goal[...].Form as a goal always ends in formalism."³ Walter Gropius also joined the voices of those who advocated an architecture without form. Basically, what Gropius said was that the form of an object should stem from the functions that the object fulfills. Thus, in *Principles of Bauhaus production*, 1926, Gropius stated that "an object is defined by its nature. In order, then, to design it to function correctly -a container, a chair, or a house- one must first of all study its nature; for it must serve its purpose perfectly, that is, it must

¹"*De nieuwe architectuur is vormloos en toch bepaald, d.w.z. zij kent geen a priori aangenomen esthetische vormschema; geen vorm (in den zin der koekenbakkers), waarin zij de functioneele ruimten, uit de praktische wooneischen ontstaan, giet. In tegenstelling met alle stijlen van voorheen, kent de nieuwe architectonische methode geen in zich gesloten typus, geen grondvorm.*" T. Van Doesburg, 'Tot een beeldende Architectuur', *De Stijl*, XII, 6/7, Rotterdam 1924. English translation published in U. Conrads, *Programs and manifestoes on 20th-century architecture*, 1970, p. 78.

²Originally published in 'G, Material zur elementaren Gestaltung', 1923. English version in Conrads, op. cit., p. 74.

³Originally published in 'Die Form', 1927, number 2, p. 59. English version in Conrads, op. cit., p. 102.

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fulfil its function usefully, be durable, economical and 'beautiful'. This research into the nature of objects leads to the conclusion that by resolute consideration of modern production methods, constructions and materials, forms will evolve that are often unusual and surprising, since they deviate from the conventional."⁴ In other words, novel forms will be produced when the nature of the functional demands, that the form has to respond to, is well understood. Basically, it is the same sort of argument that Le Corbusier was postulating in *Vers une architecture*.

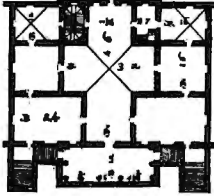
This condemnation of tradition, and the demand of an architecture not conditioned by existing forms, so eloquently expressed by avant-garde architects, does not explain completely the birth of modern architecture in the first two decades of this century. As a matter of fact, the emergence of modern architecture had both the character of an evolution and a revolution. There were ideas which had been forging for some time before they came to light in the first decades of the twentieth century. As we have seen in Chapter 8, the notion that form is the result of function and materials, to which Le Corbusier and Gropius referred, was already present in the theories of Viollet-le-Duc.

But, there are other sort of connections between the Modern Movement and the architectural tradition which have to do not so much with the ideas that modern architects expressed in their writings but with the buildings they created. For example, it can be argued that there is a continuous line of development that begins with the first Prairie houses of Frank Lloyd Wright and leads to the Barcelona pavilion of Mies, and to the two Sonsbeek pavilions built in Arnheim by Gerrit Rietveld and Aldo van Eyck. What takes place along this line of development is 1. the abandonment of the model of the Palladian villa 2. the substitution of that model by a new one: the model of the Prairie house 3. the substitution of both models, Palladian and Wrightian, by the notion of formal language (see Chart 10.1).

⁴Conrads, op. cit., p. 95.

FROM TYPE TO FORMAL LANGUAGE

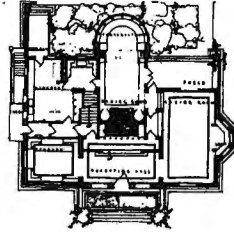
Palladio: the villas



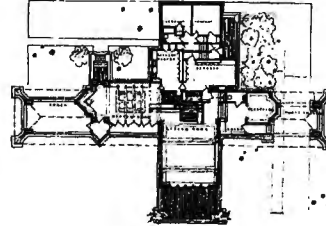
- central void
- symmetry
- predominance of form over space



Wright: the Prairie Houses



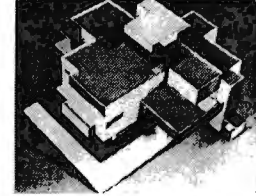
- central mass
- a-symmetry



- predominance of space over form



Van Eesteren - Van Doesburg: the Rosenberg projects

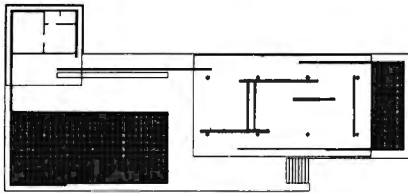


- decomposition of volumes into planes
- predominance of space



FORM SPACE

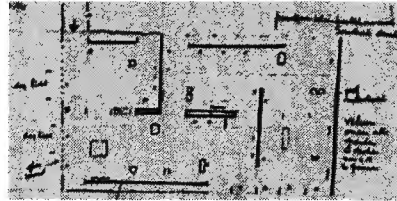
Mies: Barcelona pavillion



- the elimination of form-type
- creation of a formal language: the language of the plane



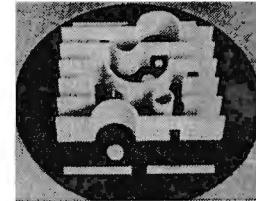
Rietveld: Sonsbeek pavillion



- an utterance in the language of the plane



Van Eyck: Sonsbeek pavillion



- an utterance in the language of the plane



Chart 10.1. The abandonment of type and its substitution by a formal language.

Type and Modern Architecture: From Type to Formal Language

10.2.1 Wright's Prairie houses: the break with the Palladian model

Palladianism was brought to America after having succeeded in England. The new houses in the East coast of the United States were built following the models provided by books like the *Vitruvius Britannicus*, 1715-1725, of Colen Campbell; *A Book of Architecture*, 1728, of James Gibbs, or *Practical Architecture*, c. 1720, by William Halfpenny.⁵ The projects of Thomas Jefferson are the best example of an architecture created after the model established by the Palladian villa.

The Palladian model was still the necessary departure point for Frank Lloyd Wright as can be observed in his earliest designs. The historical task that Wright set up for himself, was to break away with the inherited Palladian model and to come up with an alternative one. In effect, what Wright referred as the 'destruction of the box' was nothing else than the 'destruction of the Palladian model.'

Winslow house

Wright's departure from the model set up by the Palladian villas began with the Winslow house, 1893, the first commission he got after leaving Sullivan's office (Figure 10.1).



Figure 10.1. F.L.L.Wright. W.H. Winslow House, 1893.

The house is a mixture of the Palladian style and the American vernacular. The plan and the front view of the house reference the Palladian model (Figure 10.2). The ground floor plan is composed of five vertical bays: a central one where the hall and the dining room are located; two narrow ones on both sides which, as most Palladian villas, contain the stairs; and two wider ones on each side for the living rooms. In spite of the irregular arrangement of rooms, it is still possible to recognize the same underlying grid as in Palladio's villa Malcontenta. With regard to the exterior, some Palladian features can also be noticed. As the Palladian villas,

⁵R. Tavernor, *Palladio and Palladianism*, 1991, pp. 181-209.

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the Winslow house is basically a solid block topped by the pyramidal roof. Openings are symmetrically arranged in the front facade, and the projecting surface that marks the entrance is still a remnant of the classical portico of the Palladian villa.

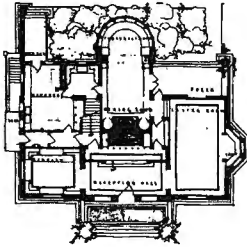


Figure 10.2. F.L.I.Wright. Winslow House, 1893. Ground floor plan.



Figure 10.3. F.L.I.Wright. Winslow House, 1893. View of the back facade.

Even though the house reminds us of the Palladian model, it already contains some of the features which would later characterize the 'Wrightian model'. First of all, unlike the plan of a Palladian villa, the plan of the Winslow house is not strictly symmetrical. Also, there are protrusions in the walls, like those giving rise to bay-windows in the back and side facades, which have no counterpart in Palladio's architecture (Figure 10.3). The polygonal room on the back, is not so much an element added to the main block of the house - as it would be the case with the classical portico attached to the Palladian villa- as it is a protrusion of the wall towards the outside. This projection of the wall can be interpreted as the result of the pressure exerted by the interior space, whose ultimate consequence would be the destruction of the volumetric envelope of the house carried out in later designs.

Other features in the treatment of the exterior of the building equally announce the 'destruction of the box', i.e. the abandonment of the Palladian model. Among them, the long eaves of the roof, which, unlike those of a Palladian villa, extend far beyond the boundaries of the volume of the house. In the front, the projecting roof interacts with the horizontal stripe that tops the wall. This stripe is clearly distinguished from the lower wall by means of a different material and color. The visual effect that this band produces is that the roof is separated from the volume of the house. The shadow cast by the roof overhang further contributes to accentuate the separation of the roof from the volume underneath,⁶ a separation that would be more radically expressed in later projects like the Robie house.

⁶This combined effect of a weaker band in the upper part of the facade together with a projecting roof that cast shadow over it, is characteristic of some traditional architecture, like for example, in the palaces and houses of Palma de Mallorca. In fact, it is the same effect that is achieved in the lateral sides of a Greek temple with the detailing of the frieze and the projecting roof; although, at a different scale.

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Going back to the plan, the most significant change with regard to the model established by the Palladian villa takes place at the center of the house. Invariably, the Palladian villas have an empty hall in the central bay. All other spaces are organized around this main hall. In Wright's houses, the center of the plan is not a *void* but a *solid*: the fireplace around which the different spaces are organized. The fundamental role that this 'marker' (e.g. the fireplace)⁷ plays in the Wrightian model will only become evident in the more asymmetrical plans of later houses.

Willitts house

In the project for the Willitts house, 1902, the abandonment of the Palladian model has been consummated (Figures 10.4, 10.5). The single volume has been given place to a cruciform arrangement of different volumes. The timid protrusions of the wall, announced in the Winslow house, have ended up destroying the boundaries of the volume, particularly in the ground floor. With the central core, or chimney, acting as a reference, the wings extend outwards, as if the house would blend with the landscape. The mass of the building concentrates on the center and disintegrates in the direction of the wings, until it becomes only a terrace covered by an overhang, allowing the vegetation to penetrate inside the territory of the house. The piers located at the end of the wings mark the end of the building.

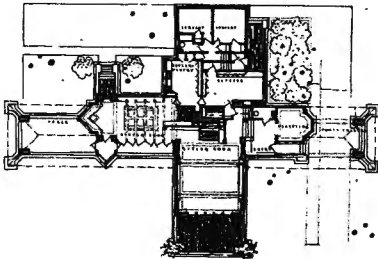


Figure 10.4. F.L.L. Wright, Willitts house, 1902. Ground floor plan.

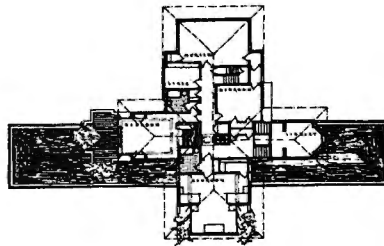


Figure 10.5. F.L.L. Wright, Willitts house, 1902. Upper floor plan.

Little remains in this house from the Palladian model. The Willitts house can be considered as a genuine example of the 'Wrightian model'. In the Wrightian model, space has triumphed over form. In the Palladian villa, space was shaped by form: the solid block of the Palladian villa sets up the limits to the interior spaces. Inside the villas, the orderly arrangement of spaces gives rise to a coherent spatial wholeness. But in a Prairie house, the block is no longer the boundary that imposes limits to the interior spaces. The interior spaces organize themselves

⁷In Wright's office buildings, the solid core equally plays a fundamental role in the spatial configuration. In the Johnson Wax and Price towers, the core containing the elements for vertical circulation, penetrate the building vertically in the same way as the chimney penetrates the volumes in the Prairie houses.

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freely around the solid central element (e.g. the fireplace). Furthermore, in the Prairie house there are no facades as in the Palladian villa. The traditional distinction between front and back facade seems to be no longer valid for the Wrightian model.

10.2.2 The invention of a new formal language: Mies' Barcelona pavilion

Wright and De Stijl

As we have seen, in the Prairie houses Wright broke the solid mass of the Palladian model into a series of planes, and established the predominance of space over form. The work of Van Doesburg was driven by similar purposes. In a series of three projects made for Leon Rosenberg, Van Doesburg and Van Eesteren carried out a laboratory experiment whose ultimate purpose was not much different from the one that had inspired Wright's work: to get rid of the influence of previous form-types (Figure 10.6).

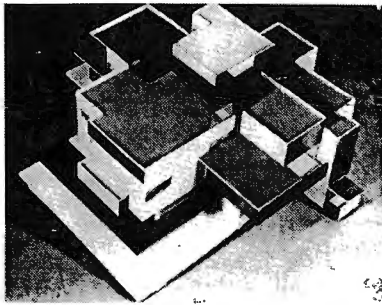


Figure 10.6. C. van Eesteren and T. van Doesburg. Model of the Private House, 1923.

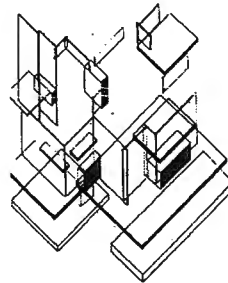


Figure 10.7. T. van Doesburg. Analytical drawing of the Private House, 1924.

In the axonometric drawings of the second project (the Private House), one of the goals of the architecture of Wright -the destruction of the box- is expressed in a radical way (Figure 10.7). In this project, there are no distinction between inside and outside spaces, between top and bottom, or between front facade and back facade. Windows are not perforations in the wall, but rather gaps that are left between the planes (incidentally, an old dream of Wright was to get rid of punched windows). As we can see, even though Van Doesburg had proclaimed the break with tradition, he could not escape the most immediate tradition represented by Wright's architecture.

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Van Doesburg was convinced that by submitting architecture to a process of pictorial decomposition it would be possible to break with previous forms. In this regard, the experiment of the Rosenberg projects ended up being both an architectural and a pictorial achievement. The architectural feat was the three unbuilt projects that conform to the principles of the Wrightian model: substitution of the volume by planes, elimination of punched openings, predominance of space over form. From the point of view of painting, the result of the Rosenberg projects was a series of 'counter-constructions' painted by Van Doesburg, which gave expression to the concept of architectural space that he and Van Eesteren tried to achieve (Figure 10.8).

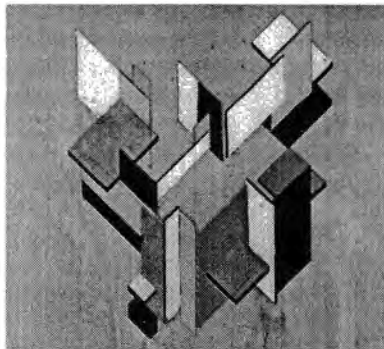


Figure 10.8. Theo van Doesburg. Color construction in the fourth dimension of space-time.

Mies' Barcelona Pavilion

The transformation of the architectural space that Van Doesburg expressed in his 'counter constructions' into a building was accomplished by Mies van der Rohe in the Barcelona pavilion. In fact, Mies' pavilion represents the materialization of the concept of space that Wright first concretized in the Prairie houses and that Van Doesburg and Van Eesteren had pursued in the Rosenberg projects. In the Barcelona pavilion, the destruction of the box is complete. Space reigns over form. Nevertheless, the Barcelona pavilion does not completely materialize the spatial concept that Van Doesburg envisioned. In the 'counter-constructions', the boundary between inside and outside has completely disappeared: planes, at different levels, are arranged freely in a three-dimensional space. In the Barcelona pavilion, the notion of house as solid block has been completely abandoned, but the boundary that separates inside from outside still persists. In this connection, the spatial concept of the Mies pavilion is a simpler version of the space contained in Van Doesburg's paintings. Because, unlike the space represented in the 'counter-constructions', the space of the Barcelona pavilion is not fully three-dimensional.

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Rather, it is a space bounded by two horizontal planes, represented by the podium and the roof.

With the Prairie houses, Wright was able to depart from the Palladian model and to provide a new alternative for it. In the Barcelona pavilion, Mies has equally succeeded to free himself from the influence of traditional form-types, but his building does not seek to establish a new one. As a matter of fact, the Barcelona pavilion is 'almost' the formless building that Mies was longing for. Its inner form or type can hardly be described: there is no main door; no front and back facade; no inner core, with the exception of the onyx-sheathed wall. Instead of a new form-type, the pavilion provides a series of syntactic rules for a formal language. As Drexler has written, "like Le Corbusier's Villa Savoye or Wright's Robie house, the Barcelona Pavilion is more than a unique masterpiece. It is the grammar of a complete style, and ordering principle capable of generating other works of art."⁸

The elements of the grammar

In effect, what one can grasp from the Barcelona pavilion is not so much a form as the syntactic rules of a formal language. The primary element in the vocabulary of the formal language of the Barcelona pavilion is the plane (Figure 10.9). Planes can adopt two spatial positions: vertical, as in the partitions and walls; and horizontal, as in the roof and the base. The presence of the columns in the inside space, however, challenges the exclusiveness of the planes as unique elements of the vocabulary. Furthermore, the columns restrict the freedom of movement of the planes/walls in space.

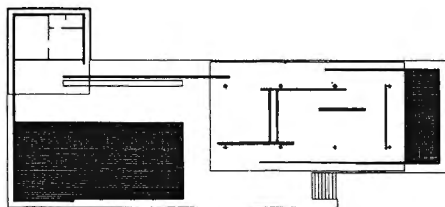


Figure 10.9. Mies van der Rohe. Barcelona pavilion, 1929.

Punched windows do not belong to the formal language of the Barcelona pavilion. A door is the result of the absence of a wall, rather than being an element in its own right defined by frames and lintels.⁹ This conception of an opening

⁸A. Drexler, *Ludwig Mies van der Rohe*, 1960, p. 20.

⁹Henri Lefebvre has referred to this positive character of doors in the following terms: "Consider a door. Is it simply an aperture in the wall? No. It is framed (in the broadest sense of the term). A door without a frame would fulfil one function and one function only, that of allowing passage. And it would fulfil that function poorly, for something would be missing. Function calls for something other, something more, something better than functionality alone. Its surround makes a door into an object. In

being the absence of form, is radically different to the one held in the Renaissance. Alberti thought of openings as positive forms: "a row of columns is nothing other than a wall that has been pierced in several places by openings."¹⁰ Behind Alberti's interpretation of the opening as positive form, lies a conception of space which is diametrically opposed to the one of Mies. In a Renaissance building, form is predominant over space. In other words, form is what exists first, space what comes after. In Mies' pavilion, the reverse is true: space predominates over form, i.e. space exists first and form comes after.

At some point, Mies had to face the contradictions involved in his attempt to transform a fundamentally abstract concept (planes in space) into a physical object (a pavilion). Because, even though conceptually the building is nothing more than planes in abstract space, a building needs doors and an enclosure that separates inside from outside. In this regard, it is significant that in the plan drawings as well as in the 'official' photographs of the building, Mies carefully avoided to show the doors. At this point, our previous discussion on Laugier's *cabane* comes to mind. The members of the structural skeleton were the only elements of Laugier's conceptual model in much the same way as walls/planes are the basic constituents of Mies pavilion.¹¹ Laugier's primitive hut did not have doors nor enclosure because it was meant to be a conceptual form expressed by means of a concrete image, i.e. the *cabane*. Mies confronted a similar problem, but in a reverse way. Unlike Laugier, Mies did build his '*cabane*', e.g. the Barcelona pavilion. But in order to become the pure expression of the concept he had in mind, Mies had to get rid of those 'licenses' (e.g. doors) that distorted the pureness of the concept.

conjunction with their frames, doors attain the status of works, works of a kind not far removed from pictures and mirrors. Transitional, symbolic and functional, the object 'door' serves to bring a space, the space of 'room', say, or that of the street, to an end; and it heralds the reception to be expected in the neighbouring room, or in the house or interior that awaits. The threshold or sill of an entrance is another transitional object, one which has traditionally enjoyed an almost ritual significance (crossing a threshold as analogous to passing through a lock, or 'graduating'". H. Lefebvre, *The production of space*, 1974, p. 210.

¹⁰L. B. Alberti, *De re aedificatoria*; English translation, *On the art of building*, Rykwert and alters, op. cit., p. 25. Even more explicitly, Alberti refers to 'the form of the openings' in the following passage: "the form of the openings will depend on the distance that the columns are apart: if close together they will be connected by beams, if far apart, by arches." Ibid., p. 30.

¹¹Another example could be brought into this discussion: the perspective drawing of the structure of the *maison Domino* from Le Corbusier. Also in this case, a double reading of the structural skeleton is possible: as a physical structure, made up of reinforced concrete; as a conceptual structure, the archetype of a modern building.

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Two utterances in the language of the Barcelona pavilion: the Arnheim pavilions

The two pavilions built in Arnheim by Gerrit Rietveld, in 1955 and by Aldo van Eyck in 1966, can be considered as two utterances in the formal language devised by Mies in the Barcelona pavilion. In effect, each one of the three buildings can be thought as a different syntactic combination of the rules of the formal language contained in the Barcelona pavilion.

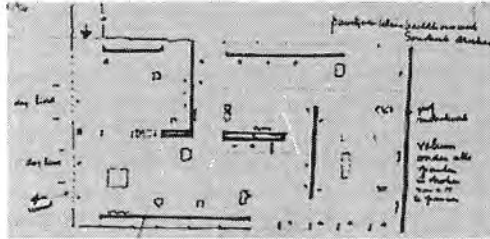


Figure 10.10. Gerrit Rietveld. Sketch for the Sonsbeek pavilion, Arnheim.

The function of the two pavilions built by Rietveld and Van Eyck was the same: to house pieces of sculpture in a semi-open space in a park. Rietveld's pavilion consists basically of planes, vertical and horizontal (Figure 10.10). As in the Barcelona pavilion, vertical columns carry the load of the roof. There are some differences between the two buildings though. In Rietveld's, the question of the separation of inside and outside does not arise because there is no inside. In the Rietveld pavilion, space is defined basically by the roof, particularly the high roof in the main structure. Even more radically than in the Barcelona pavilion, form dissolves into space. As they appear from the outside, the different elements cannot easily be assimilated to a formal/volumetric envelope (Figure 10.11).



Figure 10.11. Rietveld. Sonsbeek pavilion, Arnheim, 1954.

Van Eyck's pavilion consists basically of six lines of walls/planes laid out parallel to each other (Figures 10.12, 10.13). Walls are not only straight or rectilinear, as in the Mies and Rietveld's pavilions: there are also semicircular bulges coming out from the straight walls. Furthermore, there is a transgression of

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the rules of the language established by the Barcelona pavilion, insofar as openings are cut into the walls. Still, there are other innovations with regard to Mies' pavilion. In the Barcelona Pavilion, the roof is a solid in much the same way as the walls. In Van Eyck's pavilion, on the other hand, the roof is not a solid plane but a frame structure whose cells are filled in with reinforced nylon that filters the sunlight. Furthermore, in Van Eyck's building the roof is separated from the walls, making it evident that roof and walls are two different systems. This relation between roof and wall differs from the one adopted in the Barcelona pavilion. In Mies' building the roof lies directly against the walls, this way indicating that both walls and roof are *planes*, with the difference that some are laid out horizontally (roof) and others vertically (walls).

Yet, other sort of differences between Mies and Van Eyck's pavilion can be observed. Unlike the pavilion from Mies, the one from Van Eyck maintains the concept of front and back facade, although it reduces this distinction to its minimum expression. Front and back 'facades' are complementary to each other. Thus the semicircular depression of the wall in one of the two 'facades', corresponds to an expansion in the opposite one.

The materials employed in Van Eyck's pavilion also suggest other sort of differences with regard to the one of Mies. In Van Eyck's pavilion, walls are not sheathed with polished stone, as it is the case in the Barcelona pavilion, but they have the rough texture of the exposed concrete blocks. The purpose here is not so much to dematerialize the surfaces, as to express that the wall is a solid barrier which can only be trespassed through the openings pierced on the walls.

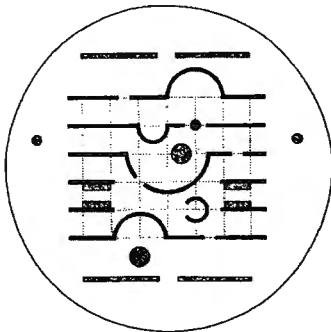


Figure 10.12. Aldo van Eyck: Pavilion at Arnheim. Ground plan.

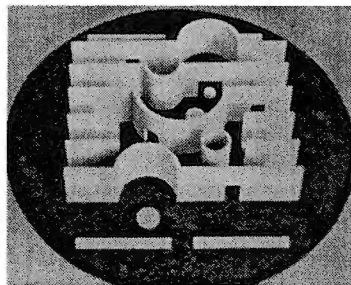


Figure 10.13. Aldo van Eyck: Pavilion at Arnheim. Model.

Working with a minimum number of elements, in this building Van Eyck achieves a unique spatial experience. The parallel walls define parallel spatial corridors. Space flows in the direction of the walls, allowing the visitor to move

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without interruption from the outside to the inside. Moving in the direction perpendicular to the walls, the uninterrupted space is experienced as a sequence of separate rooms. In addition, the semicircular bulges of the walls contribute to increase the spatial complexity, since they create another system of spaces 'inside' the walls themselves.

10.2.3 The sources of Le Corbusier's architecture and the question of Type

As in the case of Wright, the Palladian model represents the starting point of Le Corbusier's work. His earliest houses in La Chaux-de-Fonds, like the villa Schwob, respond to the tradition set up by the Palladian villa: symmetrical planning, solid masonry, cornices and punched windows. In later designs, asymmetry takes the place of symmetry; bearing walls are replaced by a structural skeleton; cornices and moldings are removed to give place to a pure composition of volumes and planes; and windows are no longer cavities made into a solid wall but surfaces made up of glass and steel.

Whereas in the case of Wright it was possible to perceive a step-by-step evolution, moving away from the traditional model of the Palladian villa, in the case of Le Corbusier this evolution does not occur. At some point in Le Corbusier's creative development, there is a radical change that separates his most characteristic work from the earliest designs. It is not possible to see then the development of his work simply in terms of a progressive liberation from the Palladian model. Also, the relation of Le Corbusier with tradition is more complex than Wright's. It cannot be said the Le Corbusier got completely rid of the Palladian model and that he provided an alternative to it, as Wright did with the Prairie houses. The Palladian model pervades Le Corbusier's villas as an invisible framework that determines the disposition of the different formal/spatial systems.

The villa archetype

Among the authors who have attempted to unfold the hidden connections that exist between the architecture of the Modern Movement and the architectural tradition, Colin Rowe occupies a prominent position. In a celebrated article published in 1947, 'The Mathematics of the Ideal Villa', Rowe drew a comparison between the villas of Palladio and the villas of Le Corbusier; two kinds of buildings which, apparently, have little in common.

In fact, Rowe begins his article admitting that Palladio's villa Malcontenta and Le Corbusier's villa at Garches are "two buildings which, in their forms and evocations, are superficially so entirely unlike that to bring them together would seem to be facetious."¹² Nevertheless, he finds that in both buildings, the volume

¹²C. Rowe, *The Mathematics of the Ideal Villa and Other Essays*, 1976, p. 3.

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has the same proportions (8 units length, 5 1/2 units breadth and 5 units height) and a similar underlying grid, having the same rhythm of double and single intervals. In addition to the volume and the grid, Rowe finds other elements of comparison between the two buildings. For example, he compares the structural skeleton of the villa Stein to the solid structural walls of the villa Malcontenta; he relates the large opening of the upper story of the villa Stein to the pediment of the Malcontenta; he compares the flat surface of Le Corbusier's villa with the 'pyramidal superstructure' of the roof of the Palladian villa; and he refers to the *piano nobile* that both villas have.

Out of these comparisons emerges a generic form that underlies both projects, the *tertium quid* that in this case corresponds to the villa-type. This generic form must be distinguished from the visible forms that characterize every building, the Malcontenta and the villa Stein. It is possible to think of this generic form as an invisible form consisting of markers or place holders which are then replaced by concrete forms. For example, the generic form (i.e. the 'villa-type') has a marker for the element that terminates the facade in the upper story. This element, in the case of the villa Stein, takes the form of the large hole of the recessed balcony while in the villa Malcontenta it adopts the form of the triangular shape of the pediment.

Rowe implicitly assumes that the villa of Palladio stands closer to the generic form (i.e. the villa-type) than the one of Le Corbusier. In contrast to the calm equilibrium that the Palladian villa conveys, Rowe sees Le Corbusier's villa as a dynamic system of forces trying to cancel out each other to restore the equilibrium of the ideal form. These tensions are more noticeable in the interior spaces than in the exterior volume: "Both houses may seem to be apprehensible from without; but, from within, in the cruciform hall of the Malcontenta, there is a clue to the whole building; while, at Garches, it is never possible to stand at any point and receive a total impression."¹³ Rowe thinks that the tensions in the villa at Garches derive from the 'horizontality' intrinsic to the free plan, which is in conflict with the 'rigid boundary of the block', i.e. the volumetric envelope of the house. Then, to restore the balance between what is '*conceptually* logical' (the free plan) and what is '*perceptually* a requisite' (the volumetric envelope), Rowe thinks that "Le Corbusier is obliged to employ an opposite resource. That is, by gouging out large volumes of the block as terrace and roof garden, he introduces a contrary impulse of energy; and by opposing an explosive moment with an implosive one, by introducing inversive gestures alongside expansive ones, he again makes simultaneous use of conflicting strategies."¹⁴

Rowe's comparative analysis not only reveals a common form underlying two buildings which in principle seem to have little in common, but it also contributes to unveiling the inner rules of the formal system of Le Corbusier. In this regard,

¹³Ibid., p. 12.

¹⁴Ibid.

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Rowe's work paved the way for the later theoretical work of Peter Eisenman, in which the idea of formal language plays a fundamental role.

The link with tradition

Indeed, the generic form that for Rowe constitutes the base of comparison between the villas of Palladio and Le Corbusier has indeed the character of a Platonic archetype. As Rowe puts it, the Platonic archetype of the villa would have pervaded the architectural tradition throughout different stylistic periods. Using Giedion's terminology, we could say that the archetype 'villa' is one of the 'constituent facts' of architecture. Rowe, however, tried to be more specific about the particular sources from which both Palladio and Le Corbusier had derived their respective designs. He suggested that the ancient house would have been for Palladio the expression of the ideal archetype, so what Palladio did was basically to adapt the ancient house to his own time. Le Corbusier, on the other hand, did not feel so close to the Greco-Roman antiquity, as Palladio did. For that reason, the theme of the ancient house could not say much to him.

Nevertheless, Rowe tried to provide an answer to the enigma of the sources of Le Corbusier architecture. He does not accept the hypothesis that Le Corbusier's architecture is the result of a sudden break with tradition. On the contrary, he appeals to Le Corbusier's capability to select a "variety of hitherto undiscriminated phenomena"¹⁵ from the past as well from the present. The great achievement of Le Corbusier was then to bring these phenomena into a new context and to be able to create new and original designs.

Type and System

Apart from the reference to the Platonic archetype of the villa, Rowe does not use explicitly the term type to explain the connection between modernity and tradition in the architecture of Le Corbusier. Following the interest in type and typology that took place in the 1960's and 1970's, other authors, among them Bruno Reichlin, have attempted to apply the notion of Type to explain the sources of Le Corbusier's architecture.

At the outset, it should be noticed that Reichlin's notion of Type does not correspond exactly to the one held by some Italian scholars and architects, who thought of Type as a concept that is derived from the systematic analysis of the architecture of the past. For Reichlin, this notion of Type has "the same limitation as the 'inductive method'"¹⁶. Reichlin contrasts Le Corbusier's imaginative way of forging a link between tradition and modernity to the deterministic view of Type adopted by some contemporary architects and theorists. According to Reichlin, Le

¹⁵Ibid., pp. 13-15.

¹⁶B. Reichlin, 'Tipo e tradizione del Moderno', 1985.

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Corbusier was able to go beyond the limited view of Type as formal abstraction, by conceiving the building as a 'system of functions'. Reichlin contends that by decomposing first the building into their separate functional/formal components, and then recombining them in new and original ways, Le Corbusier could come up with new concepts like, for example, the *plan libre*. This sort of concept could not have been derived only from the simple analysis of tradition, as the advocates of typology defend.

Reichlin seems to suggest, that in order to apply the concept of Type to the study of Le Corbusier's architecture, Type should be understood as a *pattern of systems*, rather than an schematic form derived from precedents.¹⁷ The program that Reichlin outlines to carry out a typological study of Le Corbusier's architecture includes the following issues: 1. the different types that correspond to the constituent elements of Le Corbusier's architectural system (structural, distributive, geometric, spatial, plastic...) 2. the relations between the different types 3. the new types or 'typological' design processes that can result from this approach.¹⁸

A explicit mention to the notion of Type with regard to Le Corbusier's architecture can also be found in the book by William Curtis, *Le Corbusier: Ideas and Forms*, 1986. Curtis provides an explanation of Le Corbusier's sources which is not fundamentally different to the one furnished earlier by Rowe. But while Rowe referred to a Platonic archetype, to which both Palladio and Le Corbusier would have had privileged access, Curtis appeals to a universal form that Le Corbusier would have derived from tradition. Thus he writes that Le Corbusier "roamed freely about the architectures of the world in search of universals. Beyond the incidentals of personality, period, region and style he hoped to unearth a primary language of forms rooted (supposedly) in some inherent structures of the mind." And he thinks that "during his early travels he [Le Corbusier] treated buildings like the House of the Tragic Poet at Pompeii or the cells of the monastery at Ema as if they were archetypes, and the Parthenon became a paradigm of formal excellence."¹⁹ According to Curtis, "beyond the particular example he [Le Corbusier] tried to see the type; behind the individual experience to construct the ideal form."²⁰ And from this baggage of impressions, and universal forms, Le Corbusier would have later derived its original architecture, following a creative process of cross-breeding: "In later life, Le Corbusier's mind was thoroughly stocked with impressions from the past. He was adept at juggling types from one context to

¹⁷The concept of 'format' proposed by Bruce Allsopp is akin with Reichlin's intentions to expand the meaning of type from being the abstraction of a form to be a more generic pattern including functions and modes of design. Allsopp contends that there are four kinds of 'formats' in architecture: "formats of function, of design system, of style, of pattern." B. Allsopp, *A Modern Theory of Architecture*, 1977, p. 66.

¹⁸Reichlin, op. cit.

¹⁹W. Curtis, *Le Corbusier: Ideas and Forms*, 1986, p. 228.

²⁰*Ibid.*

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another-Baroque palace plan into a redent housing, ziggurat into World Museum; he was also witty in his confrontations, as when the villas was cross-bred with a liner at Garches or the medieval drawbridge was inverted to become the entrance canopy at the Cité de Refuge."²¹

The design of the villas

In this account of different interpretations of the sources of Le Corbusier's architecture, different 'paradigms of form' have come across: the Platonic archetype (Rowe); the concept of Type as abstraction of existing forms (Curtis); the concept of System, as the ensemble consisting of form and function (Reichlin). We will inquire now to which extent the idea of System is part of Le Corbusier's creative process. For that purpose, we will take a look to the sketches and drawings made for the design of two of the villas, the villa Stein and the villa Savoye.

Villa Stein

A look at the early drawings made for the design of the villa Stein at Garches, reveals a symmetrical *partie*, quite different from what it turned out to be the final design. The program of the villa called for two different households within the same building; basically the same program as in many Palladian villas. The first schemes drawn by Le Corbusier cannot but remind the plans of a Palladian villa. The underlying grid, the symmetrical distribution of rooms around a central space, the stairs symmetrically arranged, and the rectangular outline of the house, are all attributes of the Palladian villa (Figures 10.14). The elevations also reveal a symmetrical scheme, having two separated volumes connected by the roof (Figure 10.15).

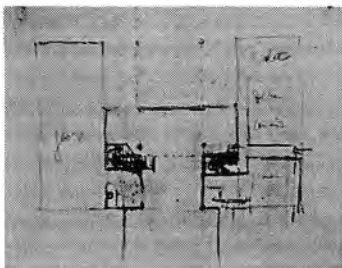


Figure 10.14. Le Corbusier. Villa Stein. First scheme of May-July 1926.

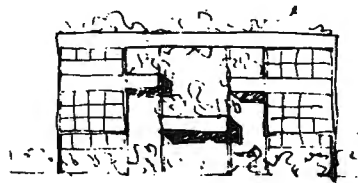


Figure 10.15. Le Corbusier. Elevation of the villa Stein, May-July 1926.

²¹Ibid.

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At some point of the design process, the initial symmetrical scheme changed into an asymmetrical one. The central opening, running across the whole height of the building, was shifted to one of the corners (Figure 10.16). The displacement of the main opening carries the elements associated with it, like the stairs and the balconies crossing over the void. What at the beginning was a symmetrical and calm disposition of elements, a scheme that conformed to the ideal villa-type that Rowe had referred to, becomes transformed into a dynamic equilibrium resulting from a system of forces and counterforces.²²

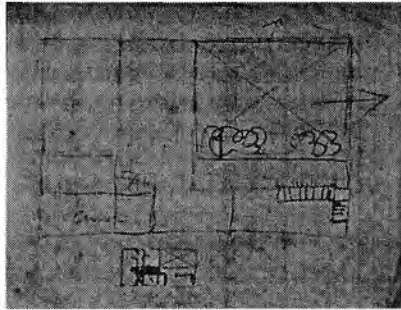


Figure 10.16. Le Corbusier. developed floor plan of the villa Stein, October 1926.

What the sketches of the design for the villa Stein reveal, is that the departure point of the creative process of Le Corbusier was still the Palladian model. In the course of that process, Le Corbusier moves away from what he perceives as sterile calmness of the symmetrical scheme and, by redefining the spatial relations between the elements of the villa-type (opening, stairs, central hall), he is able to create a new and more dynamic kind of design.

This departure from the Palladian villa, does not reflect an abandonment of the ideal scheme as it is transformation of it. As Rowe's analysis suggests, the archetype of the ideal villa is both *conceptually* and *perceptually* a constituent part of Le Corbusier's design. From a conceptual point of view, the archetypal plan is the starting point of the design process. From the point of view of perception, the archetypal villa is still present, as a standard or reference against which the tensions of the system of forces are measured.

²² This quotation of Le Corbusier, where he opposes the dynamic equilibrium to a lack of tension, can be taken as an account of his designs for villas: "The individual and the community in that correctly proportioned relationship which is the balance of nature herself-tension between two poles. If there is only one pole the results tend to be zero. Extremes destroy life, for life steers a middle course between extremes. Equilibrium indicates the presence of continuous and unflinching motion. Sleep, stupor, lethargy, and death are not a state of equilibrium. Equilibrium is the point where all forces meet and resolves themselves-poise. Thus can the future town planner read the future destiny of society." Quoted and translated in G. Kepes, *The Language of Vision*, 1947, p. 120.

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Villa Savoye

A look to the early sketches of the design of the villa Savoye reveals that, as in the design of the villa Stein, the Palladian model was in the mind of the architect when the design process began. In particular, two sketches that have been found among the drawings that Le Corbusier did for this project clearly reveal the 'Palladian origins' of the villa Savoye.²³ The drawings show a centralized scheme, that cannot but remind us of Palladio's villa Rotonda (Figure 10.17).

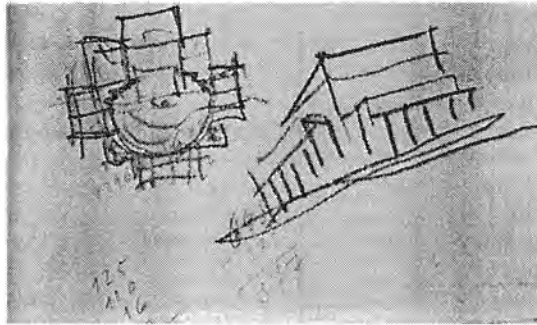
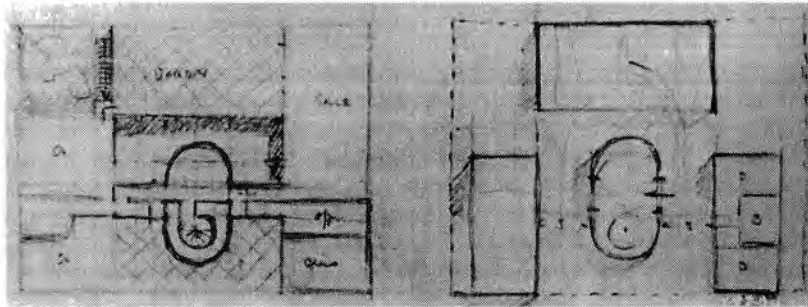


Figure 10.17. Le Corbusier. Sketches, presumably related to the design of the villa Savoye. Fondation Le Corbusier n.19505. Published in T. Benton, 'Villa Savoye and the Architects' Practice'.

The early drawings made for this project have both a synthetic and analytical character (Figures 10.18, 10.19). The plan shows a symmetrical arrangement of separate elements, like stairs, ramp, rooms and open spaces. This extreme differentiation of the components that make the building, contains the germ of the later asymmetrical arrangement. In spite of the ordered composition of the plan, the extreme individualization of the constituent components calls for a more dynamic equilibrium between the parts, away from the symmetry of the first scheme.

²³T. Benton, 'Villa Savoye and the Architects' Practice', 1987, p. 85.

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Figures 10.18, 10.19. Le Corbusier. Villa Savoye, Poissy. Floor plans of preliminary version of the project of 7-26 November 1928.

The villa Savoye exemplifies Le Corbusier's idea of a building as being composed of different systems (in the conceptual sense). The relation between the structure and the circulation elements of the villa Savoye can give us a clue of how the system works (Figure 10.20). Originally the distribution of the columns on the plan is supposed to follow a strict regular pattern, with columns separated at even intervals. This regular layout of the grid, however, is incompatible with the requirements of a ramp placed at the center. At this point, there are two different systems, the system-structure and the system-circulation, each one demanding something from the other. The system-circulation demands from the system-structure the removal of the columns from the central vertical axis, so that the opening that the ramp needs can be cut in the slab. The system-structure demands the system-circulation other kind of circulation element, different than the ramp. This conflict between two different systems is resolved by doubling the columns in the central axis, placing the columns on the edges of the ramp opening. In spite of this arrangement, the adopted solution does not completely eliminate the tension that exists between the two systems.

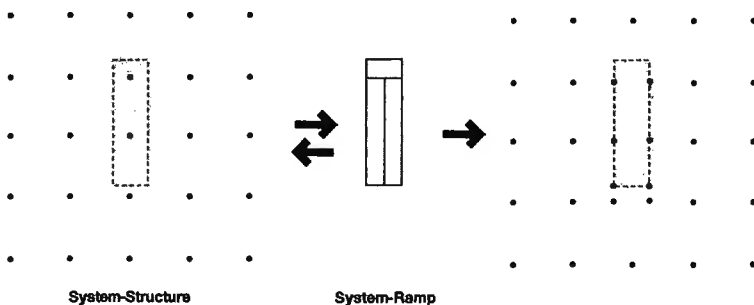


Figure 10.20. Villa Savoye. The interaction between the system-structure and the system-ramp.

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In the villa Stein, the large opening that runs across the whole height of the house can be interpreted as the counterpart of the central hall of the ideal Palladian scheme. But in the villa Savoye, there is another candidate element to be the counterpart of the central hall of the Palladian villa: the ramp (Fig. 10.21). A comparison between the villa Rotonda and the villa Savoye is, in this regard, revealing. To the static central space of the villa Rotonda would correspond a dynamic space defined by the ramp in the villa Savoye. While a visitor of Palladio's building is induced to stay at the center of the cylindrical space and to turn around the vertical axis that passes through the center of the building, a visitor of the villa Savoye is pulled upwards by the dynamic force of the ramp, moving from the ground up to the garden in the roof.

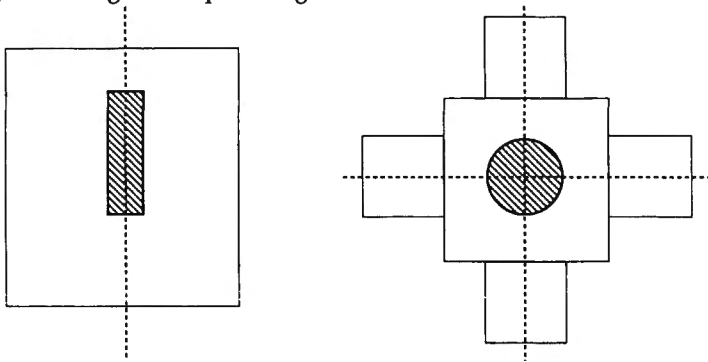


Figure 10.21. The ramp in the villa Savoye as counterpart of the central space of the villa Rotonda.

10.3 Typology: the work of Italian architects in the 1960's

During the 1920's, when the Modern Movement reached its peak, it was possible to believe that architecture had finally succeeded in getting rid of tradition. The villa Savoye or the Barcelona Pavilion seemed to owe little to the buildings of the past. The so much awaited new style had finally emerged. Modern architecture was still able to create novel formal solutions during the decades of the forties and fifties. Buildings like Saarinen's airport terminal in New York, and Le Corbusier's church at Ronchamp demonstrated the vitality of modern architecture.

However, the belief in the vitality of Modern Movement architecture began to vanish in the sixties. It was the time when the great masters were disappearing and, with them, perhaps, also the vital force that have kept modern architecture alive during half a century. A new generation of architects felt that the formal vocabulary of modern architecture was too restrictive. A feeling of boredom with the prismatic, crystalline forms started to arise. In this situation, architects like

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Carlo Aymonino, Aldo Rossi or Giorgio Grassi looked back to tradition with more positive eyes than the previous generation did. The traditional forms that had been neglected by the Modern Movement were now seen as a source of inspiration for the architecture to come.

A new awareness for the historical value of cities also contributed to the appreciation of traditional architecture. The integration of the buildings of the Modern Movement in the old parts of cities had been always problematic. Typically, a building of the Modern Movement appears like a self-sufficient structure in a splendid isolation from its immediate surroundings. In the 1960's, however, architects looked for a more successful integration of new buildings into the historical centers of cities.

As the dialectic between past and present re-entered the architectural debate, the notion of *type* of Quatremère received an unprecedented attention. Quatremère's definition of *type* was revitalized, mainly through the article of Giulio Carlo Argan, *On the Typology of Architecture*, 1962. For Italian architects, the systematic study of types, that is, typology, became not only a method of architectural research but also a mechanism to secure the connection between past and modern architecture. The old question of analysis-synthesis, which had concerned nineteenth century theorists like Durand and Viollet-le-Duc, came back to the fore. Now, architects thought that in order to create buildings that were at the same time modern and traditional, the city had to be systematically analyzed, the building types discovered. They thought that these types, scientifically discovered through analysis, would constitute the basis for architectural invention.

Quatremère's definition of Type was indeed one the pillars of the theoretical work that Aldo Rossi summed up in his *L'Architettura della città*. Rossi's interpretation of Quatremère's *type*, however, was both literal and idiosyncratic. His distinction between type and form is not fundamentally different from the previous distinction between *type* and *modèle* formulated by Quatremère (e.g. "*nessun tipo si identifica con una forma anche se tutte le forme architettoniche sono riconducibili a dei tipi*"²⁴). For Rossi, type is something that precedes the form; it is the principle that remains unaltered in spite of the changes of the form. In this regard, type is seen as an objective, logical principle: "*Io penso quindi al concetto di tipo come a qualcosa di permanente e di complesso, un enunciato logico che sta prima della forma e che la costituisce.*"²⁵ And he goes as far as to identifying type with the idea of architecture itself: "*Infino potremo dire che il tipo è l'idea stessa dell'architettura; ciò che sta più vicino alla sua essenza.*"²⁶

²⁴A. Rossi, *L'Architettura della città*, 1966, p. 32.

²⁵*Ibid.*, p. 31.

²⁶*Ibid.*, p. 33.

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But Rossi begins to depart from the original meaning of Quatremère's *type* at the moment he thinks of Type as the fundament for an epistemology of the architectural discipline. In this regard, Italian architects not only restored Quatremère's concept of *type*, but they gave to it a significance that did not have in its original formulation. It is not at all clear that Quatremère had thought of *type* as a link between modernity and tradition, as the advocates of typology have assumed. Furthermore, it is certain that Quatremère's *type* had little to do with urban morphology. But this was, in fact, the meaning that Type had for architects like Aymonino and Rossi. Still, there is one fundamental difference between Quatremère's *type* and the interpretation that architects like Rossi made of it. Quatremère's *type* needs to be understood within the context of his concern with the classic doctrine of art as imitation. In this regard, *type* was for Quatremère a principle underlying both natural and artistic forms. But for architects like Rossi, *mimēsis* and nature are no longer a significant issue in the architectural debate. For them, the interest of the idea of Type lies in the possibility of building a scientific basis for the discipline of architecture.²⁷

From the point of view of architectural form, the result of the re-emergence of Type in the 1960's, was that some traditional forms that had been expelled from the formal repertoire of the Modern Movement (like the pitched roof, for example) found their way back into modern architecture. Now, a building that did not have a flat roof could still be considered modern. Also, other formal elements, like porticoes, were again accepted; in this case, not so much because of their intrinsic formal qualities but mainly because of their urban significance.

At some point, the work the advocates of typology began to converge with the interests of the major architectural movement of the seventies, i.e. Post-modernism. In a more extreme way than the Italian architects, post-modernists attempted to free modern architecture from self-imposed formal limitations. The 'scientificism' that had characterized the work of Rossi or Aymonino gave place, in many cases, to a less transcendent play with forms in which the idea of Type could not play any significant role.

²⁷The idea of type as a fundament for an epistemology of architecture is still advocated on a recent text by C. Martí Arís, *Las variaciones de la identidad*, 1993.

10.4 The formal language of modern architecture: the work of Peter Eisenman

The rejection of the notion of Type, and its replacement by the idea of a formal language, has been a permanent quest in the theoretical work of Peter Eisenman. The idea of formal language was the subject-matter of his dissertation, *The Formal Basis of Modern Architecture*, 1963. There, Eisenman attempted to demonstrate that "implicit in Le Corbusier's diagrams [the diagrams of the 'four compositions'] are the vocabulary, grammar and syntax of a formal language."²⁸ Eisenman's purpose was to make the rules of that language explicit.

In Eisenman's view, architectural forms embody the rules of a particular formal language. He contended that "the inherent order [of a form] derives from a geometric reference, from the properties of the form itself."²⁹ In principle, the idea that a form embodies a set of rules could be traced back to the theories of the Gestalt, according to which patterns would be embodied in shapes. But Eisenman's most immediate source was not Gestalt psychology but linguistics, in particular the generative grammar of Noam Chomsky.

Eisenman proposes a distinction between two kinds of form: generic form and specific form.³⁰ In principle, this distinction reminds us of the philosophical separation between universal and particulars, as Eisenman admits: "The term 'generic form' is here understood to mean form thought of in a Platonic sense, as a definable entity with its own inherent laws. The term specific form, on the other hand, can be thought of as the actual physical configuration realized in response to a specific intent and function."³¹ Furthermore, he contends that "generic form in its architectural context can be considered under two categories: the linear and the centroidal. A cube and a sphere are centroidal. A double cube and a cylinder are linear."³²

Eisenman's conception of form, in terms of generic and specific, is not purely Platonic, but combines different paradigms of form, not necessarily compatible among them. Firstly, there is the idea of a pure Platonic form, which Eisenman associates with the geometric solids, like the cube or the sphere. Secondly, there is an Aristotelian notion of form involved, insofar as it is considered that the geometric forms potentially embody the transformation rules that will transform the generic form into the 'specific form' (e.g. "for example, the cube considered as a generic antecedent has its own formal essence: equal axes, equal sides[...]) This

²⁸P. Eisenman, *The Formal Basis of Modern Architecture*, 1963, p. 6.

²⁹Ibid.

³⁰This distinction between generic and specific form has been adopted later by Geoffrey Baker in his systematic analysis of different works of architecture. See G. H. Baker, *Design Strategies in Architecture*, 1989, p. 70.

³¹Eisenman, op. cit., pp. 12-13.

³²Ibid., p. 13.

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provides the initial conceptual ordering, from which the syntax or rules of a formal system is evolved").³³ Thirdly, there is also a reference to the idea of system, that is to say, to a conception of form in terms of the ensemble form-context. According to this, the transformation of the generic form into the specific form is not only conditioned by the rules contained in the initial form, but also by four other factors, which Eisenman refers as "intent, function, structure and technics."³⁴

In light of the previous interweaving of different notions of form, we might inquire whether there is an incompatibility between the idea of a Platonic form as a starting point of a design process, and the idea of a systematic application of transformational rules. Here, we seem to be confronting once again a Platonic-Aristotelian dilemma. The notion of a self-transforming form, which contains its rules of transformation, is essentially Aristotelian. In this regard, the contention that the initial state in the process of transformation corresponds with the Platonic solid, seems to be at odds with the Aristotelian system. According to the Platonic conception of form, the idea has to be one and the same, regardless the changing states of a form. However, in Eisenman's conception of design as a process, every stage of transformation constitutes a 'state of a system', or as he defines, a state in a formal system: "Any ordering or organization of architectural form within the design process can be called a system: more explicitly a formal system."³⁵ What is maintained throughout the whole process of transformation is not an abstract idea or form, perceivable to the mind's eye, but a coherent system of rules -i.e. the rules of the formal system.

10.4.1 Formal language and plastic form

While Eisenman's theoretical notion of design as a process of transformation can be traced back to cybernetics and structuralist linguistics, the idea of formal language -in the plastic or aesthetic sense- needs to be traced back to the origins of modern architecture. The works of Terragni, Mies, Le Corbusier and Van Doesburg, among others, constitute the aesthetic sources of the architecture of Eisenman. In particular, Terragni's use of the grid as plastic element has exerted a decisive influence on Eisenman's architecture. In this regard, it can be contended that the architecture of Terragni, in much the same way as Le Corbusier's, have a double value for Eisenman: first, a theoretical one, as the expression of the theory of formal language; second, an aesthetic one, as a source of a formal vocabulary.

What is peculiar to Eisenman's thought, is that he seeks a connection between these two domains: theoretical and aesthetic. For Eisenman, it is not enough to acknowledge the aesthetic value that the exposed grid in Terragni's Casa del Fascio

³³Ibid., p. 42.

³⁴Ibid., p. 12.

³⁵Ibid., p. 38.

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has for him. Besides, he feels obliged to rationalize this aesthetic (i.e. subjective) feeling. For that reason, he invokes the notion of formal language: "In Terragni's work, conceptual ambiguity is developed from the use of two basic and opposing conceptions of space. The first considers space as subtractive, or cut away from a solid. In this context space is considered to be metaphorically hollowed from an abstract solid volume. The second conception of space, which has Renaissance antecedents, considers space as additive, made up of a series of implied layers, much like a deck of cards. Subtractive space implies a center and is centripetal in conception; additive space is concerned more with the periphery, with edges and corners, and is centrifugal in conception."³⁶

But in spite of Eisenman's interest in playing down the plastic meaning of form, the fact is the aesthetic of Terragni's works permeates in his buildings, as much as the aesthetic of Van Doesburg's 'counter-constructions' persists in the axonometric drawings of his projects. It might be the case, that in spite of Eisenman's emphasis on the inner logic of the form, his projects cannot be completely explained without taking also into consideration the most visible or sensible component of architectural form.

10.4.2 Design as a process

In the series of House projects designed by Eisenman between 1968 and 1976, the idea of a formal language based on explicit syntactic rules became not only a mechanism to analyze existing works of architecture, but to design new buildings as well.

At the outset, it can be said that the goal of these project-experiments was not so much to design a house as *to design a design process to design a house*. For this reason, the explanatory diagrams that were produced to illustrate the 'design process' are more expressive of the architect's intention than the finished buildings (Figure 10.22).

³⁶P. Eisenman, 'From Object to Relationship II: G. Terragni', 1972.

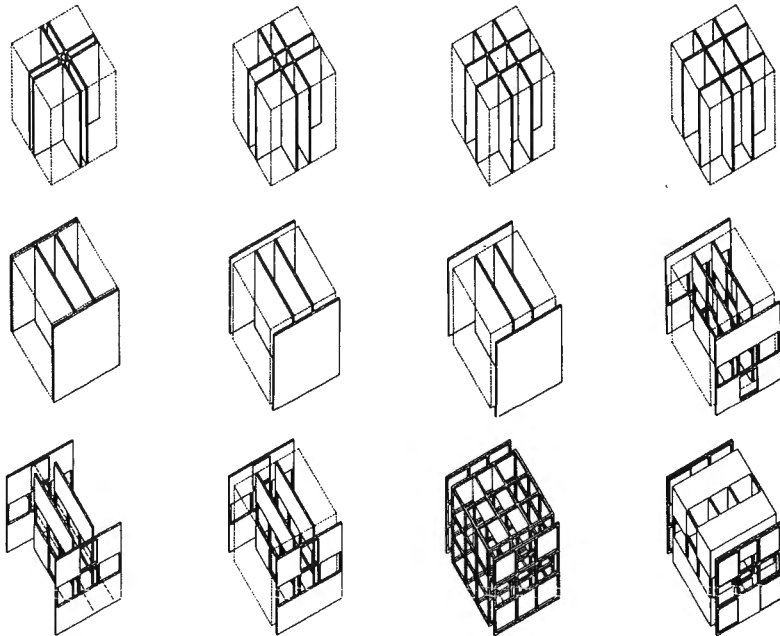


Figure 10.22. Peter Eisenman. Diagrams of House IV.

In accordance with Chomsky's transformational process, in the process that Eisenman proposes the initial form does not prefigure the form of the final design. This initial form, the cube, is more like the kernel sentences in a generative grammar: they exist to initiate the process of transformation, but the final result depends on the order and sequence of the transformations more than in the initial form.³⁷

Eisenman's transformational process cannot but remind us of the previous method of composition of Durand, which has been analyzed in Chapter 7. As we have seen, Durand's method of composition begins with a geometric scheme, the *partie*, composed of lines and points. This initial scheme is transformed in subsequent steps into a plan representation of a building. Eisenman's process also begins with a geometric form, which is not a two-dimensional scheme but a three-

³⁷For Eisenman, it is necessary to dissociate form from those factors that influence form, like symbolism or function. In this regard, the type-form is seen as a depository of conventions and traditions and, therefore, as an obstacle, more than an aid, to creation: "For example, before we can build a 'temple' we must have had an idea or concept 'temple'." Owing to our experiential and historical associations it is difficult for us to isolate the concept 'temple' from the function 'temple' or from whatever specific form we associate 'temple'." Eisenman, *The Formal Basis of Modern Architecture*, p. 15.

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dimensional figure. In both transformational processes, the initial geometric figure is always the most neutral form: the square, in the case of Durand, the cube in Eisenman's. But while Durand's method of composition can be interpreted as a process of refinement, aiming at the creation of a concrete image (e.g. the neo-Palladian plan), Eisenman's transformational process does not lead, in principle, to any definite goal. Every stage of the transformation process can be taken as an end in itself. Furthermore, instead of progressing from geometry to architectural representation, as in Durand's method, in Eisenman's process the forms remain geometrical, from the beginning to the end of the process.

10.4.3 The elimination of the form-type

As we have seen in previous sections, in the architecture of Mies the idea of Type gave place to the idea of a formal language. But Mies did not make much out of the notion of formal language from a theoretical point of view.³⁸ Eisenman, on the other hand, has stressed the theoretical implications of the idea of formal language.

In an article included in the book *House X*, Eisenman resorts to a fictitious dialogue between an 'architect' and his 'critic' to argue against the 'preconceived image' (i.e. type) that restricts the architect's creativity. The 'architect' thinks that "traditionally, the architect produced an initial form-image in response to a program of needs. This was modified during the process of design and also complicated and refined to correspond to the multiple and conflicting demands of site, material, function and meaning; but, at the same time, it maintained a link to the original image."³⁹ The 'critic' observes that the idea of design process neglects the traditional view of design based on a preconceived image: "This initial image

³⁸The comparison between architectural form and the grammar of a language has a long tradition. John Ruskin had appealed to it, although for different reasons to the ones raised by Eisenman. Ruskin compared a style with the language that a nation speaks: "We might, therefore, without the light of experience, conclude, that Architecture never could flourish except when it was subjected to a national law as strict and as minutely authoritative as the laws which regulate religion, policy, and social relations; [...] that the architecture of a nation is great only when it is as universal and as established as its language." J. Ruskin, *The Seven Lamps of Architecture*, 1880, p. 202. Ruskin thought that pure invention was not possible, that a new style could not be created out of nothing, and that architects should learn first the grammar of their language before they could design. He claimed that "originality in expression does not depend on invention of new words; nor originality in poetry on invention of new measures; nor in painting, on invention of new colours, or new modes of using them." *Ibid.*, p. 203. And referring to the architect he concluded that "a man who has the gift, will take up any style that is going, the style of his day, and will work in that, and be great in that, and make everything that he does in it look as fresh as if every thought of it had just come down from heaven[...] and those liberties will be like the liberties that a great speaker takes with the language, not a defiance of its rules for the sake of singularity; but inevitable, uncalculated, and brilliant consequences of an effort to express what the language, without such infraction, could not." *Ibid.*, p. 204.

³⁹P. Eisenman, 'Transformations, Decompositions and Critiques: House X', included in the book *House X*, 1982, p. 36.

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describes and limits the actual choice from the range of alternatives. In contrast, the transformational method, instead of narrowing at each step in the process, in fact widens the range of possibilities because it does not move toward any preconceived image." With regard to the issue of the termination of the design process, the 'critic' thinks that "the process no longer produces a preconceived object as in a traditional design process, but rather results in the exhaustion of the process when no further steps are possible."⁴⁰

This alleged opposition between a traditional design process mediated by a preconceived image (i.e. form or type) and a design process not conditioned by that image, can indeed oversimplify the role that form-type plays in the conception of a design. We have seen, in the example of villas of Le Corbusier and in the houses of Frank Lloyd Wright, that tradition inexorably exerted an influence on their respective creative process. To create new architectural forms, both Wright and Le Corbusier not only had to overcome the influence of the inherited models but also to transform the models themselves. This process is clearly revealed in the sketches of the villa Stein of Le Corbusier in which, as we have seen, the spectre of Palladio's villa Malcontenta was still present. But, if the 'preconceived image', represented in this case by the Palladian model, would have conditioned the design process of Le Corbusier's villa Stein as much as Eisenman assumes, then the villa Stein would have resulted to be as symmetrical as the first scheme that was drawn by Le Corbusier, which was not the case.

One more difficulty with Eisenman's idea of design as transformation has to do with the question of the termination of the design process. Eisenman contends that a systematic design process makes unnecessary the preconceived image. The process, he argues, is not directed towards the completion of a definite form; it finishes by itself when no further transformations are possible. This means that the termination of the process, i.e. the final form of the design, is an internal consequence of the system of transformation, rather than a decision adopted by the designer.

It is hard to believe, however, that the designer (in this case, Eisenman) would play no role in deciding the final forms of projects like the House I or House II. But it is probably true that the final form of those projects has been *also* conditioned by the rules of transformation. A comparison between the house projects of Eisenman and the projects of Le Corbusier can help to clarify this point. The idea of a building being a system made of subsystems is valid for the House II as well as for the villa Savoye. But, in spite of the tensions between the different formal systems that can be perceived in the villa Savoye, this building is still a complete organism, a whole as opposed to the sum of parts. This sense of wholeness, of unity that transcends the individual parts, is missing in every state of development of the

⁴⁰Ibid.

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transformational process that Eisenman proposes and, it could be argued, it is also sometimes missing in the final state of the process, that is, in the building.⁴¹

10.4.4 The elimination of the subject

In spite of the parallels between the linguistic grammar of Chomsky and the formal grammar of Eisenman, there is nevertheless a substantial difference between both. The purpose of Chomsky's grammar was to explain the process by which sentences in a language are created. Chomsky, however, did not expect that the generative grammar could actually create new utterances. This was a faculty that he attributed exclusively to the speaker of a language. But Eisenman, however, thinks of the systematic transformation process as an objective procedure able to generate designs, without the intervention of the designer.

Ultimately, Eisenman's notion of design as a process of transformation aims at undermining the role that the architect plays in the conception of the design; a goal that conforms with the spirit of Structuralism. Eisenman assumes that his design process is *really* an objective and autonomous one; that the transformations from one stage to another actually happen as a result of internal laws; and that the output of the process is an internal consequence of the process itself.

The question of how much of Eisenman's process is objective and how much is depending on the aesthetic judgement of the designer will not be pursued here. One thing seems nevertheless clear. Eisenman's design process has been *designed* by Eisenman, in the same way as Durand's method of composition is an invention of Durand. Their respective methods are not purely objective, as the Pythagorean theorem can be, but they respond to a certain *image* of architecture which is largely dependant on the taste of the authors as well as of the conception of architecture prevalent in their time. In the case of Durand, the neo-classic style permeates the drawings that give expression to his theory. In Eisenman's diagrams and drawings, it is still possible to perceive the influence of modern avant-gardes. This suggests that in spite of the attempt to get rid of form by means of objective methods of design, form nevertheless persists.

10.4.5 Conception and perception

As has been argued in previous chapters, one of the meanings that the Idea, Type or Form has in architecture is bring together the artist's mind, the architectural work and the beholder's mind. Modern architecture achieved the most complete

⁴¹Without the architect having in mind the idea of the building, the process of generation of variations could go forever, without ever reaching a definite form. This, however, seems to be contrary to the basic purpose of architectural design, i.e. to create forms that are as complete and unique as the forms created by nature.

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unification of these three realms: conceptual, objectual and perceptual. In the case of a building like the villa Savoye, the beholder is expected to reproduce in his mind the creative process that has taken place earlier in the mind of the architect. The building then, becomes the embodiment of an idea shared by the architect and by the viewer.

Behind Eisenman's rejection of the 'preconceived image' lies the intention to break this identity of conception and perception, which was at the root of Modern Movement architecture. Eisenman's wants to do away with the conceptual component (substituting the creative subject with a systematic design process) and with the perceptual component (denying the beholder the possibility to apprehend the form of the building).⁴² The only thing that remains is the object itself, with its own inherent logic.

It is nevertheless paradoxical, that while Eisenman's proposes a systematic process that can be made explicit and, therefore, understandable by anybody, the perception of the finished building causes the opposite effect: rather than being understandable to the mind's eye, they puzzle the viewer instead.⁴³

The willingness to break the nexus conception-perception is already patent in the early series of House projects. Later, Eisenman's buildings have become increasingly incomprehensible to the eye. Concomitant to this development, there has been a greater expressiveness of the architectural forms and of the processes that give rise to them. The Guardiola house, for example, can be read as the materialization of the process of transformation itself. In this project any trace of the designer's hand has been eliminated, at least, metaphorically. The forms appear to be the outcome of a natural force which, like a geological thrust, has pushed the forms down the hill. In this project, the process of transformation is more 'natural' than 'abstract', if we compared to the early Houses. Instead of the opposition natural form-art form, with which artistic theory had been confronted in the past, there is a now an opposition between a *natural process* of form

⁴²At the beginning, however, Eisenman seemed to have adhered to this identity of the conceptual and perceptual realms characteristic of modern architecture: "To understand volume we must introduce the notion of movement, and postulate that an experience of architecture is the sum of a large number of experiences -each one of them apprehended visually, it is true, as well as through other senses; but accumulated over a much longer time span than is required for the initial appreciation of a pictorial work; in building up into a conceptual; not a perceptual whole. And since this whole is conceptual it must have a clarity of concept: its argument must be intellectually as well as visually comprehensible." Eisenman, *The Formal Basis of Modern Architecture*, p. 31.

⁴³Rosalind Krauss thinks that this difficulty in apprehending the forms of Eisenman's buildings represents in fact an exciting intellectual challenge for the beholder: "And so, in those buildings the viewer is confronted with two parallel systems; one that holds the building up physically and another that obviously does not[...]It should be mentioned here that the sophistication of design in these houses is such that identifying system I and II is not a simple matter, and that given alternative readings and perspectives, the elements that make up the one or the other keep changing places." R. Krauss, 'Death of the Hermeneutic Phantom: Materialization of the Sign in the Work of Peter Eisenman'; included in P. Eisenman, *Houses of Cards*, p. 175.

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generation versus an *artificial process*. What the Guardiola house suggests, is that this opposition can be overcome, and that the process by which architecture creates forms is fundamentally the same to the one followed by nature in her creations.

10.4.6 Form and inner structure

In the course of the previous chapters, the distinction between two kinds of form, which we will now refer as 'inner form' and 'outer form', has constantly emerged. This dualism had distinctive connotations for every theorist. Vitruvius appealed to the distinction between structural form and ornament; Alberti had distinguished between real beauty (*pulchritudo*) and additional beauty (*ornamentum*). For Laugier, Quatremère and also Durand, the inner form was synonymous of Type, even though each author used a different name to refer to it (*cabane, type, partie*). Later in the nineteenth century, following the influence of the biological sciences, the inner form became an objective principle that is subjected to the influence of external causes. The conception of Style held by Semper was based on this notion of form. After the advent of the psychology of perception, the inner form became associated with the real form perceived by the mind, as in Hildebrand's real form (*Daseinsform*), Frankl's 'mental image' (*Vorstellung*), Arnheim's 'structural skeleton', and Gombrich's 'conceptual schema.'

This opposition inner form-outer form, is also present in Eisenman's theory. But Eisenman is apparently less influenced by biological or psychological paradigms, as by cybernetics; indirectly, however, through the theories of Chomsky. In this regard, Eisenman writes that: "In architecture, relationships exist in two ways, in the environment itself and in the individual's ability to understand and relate to them. They exist at a real, concrete level where the individual is aware of them through his sense; perception, hearing, touching, etc.; and they also exist at an abstract or conceptual level in the actual object. They cannot be seen or heard even though they can be described. A similar form of distinction has been proposed by Noam Chomsky in linguistics; a perceptual or surface structure, and a conceptual or deep structure."⁴⁴

Eisenman's assumption is that architectural forms are not only visually perceived, but can be *read like a sentence*. For Eisenman, form is relevant as a system of signs that convey a meaning which the *reader* (e.g. the beholder that perceives the building) can decipher.⁴⁵ Architectural forms then would have a syntactic and semantic value. In a given sentence, for example, words can be

⁴⁴P. Eisenman, 'Notes on Conceptual Architecture. Towards a Definition', 1971.

⁴⁵In this regard, the 'conceptual art' of Sol Lewitt appears to be the model to follow. Eisenman writes that "in Lewitt's work the conceptual aspect can be called a-spatial, in that the relationship of the bars in the grid, or the relationship of the solid to the void can be given pure code notations of + and - or x and y. The physical presence is merely a general representation in form, of the sign system." Ibid.

replaced without modifying the internal structure of the sentence.⁴⁶ Similarly, architectural forms are supposed to give visual expression to an underlying structure that is independent from them. But a difficulty with the language of architectural forms is that the pure sign, devoid of meaning, does not exist in architecture. As Eisenman contends, "the idea of an architecture as distinguished from a painting will always contain in the idea, ideas of functional and semantically weighted objects as walls, bathrooms, closets, doors, ceilings. There is no conceptual aspect in architecture which can be thought of without the concept of pragmatic and functional objects, otherwise is not an architectural conception."⁴⁷

The question that intrigues Eisenman is to which extent would be possible to separate the form from the content, the visible form from the underlying structure. He asks: "For example, it would be difficult to imagine a building without an entry, or without some form structure; yet, does the mere presence of these in a building represent a resort to preconceived notions? Obviously, when these elements begin to look like a particular style -that is, when buildings that have flat roofs look like modern buildings, and when rectilinear forms are used exclusively as opposed to rounded or diagonal forms- the question of preference or preferred elements becomes unavoidable."⁴⁸

Ultimately, Eisenman's efforts are directed to question the inner structures of architecture which he thinks to be closely related to the inner structure of language. In his attempt to destroy the association between the *sign-door* and the *form-door*, he has designed buildings whose door cannot be identified with any recognizable form-door, and whose facades are indistinguishable from the elevations. A similar separation of form and meaning, was already present in the Barcelona pavilion of Mies. Mies' building is essentially a building without entrance, even though it has doors. In the pavilion, the function 'entrance' is not associated to the form 'gate.' But, by questioning the inner structure of form and language, Eisenman's ultimate goal is to make the beholder doubt all his

⁴⁶The equation of the inner structure of a form with the inner structure of a sentence has a long history. As we have seen in Chapter 8, Heinrich Hübsch had already referred to this idea of substitution of elements within a given inner form or *Grundgestalt*. Incidentally, Hübsch was writing about the same time when the linguist Wilhelm von Humboldt distinguished between the inner and outer form of a language. A most revealing link between the inner structure of language and the inner structure of architectural forms, can be found in a passage where Ferdinand de Saussure, the founder of structuralist linguistics, took the example of a Doric temple to illustrate his concept of syntagmatic versus associative dimensions of language: "From both (syntagmatic and associative) points of view a linguistic entity is comparable to a defined part of a building, e.g., a column. On the one hand, the column finds itself having a certain relation with the architrave which it supports; this arrangement of two entities which are actually present within the same space is reminiscent of a syntagmatic relation. On the other hand, if this column belongs to a Doric order, it suggests a mental comparison with the other orders (Ionic, Corinthian, etc.) which elements are not present in that space; thus the connection is associative." Ferdinand de Saussure, *Course in General Linguistics*; translated and quoted in Emilio Garroni, 'The Language of Architecture', 1981.

⁴⁷Ibid.

⁴⁸P. Eisenman, *House X*, p. 42.

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architectural preconceptions, at least as much as the architect himself is willing to doubt his own. The question that remains open is whether after stripping architecture from its basic structures, the resulting forms can be called architecture at all.

10.5 Conclusions

The idea of Form and Type was rejected by Modern architecture, as being a hindrance for the creation of new architectural forms. However, the work of Wright and Le Corbusier, Mies and Van Doesburg, suggests that modern architecture did not completely get rid of previous form-types. The links between the architectural tradition and the Modern Movement suggests the existence of deeper structures in architecture. The notion of Type might be one of these structures.

The idea of Type was behind the creative efforts of the precursors of Modern architecture. Wright transformed the inherited Palladian model into a new one, the Wrightian model. Le Corbusier distorted the elements of the villa-type, but the framework of the classical scheme still underlies his projects. Van Doesburg, in spite of his rejection of the inherited form-types, could not free himself from the influence of the most immediate tradition: the Prairie houses that Wright had built at the turn of the century. Mies adopted a more radical position. He got rid of the influence of the Palladian model but did not propose an alternative one. Instead, he replaced the idea of Type, understood as model or pattern, by the notion of formal language. The Barcelona pavilion, rather than being the embodiment of a new form-type, is the negation of the idea of Type: the form, model or pattern has been replaced by a system of rules that determine the spatial relations of the elements of the language.

The rejection of the form-type has also been postulated by Eisenman, who argues that the form-type represents a hindrance to the creative process of the architect. His alternative to the 'preconceived image' is a systematic process of transformation in which the starting point is the most neutral form: the cube. Even in this case, it cannot simply be said that form, as preconceived image, plays no role in Eisenman's architecture. There are some evident aesthetic connotations in the choice of certain formal elements, like the grid, or even in the way the designs are represented by means of axonometric drawings, that cannot but recall the previous work of Terragni, Le Corbusier and Van Doesburg.

Chapter 11

Type as Mind Structure

11.1 Introduction

In the second half of this century, new fields born after the advent of the computer, like cybernetics and information theory, have played a similar role as the one that biology and psychology had in the past: they have become a source of conceptual paradigms for other disciplines, including architecture. Some of the previous paradigms of form have pervaded in the newly created fields though. For example, the notion of System, understood as the ensemble form-context, constitutes a basic principle in cybernetics, structural linguistics and information theory. Similarly, the notion of Gestalt, a fundamental concept of the psychology of perception, still pervades in the theories developed within problem-solving and information theory. In artificial intelligence and related fields, the notion of Type pervades in concepts like 'knowledge structures', 'mind structures' or 'patterns of thought'. Different authors have proposed terms like *frame*, *script* or *schema* to refer to these 'patterns of the mind'.

The theories formulated by the researchers of the mind to explain how human creativity works, confirm what architectural theorists have known since a long time: that creativity only occurs within certain established boundaries or limits. Authors working in the area of problem-solving and artificial intelligence, have coined terms like *problem space*, *conceptual space* or *thought style* to express the same idea of limits. In the field of art and architectural theory, these limits that make creativity possible, had been expressed before through the notion of Type.

An idea of Type is also present in some of the formalisms that have been proposed in the area of computer-aided design, like *parametric variation*, *parametric shape grammar*, and *design prototype*. Rather than effectively replacing the human designer with a computer, these formalisms help to understand some

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important aspects of design and creativity, which, paradoxically, cannot be transposed into a computer. For example, the differentiation between mechanic generation of variations and creativity, the relation between conception and representation in the design process and the distinction between geometric shape and architectural form.

As with the study of creativity, the notion of systematic design process postulated by advocates of computer-supported design methods, has precedents in the field architectural theory as well. The method of composition of Durand and the transformational process of Eisenman are the most clear examples. To forge a link between the emerging field of computer-aided design and the main body of architectural theory has become a priority for contemporary design methodologists. The attempts to create such a link, however, have made clear that is necessary to distinguish between a design theory whose purpose is mostly speculative and a 'functionalized' design theory, whose goal is to create concrete methods to design.

11.2 The scientific study of the mind

11.2.1 The processes of the mind

In his book *Productive thinking*, completed in 1943, Max Wertheimer extended the principles of Gestalt psychology to the solution of abstract problems. Wertheimer distinguished between productive or creative thinking and reproductive or mechanical thinking. The first has to do with the genuine understanding of a problem. The second, with the repetition of established procedures.

In line with previous Gestalt theories, that he and others had developed first in the area of the psychology of perception, Wertheimer contends that to solve a problem is necessary to understand the 'structural features of a problem situation', that is to say, it is necessary to grasp its structure or Gestalt: "When one grasps a problem situation, its structural features and requirements set up certain strains, stresses, tensions in the thinker."¹ This structure is mostly an objective form or pattern and, as such, it is embedded in the problem itself. The process of grasping the structure of the problem is a dynamic process carried out by the mind and governed by the law of *Prägnanz*. According to Wertheimer, the emergence of a Gestalt in the course of this process makes it possible to advance towards the solution of the problem. Furthermore, he contends that a similar theory can explain the process of artistic creation, particularly in music. Thus, Wertheimer

¹M. Wertheimer, *Productive Thinking*, 1982, p. 239.

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thinks that a musician composing a melody works from above, that is, from the whole to the parts: "A composer does not usually put notes together in order to get some melody; he envisages the character of a melody in *statu nascendi* and proceeds from above as he tries to concretize it in all its part."²

What Wertheimer was outlining in his book, was basically a program for a science of cognition that would be later carried out by authors like Allen Newell and Herbert Simon. In their book *Human Problem Solving*, Newell and Simon attempted to model the sort of cognitive processes that Wertheimer had started to study. By modelling these processes in a computer, they were able to formalize them in a more rigorous way³, coming up with new terms like *problem space* (e.g. "the space in which his [the subject's] problem solving activities take place"⁴).

Herbert Simon, especially, has defended the possibility that the mind and its processes can be studied scientifically. He has gone as far as proposing a theory of discovery that "is concerned with the definition and logical nature of discovery, and [...] seeks to provide normative advice and prescriptions for anyone who wishes to proceed rationally and efficiently with a task of scientific discovery."⁵ Simon's ideas have grown in close connection to the development of the modern digital computer, which he considers the matrix from which not only information theory but also transformational linguistics were born.⁶ Simon sees in the distinction between software and hardware a parallel of the philosophical mind-body dualism. He does not pretend though, that the human mind works like a computer. Rather, Simon's intention is to simulate in a computer the cognitive processes that go on the mind during problem-solving, including the "unsystematic, inductive, heuristic ways" of thinking.⁷

Like Simon, other authors have attempted to model the cognitive processes of the mind with the help of the computer. For that purpose, they have proposed different knowledge structures or models of the cognitive processes, like Minsky's *frames* or Schank and Abelson's *scripts*⁸. All of these knowledge structures convey the idea of a patterned process of thought amenable to computer implementation.

²Ibid., p. 242.

³"The important step taken by Newell, Shaw and Simon was to formalize these ideas in a computer program, thereby demonstrating that mental structures, like goals and the processes that generate and manipulate them, can be described with complete rigor." A. Ericsson, P. G. Polson and M. Wertheimer, preface to the Phoenix Edition of *Productive Thinking*, p. xiii.

⁴A. Newell, H. Simon, *Human Problem Solving*, 1972, p. 59.

⁵H. Simon, *Models of Discovery*, 1977, p. 265.

⁶"Historically the modern theory of transformational linguistics and the information-processing theory of cognition were born in the same matrix -the matrix of ideas produced by the development of the modern digital computer, and in the realization that, though the computer was embodied in hardware, its soul was a program." H. Simon, *The Sciences of the Artificial*, 1969, p. 89.

⁷Simon, *Models of Discovery*, p. 266.

⁸R. Schank and R. Abelson, *Scripts, Plans, Goals and Understanding*, 1977. A script is, according to Abelson and Schank, a schemata or knowledge structure that can "lead towards the eventual

11.2.2 The study of human creativity

In recent decades, some authors have attempted to come up with new theories to explain the less systematic side of human creativity. A significant contribution in this regard was Arthur Koestler's book *The Act of Creation*, 1964. Koestler rejects that *creatio ex nihilo* can exist with regard to human creativity: "The creative act is not an act of creation in the sense of the Old Testament. It does not create something out of nothing; it uncovers, selects, re-shuffles, combines, synthesizes already existing facts, ideas, faculties, skills."⁹ He thinks that "we learn by assimilating experiences and grouping them into ordered schemata, into stable patterns of unity in variety. They enable us to cope with events and situations by applying the rules of the game appropriate to them."¹⁰ *Matrix* is the key concept of Koestler's theory of creativity. Matrixes are not only patterns, but patterns which contain a set of rules or code. Koestler refers by matrix to "any skill or ability, to any pattern of activity governed by a set or rules-its 'code'."¹¹ The working of the mind can be explained with these pair of terms: matrix and code. From the two, the matrix is the most flexible one; the one that can be adapted to particular situations. The code, on the other hand, represents the invariant element that controls the matrix.¹² According to this 'matrix-code' model, there would be two kinds of thinking: creative and repetitive. Creative thinking, involves the participation of more than one matrix or 'frame of reference'. Repetitive thinking would be confined to a single matrix.

Margaret Boden, in *The Creative Mind*, 1990, invokes the discoveries made by workers in artificial intelligence and problem-solving to postulate the existence of a 'computational psychology' whose purpose would be the application of computer-based paradigms to the understanding of the human mind. Like Simon, Boden contends that the mind can only be creative within some established limits, and that the creation of a 'conceptual space' is a prerequisite for a genuinely creative work. Thus, she claims that the artists or scientists that work at a given time within a conceptual space, generate works that are characterized by the same 'style of thinking': "The artist or scientist may explore a certain style of thinking so

computer understanding of natural language." *Ibid.*, p. 20. The authors distinguish between two kinds of knowledge: 'general knowledge' and 'specific knowledge'. A script stands for the 'general knowledge', that is, the conceptualized preconceptions that allow a person to behave in a given situation without knowing every specific detail involved. *Ibid.* p. 37.

⁹A. Koestler, *The Act of Creation*, 1964, p. 120.

¹⁰*Ibid.*, p. 44.

¹¹*Ibid.*, p. 96.

¹²Koestler gives the example of the spider that builds a web. The spider can decide the supporting points of the web, but the form of the cells will always be polygonal, because is determined by the code. The code is part of the nervous system of the spider, while the matrix is the result of the strategy that the spider follows in the construction. *Ibid.*, p. 38. Seen in this light, Koestler's matrix-code reminds other pairs like types and instances: every spider web is an instance of the universal 'code'.

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as to uncover its potential and identify its limits."¹³ According to Boden, artists will continue creating within a given 'style of thinking' until "the rules have been well and truly tested, so that the generative potential of the style is reasonably clear, boredom and/or curiosity invite a change in the rules."¹⁴

11.2.3 Artificial Intelligence and Architectural Theory

Basically, what the different students of the mind are saying, is that 1. creation occurs within some limits or boundaries 2. that once these boundaries exist, the mind explores its limits, creating as many variations or solutions as possible and 3. that creativity means the modification of existing patterns and conceptual spaces.

These contentions would certainly be no surprise for architectural theorists who, for centuries, have been concerned with the invention of architectural form. As we have seen in Chapter 6, Quatremère de Quincy, had already contended that the imagination of the artist can only operate within certain limits. He spoke of the "*formes & de systèmes consacrés d'abord par l'usage*" which "*tracèrent le cercle, dans lequel l'imagination avoit tout l'effort nécessaire pour inventer.*"¹⁵ And similarly to Koestler, Quatremère also believed that to create is basically "*trouver des combinaisons nouvelles d'éléments préexistants.*"¹⁶ In the early decades of this century, Henri Focillon had also contended that creativity needs limits: "A large number of experiments and variations is likely to occur whenever the artist's expression is at all confined, whereas unlimited freedom inevitably leads to imitation."¹⁷ More recently, Bruce Allsopp, an architectural theorist, has used the term 'format' to refer to the limits that make creativity possible: "Format involves acceptance of limitations. In the mood of self-expressionism limitations were disliked by artists. But most of the greatest art has been produced within

¹³M. Boden, *The Creative Mind*, 1992, p. 47.

¹⁴*Ibid.*, p. 48. 'Conceptual space' and 'style of thinking' are expressions reminiscent of the concept of paradigm, made popular by Thomas Kuhn in his book *The Structure of Scientific Revolutions*, 1962. Kuhn postulated that scientists work within established paradigms until a disagreement between facts and theory forces them to search for a new ones. For Kuhn, the first case corresponds to the stage of 'normal science': "In so far as he is engaged in normal science, the research worker is a solver of puzzles not a tester of paradigms. Though he may, during the search for a particular puzzle's solution try out a number of alternative approaches, rejecting those that fail to yield the desired result, he is not testing the paradigm when he does so. Instead he is like the chess player who, with a problem stated and the board physically or mentally before him, tries out various alternative moves in the search of a solution. These trial attempts, whether by the chess player or by the scientist are trials only of themselves, not of the rules of the game." Kuhn, *op. cit.*, p. 144. This stage of 'normal science' would correspond to what Boden calls 'conceptual space'. When the prevalent paradigm is put in crisis though, scientists have to re-think the basic assumptions of their discipline. It is at this moment of transition from a paradigm in crisis to a new paradigm, when authentic new works are likely to be created.

¹⁵Entry 'Invention', *Encyclopédie Méthodique*, vol. 2, p. 570.

¹⁶*Ibid.*, p. 569.

¹⁷H. Focillon, *The Life of Forms in Art*, 1989, p. 62.

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limitations. The sonnet, the fugue the sonata have not inhibited great artists from doing their best. The acceptance of limits within which a work must be done, whether the format be stylistic, systemic or functional, provides a challenge to which the artist can respond.”¹⁸

The affinities between the ideas generated after the advent of the computer and the established body of architectural theory help us to understand, retrospectively, the underlying preoccupations of architectural theorists. In effect, we could now interpret some of the theories that have been formulated in the past, like the theory of the primitive hut, as attempts to come up with a rational explanation of the processes by which the man invents forms.

Nevertheless, the explanations of the process of form invention in architecture that have been provided in the past by different architectural theorists, need to be understood within the frame of reference adopted by each author. Vitruvius, for example, operated within the frame of the classic doctrine of imitation. According to this, the original form or model from which architecture would have derived was not in the mind of the builder, but in nature herself. Laugier's frame of reference was the emerging epistemology of the seventeenth and eighteenth century, which put the emphasis on the relation between perception and acquisition of knowledge. Accordingly, his primitive hut was more a concept in the mind than a physical structure created by nature. Quatremère's theory of Type emerged in the context of the rise of scientific knowledge, and his notion of *type* was a reflection of similar theories of form that were being developed within the realm of the natural sciences. In the transition from the nineteenth to the twentieth century, the fields of art theory and history were strongly influenced by the psychology of form. The interpretation of the origins of architecture provided by Le Corbusier, emphasized the mentalistic nature of the first architectural invention. For Le Corbusier, the first house was a primitive thought, as opposed to a primitive construction. Finally, in this century, fields like cybernetics and information theory, have provided the framework within which notions like 'design process' have emerged. Accordingly, architects and design theorists like Alexander and Eisenman, rejected the hypothesis according to which the design of a building must start with a preconceived image or type, and proposed instead a theory of design based on the notion of a systematic 'design process'.

¹⁸B. Allsopp, *A Modern Theory of Architecture*, 1977, p. 66.

11.3 Design as rational process

The work carried out in the area of computing, artificial intelligence and information technology, has found its way into the area of design and architecture. The use of the expression *design problem* by 1960's design theorists is an example of the influence of the ideas generated in those fields. In accordance with this view of design as a problem to be solved, a building form became the *design solution* generated by a systematic *design process*. In this context, the task of the designer was then to solve the design problem, that is to say, to create a form that fulfills the functional demands in the most efficient way. This is basically the view of design fostered by Christopher Alexander's book *Notes on the Synthesis of Form*, 1964, and by the Design Methods movement that emerged during the 1960's.¹⁹

11.3.1 Design as a problem

In his book, Alexander proposed a method of design based on the set theory of mathematics. The first part of the book is dedicated to justify the need for rational methods in design. The arguments that Alexander brings forward are persuasive and provocative, but based on some misconceptions about architectural form.

Alexander begins claiming that design problems have become too complex for a modern designer to handle properly. He says that "today more and more design problems are reaching insoluble levels of complexity. This is true not only for moon bases, factories, and radio receivers, whose complexity is internal, but even of villages and teakettles. In spite of their superficial simplicity, even these problems have a background of needs and activities which is becoming too complex to grasp intuitively."²⁰ If the designer is to have control of the whole complexity of problems involved in today's design, Alexander contends, it is necessary to create methods that help to better understand the problems involved in a design.

Both, the assumption that design is a problem to be solved and the related contention that design problems have become too complex for a human designer to handle, are two basic premises upon which the whole Design Methods approach is based. The view of design 'as problem' already says a lot about the intentions of the advocates of Design Methods. For Alexander any design, be it a kettle or a village, is by definition a *problem* that has been *solved*, meaning that the designer has to find the most appropriate form that fits to the functional requirements. But, even though the design of certain objects can be seen as a search for the form that

¹⁹C. Alexander, *Notes on the Synthesis of Form*, 1964. Alexander, however, in a preface written ten years after the first edition of the book, denied any connection between his ideas and the ones of the Design Methods group.

²⁰Alexander, *op. cit.*, p. 3.

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better satisfies the function, or functions, it would still be difficult to contend that the forms of a Greek temple and a Gothic cathedral, or of the villa Rotonda and the villa Savoye, have been created to give response to specific functional demands, unless the cultural and symbolic values of art form are included among them.

Therefore, one of the main tenets of Alexander's theory is the denial of all of those meanings of form, other than those which have a functional justification. In Alexander's theory, art is subsumed under craftsmanship, i.e. the creation of forms that respond to specific functional demands.²¹ This view of design, as the creation of functional artifacts through scientific procedures, is in fact the expression of a culture for which issues of aesthetics and symbolism have become less important than functional efficiency and pragmatism.²²

11.3.2 Design as abstract model

The notion of System, understood as the ensemble form-context, pervades in Alexander's *Notes on the Synthesis of Form*. For Alexander, design is composed of two elements, form and context: "The form is the solution to the problem; the context defines the problem."²³ He thinks of the forms of artifacts, buildings and cities as being in a continuous process of interaction with an abstract context, i.e. the set of functional demands that the form has to fulfil. According to this, the goal of the design process is to achieve the *fitness* between form and function.

This 'biological model' of design that Alexander propounds, was not essentially new, as Philip Steadman has pointed out.²⁴ As we have seen in Chapter 8, nineteenth century theorists like Viollet-le-Duc and Semper, had based their theories on a similar model. There is, nevertheless, a substantial difference between the functionalist theories formulated by nineteenth century theorists and Alexander's. Viollet-le-Duc, for example, was content with recognizing a relation between form and function, but he did not go as far as to propose an abstract model that reproduces that relation. He did not attempt to propose either a method to create forms that fit to the functional requirements, as Alexander did (Figure 11.1). Viollet-le-Duc, like Semper and also Le Corbusier, were operating within the framework of speculative thought. Alexander, however, goes beyond pure theoretical speculation: he attempts to create an abstract model of the design

²¹This view of design as being basically craft was later a main tenet of Simon's 'science of the artificial', a science that would encompass "engineering, medicine, business, architecture, and painting" and would be concerned "not with how things are but with how they might be -in short, with design." H. Simon, *The Sciences of the Artificial*, 1969, p. xi.

²²With regard to the rationalist approach adopted by the design methodologists, Skolimowski contends that with their theories "serve the cause of the ideology of modern science. They all perpetuate the cult of objectivity, of factuality, of quantity and number." H. Skolimowski, *Rationality in Architecture and the Design Process*, 1978.

²³Alexander, op. cit., p. 15.

²⁴See P. Steadman, *The Evolution of Designs*, 1979.

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process in which the relation form-function has been systematized according to certain mathematical procedures (Figure 11.2). In this regard Alexander, operating at a higher level of abstraction than previous architectural theorists, since he tries to systematize the design process itself.

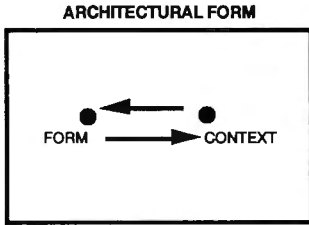


Figure 11.1. Conceptual model of Viollet-le-Duc.

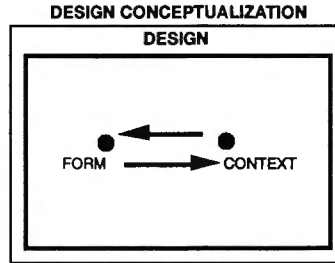


Figure 11.2. Conceptual model of Alexander.

11.3.3 Design as a process

Christopher Jones, a leading advocate of the application of rational methods to design, contends that "all the methods are attempts to make public the hitherto private thinking of designers; to *externalize* the design process."²⁵ For Jones, these would be the 'advantages' that such an open design process could bring: "A major advantage of bringing design thinking into the open is that other people, such as users, can see what is going on and contribute to it information and insights that are outside the designer's knowledge and experience."²⁶

Jones appeals to the simile black-box/glass-box to illustrate the difference between an intuitive design process and a rational design process: "From the creative viewpoint the designer is a *black box* out of which comes the mysterious creative leap; from the rational viewpoint the designer is a *glass box* inside which can be discerned a completely explicable rational process."²⁷ A similar contention was made by Alexander, who defended the existence of rational methods of design on the basis that "the use of logical structures to represent design problems has an important consequence. It brings with it the loss of innocence."²⁸

At this point, what the design theorists like Alexander and Jones contend implies a negation of what philosophers refer to as 'the other-minds problem'; i.e. the impossibility for anybody to know what is actually happening in the mind of somebody else. Contradicting this philosophical premise, the design theorist

²⁵J. C. Jones, *Design Methods*, 1992, p.45.

²⁶*Ibid.*

²⁷*Ibid.*, p.46.

²⁸Alexander, *op. cit.*, p. 8.

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contends that design concepts can be 1. dissociated from the mind of the designer and 2. submitted to a further level of conceptualization. This way, design becomes, as Jones says, *externalized*; or in other words, it becomes a sort of meta-language that transcends the individuality of the designer.

The paradigm provided by the computer is behind this view of the designer as a 'glass box'. Typically, a computer receives inputs in form of data; processes the data according to built-in procedures, and gives information as output. Design theorists advocated that design could be characterized in a similar way, as a process consisting of three stages: analysis, synthesis and evaluation. This means that the designer, in much the same way as the computer, receives the information of the requirements that the form has to fulfill (i.e. the design brief); applies systematic methods to process the information and gives a solution to the problem (i.e. the final design). This 'rational' view of design, as we will argue in the following pages, totally neglects the role that form plays in the conception of a design. More precisely, it fails to recognize the link that exists between conception and graphic representation in architectural design.

11.3.4 Function and form

Alexander thinks that type, or form, is a preconception that hinders the creation of original designs that respond to functional demands. He contends that the designs "which we can generate by varying the existing types do not exhibit the radically new organization that solutions to new design problems demand."²⁹ His goal is then to provide a method that makes it unnecessary for the designer to rely on existing form-types. This way, he thinks, a designer would be able to create forms that do respond to the functional demands.

At first glance, Alexander's view of design could be taken as the expression of a 'naive functionalism', according to which a form would be just the by-product of function. But, in spite of his attempt to undermine form, making it the mere consequence of function, Alexander's proposed theory does not succeed in getting completely rid of it. He argues, that a well-stated description of the functional demands that a design has to fulfill, already contains the pattern that will give rise to the form itself. But this means that the form is already in the function, thus questioning a basic premise of his theory, namely, that function determines form.

At this point, certain contradictions arise in Alexander's theory, as Steadman has rightly pointed out.³⁰ Because, even though Alexander rejects the notion of preconceived form on the grounds that this hinders the emergence of original formal solutions, he admits nevertheless that there is an intrinsic pattern (i.e.

²⁹Ibid., p. 74.

³⁰See Steadman, *op. cit.*

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form) in the function and, quite surprisingly, he appeals to the 'inventive' capabilities of the designer to discover this pattern. Thus, Alexander claims that "the designer must first trace his design problem to its earliest functional origins and be able to find some sort of pattern in them." This means that two of the premises on which Alexander's theory, i.e. that form-type is a hindrance to the design and that the complexity of designs problems surpasses the designer's inventive capabilities, are in contradiction with the method proposed because, after all, it has to be the designer who discovers the pattern inherent in the problem.

Moreover, Alexander fails to explain the most critical issue of his theory of design: the way in which a set of functional requirements is transformed into a form. Steadman has also criticized what he perceives as a 'biological fallacy' in Alexander's theory. Basically, Steadman rejects the belief that function can ever determine form, and contends that such a belief is in fact a misconception resulting from the transposition of a 'biological model' to design. He thinks that form cannot be completely eliminated from the design process, nor can the designer be removed either. Without a first formal hypothesis the process of continuous adaptation of form to function that Alexander proposes could not even start to take place, since there would be no form to check whether this fits to the context or not. Quite reasonably, Steadman concludes that the real issue to be addressed by design theorists is the understanding of the processes by which a designer conceives an idea, something that was not addressed by Alexander: "What he [Alexander] does not pursue in any way is the key psychological question of where hypothesis and where invention, be they in the scientific or in the design field, ultimately come from."³¹

11.3.5 The communicative value of Type

The consideration that Type is an obstacle to creativity, is intrinsic to the Design Methods approach. Alan Colquhoun, in his article 'Typology and Design Method', 1967, voiced this negative view of Type, writing that "many people believe -not without reason- that the intuitive methods of design traditionally used by architects are incapable of dealing with the complexity of the problems to be solved and that without sharper tools of analysis and classification the designer tends to fall back on previous examples for the solution of new problems- on type solutions."³² In his article, Colquhoun refers to the design theorist Tomás Maldonado, who had contended that 'creation is a process of adapting forms derived either from past needs or from past aesthetic ideologies to the needs of the present'. Maldonado admits that this is in fact how designers work, even though

³¹Ibid., pp. 206-207.

³²A. Colquhoun, 'Typology and Design Method', in *Essays in Architectural Criticism: Modern Architecture and Historical Change*, 1981, pp. 43-51.

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he thinks that they should not work that way. As other design theorists in that time, Maldonado, and to some extent Colquhoun, believed that a design should stem from the proper understanding of the problem at hand, and that the fact that a designer needs to rely on the Type -as inherited form, or mental picture of the final design- is only a remedy, a temporary solution that will become unnecessary as soon as the appropriate design methods are devised.

On the other hand, the recognition that Type, like language, fulfills a communicative and social role, linking tradition with the present, is the most significant contribution of Colquhoun's article. Colquhoun thinks that, in the stage of craftsmanship that preceded art, the form of an object was the carrier of a message, i.e. the image that the craftsman had in mind when he made the object. In a later stage, the communicative value persisted in artistic forms, in this case not as the expression of the artist's idea but as "a system of representation which embodies these values." This means for Colquhoun that "the work of art, in this respect, resembles a language."

In fact, by stressing the communicative value of art form, Colquhoun was postulating a reconciliation of two antagonistic views of Type: the one maintained by those who reject Type on the grounds that hinders the creation of genuinely new forms, and the one postulated by those who see Type as an unavoidable link with tradition. In order to make both views compatible, Colquhoun thinks that is necessary "the application of the mathematical tools proper to our culture." But he also warns that "these tools are unable to give us a ready-made solution to our problems. They only provide the framework, the context within which to operate." Ultimately, it is the artist who must have the capacity to exploit those tools to create new forms.

11.3.6 The failure of the Design Methods approach

Thirty years after the emergence of the Design Methods movement, it can be affirmed that the idea of a rational method of design has not brought about any substantial change into the form-making process in architecture. The reasons for this failure of the 'rationalistic' view of design are basically three: first, the adoption of a naive functionalism, according to which form would be the consequence of function; second, the negation of the conceptual value of graphic representation as design tool; and third, the failure to distinguish between geometric shape and architectural form.

With regard to the first point, the experience of the Modern Movement shows that strict functionalism cannot exist in architecture. The buildings of the Modern Movement were only 'aesthetically functional'. This means that the alleged 'functionalism' of modern architecture is inseparable from a certain formal

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aesthetic, to the point that it would be wrong to distinguish between one and the other, that is, between function and form.

However, design methodologists in the 1960's overlooked the value that form has in architecture, postulating an extreme functionalism that was alien to the spirit of the Modern Movement. Only later did some of these design methodologists realize that they could not get rid of form so easily. Geoffrey Broadbent, who with his book *Design in Architecture*, 1973, became one of the earliest divulgators of design methodology, has written in a more recent edition of the same book that "the presumption behind much theorising of the '60s was that *somehow* the Process would 'generate' the form. But it rarely happened like that for the very obvious reason that most architects approach most of their designing with certain preconceptions concerning, not just the *partie* of the building type but also, specifically, the *style*."³³ At this point, Broadbent admits that "gone are the days when architects believed that, given sufficient analysis, they could design the perfectly 'functional' building."³⁴

The second reason for the failure of the Design Methods approach needs to be found in the belief that design is an eminently abstract process, amenable to mathematical representation, and that graphic representations (like sketches, drawings and models) are just the outcome of a mathematically-based process. This view of the relation between conception and graphic representation in design totally neglects one of the fundamental principles on which the notion of design was forged in the Renaissance: the unity of conceptual and sensible representations.

As we have discussed in Chapter 4, *disegno* in the Renaissance meant simultaneously two things: the concept or idea in the mind of the artist and its sensible representation by means of drawings or models. Both aspects of *disegno* were intimately connected and could not be dissociated. But, for the advocates of rational design processes, thinking precedes the graphic representation. Jones says, for example, that "the new methods are not concerned with designing as we know it but with the thinking that precedes the making of drawings and designs."³⁵ In this case, the design theorist is thinking of design in terms of problem-solving. He thinks that once the abstract puzzle is solved, then the graphical representation of the design comes *naturally* as a by-product of the mathematical procedure. But, by thinking this way, the design methodologist is ignoring that, in design, the conceptual and sensible components of the idea cannot be separated. Design is not *first* the abstract formalization of a problem that *then* becomes a sensible form. Rather, in design the conceptual and sensible aspects are so intimately united, that

³³G. Broadbent, *Design in Architecture*, 1988, p. 463.

³⁴Broadbent, *op. cit.*, p. 463-464.

³⁵Jones, *op. cit.*, p. 45.

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any attempt to separate them conveys the risk of transforming design into something else (e.g. applied mathematics, geometry).

In this regard, another criticism can be made to the view of design furnished by the Design Methods movement, namely, that it fails to distinguish properly between geometric shape and architectural form. Alexander's method is built upon the belief that both are the same. As he writes in the concluding paragraphs of *Notes on the Synthesis of Form*, "the shapes of mathematics are abstract, of course, and the shapes of architecture concrete and human. But the difference is inessential. The crucial quality of shape, no matter of what kind, lies in its organization, and when we think of it this way we call it form."³⁶ Contrary to Alexander's contention, the difference between mathematical shape and architectural shape (form) is essential. Architectural form should not be equated with the abstractions used to represent it: they are two different things. Otherwise, to confuse architectural form with geometric shape, denotes a lack of sensitivity regarding the true nature of architectural form.

11.4 Computers and architectural design

11.4.1 Computer-aided architectural design

The expression 'computer-aided architectural design', CAAD, was coined in a time when design was thought to be, more than anything else, a matter of 'problem-solving'. This is, in fact, the view of design that William Mitchell adopted in his *Computer-aided Architectural Design, 1977*: "For our purposes here, it is useful to regard architectural design as a special kind of problem-solving process, and to discuss design within the framework of a general theory of problem-solving."³⁷ According to this view, there is not much difference between finding the proof to a theorem and designing a building. In both cases "the goal is to obtain something that is yet non-existent."³⁸ But, the difficulty of understanding design as problem-solving is, that in order to test if something is a solution to a problem, a solution has to be created first. For that reason, Mitchell proposes to think of design in terms of "a generative system which can then be operated to produce a variety of potential solutions"³⁹, an idea that -according to Mitchell- can be traced back to Aristotle.

³⁶Alexander, op. cit., p. 134.

³⁷W. Mitchell, *Computer-aided Architectural Design, 1977*, p. 27.

³⁸Ibid., p. 29.

³⁹Ibid.

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As examples of 'generative systems' in architectural design, Mitchell mentions Leonardo's sketches of central plans and Durand's schemes. To support this view of design as a generative system, Mitchell quotes the historian Paul Frankl who, as we have seen in our previous discussion in Chapter 4, had stressed the systematic character of Leonardo's designs. Frankl, we must remember, had suggested that Leonardo began with the simplest spatial forms, like a square or octagon, and then proceeded to create different plans "by the mechanical addition of circular, semi-circular, or octagonal ancillary spaces to the principal and cross axes of his basic figures."⁴⁰ It is precisely this idea of design as 'scientific combination' of geometric shapes that Mitchell considers to be amenable to computer implementation. With regard to Durand's method of composition, Mitchell thinks that "was also based upon systematic exploration of alternative ways in which various elements from a fixed vocabulary could be assembled in different combinations to generate architectural forms."⁴¹ Mitchell sees in this idea of design as 'composition' a chance for the application of computers in architectural design.

The tasks that Mitchell thought a computer could perform in architectural design are three, in accordance with the model *analysis-synthesis-evaluation*.⁴² The first task is to "store and retrieve" data describing a design, like drawings, specifications, schedules and other kind of documentation that the design of a building conveys. Second, "to automatically generate solutions to well-defined problems by executing a program which operates upon the data structure to compute and assign particular values to variables." In this case, Mitchell contends, the computer would operate as an 'automated design synthesis machine'. The third task is "to test potential solutions." In this last case, Mitchell sees the computer take over from the architect the task of design evaluation.

The view of design that Mitchell furnishes in this book, can be summarized saying that 1. design is problem-solving 2. design consists on the systematic creation of variations 3. these variations can be carried out by a computer. What was missing, however, is an explicit reference to the question of the relation between computer and designer in the process of conceiving and developing an idea. In effect, only the attempt to elucidate the relation between designer and machine in the process of design, can ultimately justify the use of a expression such as 'computer-aided architectural design'.⁴³

⁴⁰P. Frankl, *Principles of Art History*, 1968, pp. 5-6.

⁴¹Mitchell, op. cit., p. 35.

⁴²Ibid. p. 58.

⁴³Broadbent was aware of the importance of the interaction between man and machine in the design process, as he contended that "the achievements of computer-aided design so far, and on the whole, have seemed to be almost trivial, at least in the field of architectural design." Broadbent, op. cit., p. 301. He thought then that "future developments in computer-aided design, therefore, will most certainly be more fruitful if we pay more attention to what the human being can do well, what the computer can do well, and the possibilities for dialogue between them." Ibid., p. 314. Other authors, among them Lionel March and Bryan Lawson have also referred to the possible impact that the implementation of a design in a computer might have on the designer. Lionel March, 'The Logic of

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11.4.2 Typological design

In the course of the last thirty years, the possibility that a computer could carry out automatically a design, has been a driving force behind much investigation on the design process in architecture. These investigations have contributed to understand better the essence of architectural design; in particular, those aspects of design that are less amenable to systematization.

One of the earliest accounts of the works carried out to understand the nature of the design process in architecture is contained in Geoffrey Broadbent's *Design in Architecture*, 1973. In this book, Broadbent proposed to distinguish between four classes or modes of conceiving architectural form, which he called *pragmatic*, *iconic*, *analogic* and *canonic*. These categories are supposed to correspond to the historical development of architectural form, from the earliest times to the present. Thus, *pragmatic* design refers to the time when architecture was basically the creation of shelter, and "the earliest designers seem to have taken a highly practical view, using whatever materials lay to hand, establishing by trial and error what the materials could do."⁴⁴ *Iconic* design, constitutes the next phase, when "each member of the tribe has a fixed mental image of what a house should be like."⁴⁵ *Analogic* design embraces those cases in which non-architectural forms like, for example, the forms of natural plants, are transformed into architectural forms (e.g. a capital that takes the form of a lotus flower). Finally, *canonic* design refers to the use of geometric tools, like grids or proportional systems in the design of buildings.

In the epilogue to a later edition of the book, Broadbent partially reformulated these four 'types of design'.⁴⁶ Thus, he proposed to replace the name 'iconic' by *typologic*, and canonic by *syntactic*. By *typological* design is meant "design by which one draws on known and established types, penetrating, as far as one can, to the

Design and the Question of Value', 1976, writes that "by itself, the computer in architectural design is as much, and as little, a tool as a tee-square, a drafting machine, or a slide rule. The real difference lies in the fact that the computer leads us to think much more rigorously about what we are up to than these other aids ever demanded. The architectural tasks of bringing building components together, of laying out planning and structural grids, of organizing space all have their counterpart in mathematical structure." And a similar contention is made by Bryan Lawson: "Since we understand so little about the design process it may therefore seem rather foolhardy to attempt a computer-aided design process, but there is a nice paradox here. The application of computer techniques to any system forces us to make explicit otherwise implicit procedures, and drives us to examine and investigate our assumptions about the way in which we make decisions." B. Lawson, *How designers think*, 1980, p. 190.

⁴⁴Broadbent, op. cit., pp. 26-27.

⁴⁵Ibid., p. 30.

⁴⁶Ibid. As Broadbent explains it, by the time he first wrote his *Design in Architecture*, he was not aware of the theory of Type of Quatremère de Quincy. Broadbent did not make any reference either to the possible correspondence that might exist between his theory of the four kinds of design and the three phases of the evolution of architecture that Hegel described in the *Vorlesungen*, i.e. symbolic, classic, romantic.

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'essence' of the type", while *syntactic* is that "in which one works by some rule-based system, often, but not always geometric."⁴⁷ Broadbent also contemplates the possibility that his 'types of design' could be supported by computers. He thinks that "'Typologic' design, of course, is a 'natural' for computing. Data banks can be set up for every conceivable kind of 'type' and what is more they can be used in a number of ways, as catalogues of Quatremèrian 'Models' and as data bases too for abstracting the nearest we can get to Quatremèrian 'Types'." And he concludes this remark with a premonition: "Who knows, one day computers, God-like, may show us Plato's 'Ideal Forms'."⁴⁸

11.4.3 The idea of Type and the computer

Parametric variation

As Broadbent rightly hints, the idea of Type can act as the nexus between the existing body of architectural theory and the field of computer-aided design. In particular, the concept of *parametric variation* shows to which extent a notion of Type is, in fact, embedded in the computer. In a computer modelling or drafting program, any figure drawn on the screen is in fact an instance of a generic type. In the case of a rectangle, for example, the generic type is defined in the computer program in algebraic terms, while the particular rectangle that appears on the screen is an instance of the type, having specific dimensions (length and width) and attributes (line width, line color).⁴⁹

Essentially, this idea of parametric variation, as implemented in current modelling programs, has its sources in the analytic geometry of Descartes and Fermat. The novelty that the computer brings, is that it can put together two kinds of representation, one purely algebraical, the other graphical. From the point of view of the computer representation, the most important is not the concrete figure that is displayed on the screen but the underlying generic representation (i.e. the type or class to which the figure belongs). In this regard, the relevant aspect of the representation of geometric shapes in a computer is that every shape becomes a sort of 'conceptual schema' which potentially embodies a infinite number of variations.⁵⁰

⁴⁷Ibid., pp. 455-457.

⁴⁸Ibid., p. 458.

⁴⁹This notion of *instantiation*, is one of the fundamentals of computer graphics, and as such, was already present in the first computer drafting program: Sketchpad, created by Ivan Sutherland in 1963. In Sketchpad, *instances* were created from *master objects*, i.e. the generic definition of the object.

⁵⁰Douglas Hofstadter has defined this 'schema' in the following way: "Once your 'cat' has been represented inside a powerful computer program it is no longer just one cat; it is a 'cat schema', a mold for many cats at once, and you can skin them all differently (or at least until the cat schema runs out of lives)". D. R. Hofstadter, 'Methamagical Themas. Variations on a theme as the essence of imagination', 1982.

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Some authors, have been willing to see in this idea of parametric variation a possible model of the design process. According to this, once a certain type of design had been implemented in the computer, this could create an infinite number of variations (i.e. 'designs').⁵¹ In the context of architectural design, William Mitchell has used the expression 'types and instances' to refer to a similar view of the design process, according to which a design is seen as a particular instance of a generic case.⁵²

Creativity and generation of variations

In principle, it would be possible to think of the paradigm of 'types and instances' as an abstract model of the design process. According to this, an architect would start a design with a particular 'type' in mind to create, in a second step, specific designs that are variations of the initial form-type.

Paradoxically, the attempts to carry out in the computer this process of generation of variations has only made evident the limitations that such a view of creativity convey. In his book *Gödel, Escher, Bach: an Eternal Golden Braid*, 1979, Douglas Hofstadter relates his frustration when, after having written a computer program to create English sentences, he realized that, after a while, the sentences that the computer was able to generate all fell within a 'conceptual space' and could not go beyond it. At that point Hofstadter made the following reflection: "At first it seemed very funny and had a certain charm, but soon it became rather stale. After reading a few pages of output one could sense the limits of the space in which the program was operating; and after that, seeing random points inside that space -even though each one was 'new'- was nothing new. This is, it seems to me, a general principle: you get bored with something not when you have exhausted its repertoire of behavior, but when you have mapped out the limits of the space that contains its behavior."⁵³

The conclusion that can be derived from Hofstadter's experience, is that artistic creativity encompasses something more than the pure generation of variations.⁵⁴

⁵¹The notion of *parametric design* was first introduced by W. R. Spillers in the field of engineering. W. R. Spillers, 'Some Problems of Structural Design', *Basic Questions of Design Theory*, 1974. Quoted in Steadman, op. cit., p. 241.

⁵²According to Mitchell, the idea of 'types and instances' can be traced back to the distinction between 'types' and 'tokens' proposed by Charles Sander Peirce in the realm of semiotics. See W. Mitchell, *The Logic of Architecture*, 1990.

⁵³D. R. Hofstadter, *Gödel, Escher, Bach: an Eternal Golden Braid*, 1979, p. 621.

⁵⁴Also Margaret Boden has also warned against the risk of identifying the mechanic generation of variations with creativity. In this regard, she refers to Noam Chomsky who had "remarked on this capacity of language-speakers to generate first-time novelties endlessly, and called language 'creative' accordingly." Boden criticizes Chomsky's use of the term 'creative': "His [Chomsky's] stress on the infinite fecundity of language was correct, ...but the word 'creative' was ill-chosen." Boden, op. cit., p. 38. Boden proposes a distinction between 'first-time novelty' and 'originality', based on the following terms: "A merely novel idea is one which can be described and/or produced by the same set

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In effect, creativity involves not only the creation of variations but the invention of the theme itself. An artist does not necessarily select first the theme for, in a second step, making variations of it. In fact, in artistic creativity it is impossible to separate the invention of a theme from the creation of the variations. As we have seen in our previous discussion on the creative processes of Leonardo and Palladio in Chapter 4, the invention of the theme and the generation of the variations constitute two inseparable moments of the same process. Regardless the parallelism that can be drawn between the 'creativity' of a computer and the creativity of an artist, the generation of shapes on a computer, by means of parametric variation, cannot be considered the equivalent of the designer's creative process. For, even though the generation of variants is something a computer can do well, the computer *cannot be aware*, as a designer is, of the theme that underlies the multiple variations. This awareness of the theme, and of the tension existing between the theme and the variations, constitutes an essential part of creativity that cannot be simply transposed into a computer.

Nevertheless, it is also true that a method of composition, such as the one proposed by Durand, could be implemented in a computer without betraying the original purpose of Durand's theory. But this is not meant to speak highly about computers as to speak poorly about Durand's notion of architectural design, as we have claimed in a previous chapter. In effect, a computer-supported method, based on the idea of instantiation, could reproduce step-by-step the method of composition of Durand, as different authors have already contended. But what should be objected to both Durand's method of composition and to the advocates of parametric design, is that they reduce architectural design to a process of *generating abstract shapes*, as opposed to *creating meaningful architectural forms*.

Modelling the design process: Design Prototype

In his paper 'Design Prototypes: A Knowledge Representation Schema for Design', 1990, John Gero proposed to transform the idea of parametric design into a model of the design process or, as the author calls it, a 'design prototype'. The idea of parametric design is for Gero too deterministic, in the sense that implies a direct connection between function and form that is never true. The 'design schema' he proposes is meant to break with this nexus form-function, introducing an in-between process of checking the actual behaviour of the design with the expected behaviour. The 'expected behaviour' is not an *objective* functional requirement that the design needs to fulfill, but the *designer's perception* of that functional need.

of generative rules as are other familiar ideas. A genuinely original, or creative idea is one which cannot." Ibid., p. 40.

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In fact, what distinguishes Gero's design conceptualization from previous ones (Alexander's pattern, parametric design) is the intention to model not an abstract design process *per se*, but a design process that has been *mediated* by the designer's mind. Gero considers that "human designers form their individual design experiences into generalized concepts or groups of concepts at many different levels of abstractions; that is they schematize their knowledge." The aim of the design prototype is to model, with the help of the computer, the schematized knowledge that the designer possesses.

In order to achieve such a conceptualization of design knowledge, Gero finds it necessary to distinguish between three kinds of design: routine, innovative and creative. But the very need to distinguish between kinds of design indicates that there are aspects of design (the so-called 'creative design') that cannot be detached from the designer's mind. As Gero acknowledges: "In creative design, the role of context and the designer's perception of it play an increasingly important part." Nevertheless, the 'design prototype' should capture or represent not only the routine design but the creative design as well.⁵⁵ This means that the designer's perception becomes part of the formalization of the design process, i.e. the design prototype. In other words, Gero assumes that the computer is not only able to *represent shapes* but also to *understand form*, in much the same way as the mind does. But, in spite of this assumption, there is in fact a difference between a *computer* and the *mind* and this difference is precisely of the same sort as the one that exists between *shape* and *form*. *Shape* (e.g. geometric figure) is amenable to systematization and, as such, can exist with independence of the mind that thinks or conceives the shape. But, *form* exists insofar as it is a 'form in somebody's mind' and, as such, it cannot be detached from the designer that conceives the form.⁵⁶

In accordance with the idea of design formulated by design methodologists in the 1960's, the concept of a 'design prototype' is based on the assumption that design is basically a purely abstract process amenable to mathematical representation. In this regard, the idea of a 'design prototype' can be subjected to similar criticisms as the idea of 'rational design method' postulated earlier by the Design Methods movement. In both cases, the role that graphic representation plays in the conception of a design is neglected. Instead, design is understood as an impersonal, abstract, mathematically-based process, whose goal is the creation of a graphic output, i.e. the design or drawing. As we have previously argued, this

⁵⁵"The design prototype representation schema aims to match the expectations of a designer who utilizes computational processes in the production of a design. It readily provides a framework that supports both routine and nonroutine design processes." J. Gero, 'Design Prototypes: A Knowledge Representation Schema for Design', 1990.

⁵⁶It is never explicitly stated, though, whether the purpose of the 'design prototype' is to carry out an automated design with a computer or if the goal is to create a more fluent interaction between designer and computer. However, the use of the expression 'human designer' indicates that the author thinks that there are, or there can be, designers which are not human, e.g. computers, that can execute the design processes that have been modelled after the 'human designer'.

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notion of design has certainly little to do with the original meaning that *disegno* had in the Renaissance which, as we have seen, embraced both the conceptual and sensible dimensions of the artistic creative process.

11.4.4 Shape grammars: type and rules

Chomsky's generative grammar

In *Syntactic Structures*, 1957, Noam Chomsky described the formal structure of a language in terms of transformations applied to kernel sentences. The kernel sentences were "simple, declarative, active, with no complex verb or noun phrases."⁵⁷ The recursive application of a limited number of transformations upon a kernel sentence should be able to generate all possible sentences in a language, the so-called non-kernel sentences.

The novelty that the idea of transformational grammar brings, from the perspective of a history of ideas, is the replacement of the idea of a *fixed form-type* by the idea of a *patterned process*. The purpose of Chomsky's grammar is not only to discover the common patterns underlying the sentences in a language (i.e. the rules of syntax). Rather, he proposes a mechanism, the transformational grammar, that is supposed to explain the process by which a speaker of a language is able to generate sentences. Thus, Chomsky thinks "the linguist's task to be that of producing a device of some sort (called a grammar) for generating all and only the sentences of a language, which we have assumed were somehow given in advance."⁵⁸

Shape grammars and architectural design

As we have argued in the previous chapter, the idea of the generative grammar was behind the early theoretical work of Peter Eisenman. However, it is in the idea of *shape grammar*, first formulated by George Stiny and James Gips, in 1972,⁵⁹ where a direct application of generative grammar to design has been consciously pursued.

In a paper called 'Two exercises in formal composition', 1976, Stiny compared the shape grammar with the linguistic grammar in the following terms: "Shape grammars are like phrase structure grammars. A phrase structure grammar is defined over an alphabet of symbols, and maps strings of symbols into strings of symbols to generate a language of strings of symbols; a shape grammar is defined

⁵⁷N. Chomsky, *Syntactic Structures*, 1957, p. 107.

⁵⁸*Ibid.*, p. 85.

⁵⁹G. Stiny and J. Gips, 'Shape Grammars and the Generative Specification of Painting and Sculpture', 1972.

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over a set of shapes, and maps shapes into shapes to generate a language of shapes."⁶⁰ The common principle that persists in both cases, the shape grammar and the generative grammar of Chomsky, is the idea of recursive application of a set of transformations upon a set of elements.⁶¹

In accordance with the tradition of Durand and the *Beaux-Arts*, Stiny considered that design is basically a matter of formal composition: "Formal composition consists of arranging or combining or putting together certain spatial elements in accordance with some system of rules."⁶² With the shape grammar, Stiny hoped to contribute to the creation of a 'science of formal composition', that is to say, a 'science of form' or a 'science of design'.

A quotation from the English translation of Paul Frankl's *Die Entwicklungsphasen der neueren Baukunst* is mentioned by Stiny in the same paper. Stiny considers Frankl's interpretation of Leonardo's design for centralized churches a case study for the idea of design as 'formal composition'. Based on Frankl's interpretation, he proposes two exercises to illustrate the possibilities of shape grammars in architectural design. The first exercise is to generate a series of compositions to explore "the possibilities for arranging certain spatial elements in some ordered way." The formal generation begins with the selection of a series of shapes, in this case polygons, and with the definition of the spatial relations between shapes by means of markers. These two sets, shapes and spatial relations, are the constituent elements of the shape grammar. The shape grammar thus defined will "generate shapes made up of shapes in the vocabulary in accordance with the spatial relations", starting with an initial shape and applying in a recursive manner a series of transformations. Incidentally, and regarding the parallelism between shape grammar and generative grammar, it should be noticed that the capacity that Stiny assigns to the shape grammar to generate shapes within a particular style, has no counterpart in the Chomsky's grammar. As we have already mentioned, Chomsky declared that the purpose of the generative grammar was not to generate sentences but to check the correctness of a given sentence.⁶³

⁶⁰G. Stiny, 'Two exercises in formal composition', 1976, pp. 187-210.

⁶¹In a later paper, Stiny presented a more systematic formulation of the notion of shape grammar, which is defined in most strict mathematical terms. Thus, a shape is defined now as "a limited arrangement of straight lines defined in a Cartesian coordinate system with real axes and an associated Euclidean metric." Some operations, like the Boolean operators and the isometric transformations, can transformed the shapes into new ones. Then, it is stated that a shape grammar consists of four components: a finite set of shapes, a finite set of symbols, a finite set of shape rules and an initial shape. Apart from this description, no formal definition of shape grammar is offered in the paper. There are expressions such as "a shape grammar defines a set of shapes called a language", but this sort of expressions cannot be considered as definitions. A broader generalization of the shape grammar is the 'parametric shape grammar,' in which shapes are replaced by schemes having no specific dimensions. See G. Stiny, 'Introduction to shape and shape grammars', 1980.

⁶²Stiny, 'Two exercises in formal composition', p. 187.

⁶³A. Fleisher has rightly called the attention on this difference between linguistic grammar and shape grammar: "The linguist's grammar is a theory that assigns structure to sentences that are correct. It is not a theory intended to generate sentences, or to ensure propriety, or to constrain

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For the second exercise, Stiny proposes to *complete* "the series of related central-plan churches of Leonardo" by deriving a shape from the existing plans first for then using this as a generator of new shapes. Stiny contends that "we could first decompose the given form into its principal and ancillary elements and then recombine the ancillary elements with the principal one in as many new ways as possible." He proposes to proceed in four stages: "First, a shape (or shapes) is given. The style of this shape is to be inferred. Second, the vocabulary of primitive shapes occurring in the shape is determined by decomposing it. A decomposition of the shape specifies the primitive shapes from which it is seen to be made up. Third, the spatial relations that govern the joint occurrence of any two of these primitive shapes in the shape are specified. Fourth, the vocabulary of primitive shapes and the spatial relations are used to define simple shape grammars that generate the given shape and other shapes as well."

According to Stiny, a shape grammar derived from a coherent body of cases (in this case, Leonardo's plans for centralized churches) constitutes a *style*. Furthermore, the shape grammar thus obtained is supposed to create new shapes that will conform to the characteristics of the original 'style'. One must agree with Stiny though, that the idea of style was 'too strict' as compared to the one held by architectural theorists like Ackerman and Summerson.⁶⁴ Furthermore, to reduce the whole problematic of style to a mere question of combination of geometric shapes must be, in principle, questionable. Not only that, but the notion of shape grammar implicitly reduces the whole complexity of architectural form to geometric shape, and degrades design to a mere combination of shapes. As we will argue in the next pages, these misconceptions about architectural form and about architectural design, on which the idea of shape grammar is based, cannot but cast some doubts on the pretension to create with it a science of architectural design.

Shape grammars and Palladian villas

In the last two decades, different authors have applied shape grammars to the study of coherent bodies of architectural works, among others the Prairie houses of Wright⁶⁵ and the villas of Palladio. Stiny and Mitchell applied the shape grammar formalism to Palladian villas and Mitchell has later presented a modified version of it.⁶⁶

stylistics. The sentence hardly matters. All of us speak correctly. It is the grammar that stands trial. Judgement is rendered by the parser, which passes on the ability of the grammar to describe the sentence. The shape grammarian intends the grammar for quite the contrary purpose: to generate sentences". A. Fleisher, *grammatical architecture?*, 1992, pp. 221-226.

⁶⁴Stiny, op. cit., p. 204. If would be not so strict if compared to the notion of style held by Viollet-le-Duc, for example, who had already thought of style as a principle from which all 'styles' (Roman, Greek, Bizantine and so on) could be derived.

⁶⁵H. Koning, J. Eizenberg, 'The language of the prairie: Frank Loyd's Wright prairie houses', 1981.

⁶⁶W. Mitchell, *The Logic of Architecture*, 1990, pp. 152-181.

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As Mitchell describes it in *The Logic of Architecture*, the Palladian grammar, is a “fairly sophisticated grammar to generate villa floor plans in the style of Palladio.”⁶⁷ As in Wittkower’s formula, in Mitchell’s shape grammar the most abstract expression of a Palladian villa is also a grid. But while Wittkower suggested that the squared tartan grid is the formula from which all the villas derive, the origin of the generative process that Mitchell presents is different. At the beginning the generative process there is only a point and a set of rules, basically all what the parametric shape grammar requires to begin the generation process of a Palladian floor plan. This means that the process of generation does not begin with a complete shape, but with a formless schema. The first task of the grammar is to generate an a-dimensional grid by means of the recursive application of a limited number of rules. The rules that create the grid layout can be applied in different ways, but the number of possible combinations is limited. Once the grid layout has been created, values are assigned to the parameters of the grid. This parametrized grid is, in fact, the true origin of the process of transformation. By assigning numerical values to the parameters of the grid, the parametric shape grammar can give rise to “a countably infinite universe of villa designs.”⁶⁸

The subsequent rules transform the geometric grid into a floor plan that conforms to the characteristics of the plans drawn in the *Quattro Libri* (e.g. the openings are lined up along axes). The process of transformation ends up with the so-called termination rules. At that point, the plan has been completed. The Palladian grammar that Mitchell describes, cannot generate all possible Palladian plans (e.g. the villa Rotonda), but it can create “all the uniaxial villa plans published in Palladio’s Four Books of Architecture, together with many plans sketched elsewhere by Palladio, and a rich catalogue of original plans in a convincing manner.”⁶⁹ The shape grammar then is a device to describe, by intension rather than by extension, a collection of shapes, in this case shapes representing floor plans of the villas of Palladio.

At this point, it seems pertinent to ask about the ultimate purpose of the Palladian grammar that Mitchell proposes. In particular, we should ask whether the purpose of the grammar is 1. to simulate the human design process; in this case, the process that went in Palladio’s mind 2. to be a conceptual device for the creation of new designs 3. to be a tool for analyzing a coherent body of architectural works. Quite reasonably, Mitchell is reluctant to contend that the process of transformation represented by the shape grammar parallels or simulates the process that goes on in the designer’s mind. In fact, such possibility is explicitly

⁶⁷Ibid., p. 152.

⁶⁸Ibid., p. 167.

⁶⁹Ibid.

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rejected by Mitchell: "I do not want to suggest that designers necessarily follow explicit grammatical rules", although -Mitchell continues- "they sometimes do."⁷⁰

Recently, the work of Stiny and Mitchell has received the attention of the historians George Hershey and Richard Freedman. Hershey and Freeman have attempted to apply "the essential notion of a generative grammar to the history and analysis of architecture." In line with the previous work of Wittkower, the authors think that "Palladio's villas embody geometrical rules", although "there is less certainty as to precisely what the rules are. He wrote some of them down and hinted at others, but most have to be extrapolated from his work; and that is where the disagreements lie."⁷¹

In effect, as the authors contend, the interpretations of the rules that are implicit in Palladio's villas vary for every author. While in Mitchell's Palladian grammar the starting point is a dimensionless shape (e.g. a point), Hershey and Freedman begin their generation process with a rectangle that is then subdivided in horizontal and vertical bands. When a room has reached the minimum established size, the process of subdivision stops, and the floor plan is completed with the insertion of walls, openings and porticoes. Once the plan has been generated, a separate process creates the facades from the plans. As the authors concede, the grammar cannot generate all Palladian villas. In particular, it cannot generate plans with a T-cross central hall (Malcontenta) and circular hall (Rotonda).

Objections to the application of shape grammars in architectural design

In principle, the idea of shape grammar, understood as formalization of the design process, is liable to the same sort of criticisms to which the inductive-deductive scientific method has been subjected.⁷² First of all, the advocates of the application of shape grammars in architectural design underestimate the fact that any hypothesis that could be formulated about the rules of composition of any coherent set of shapes, like the plans of the Palladian villas for example, necessarily *presupposes* something about the shape. It is not that facts (i.e. shapes) and hypothesis (i.e. the rules of composition) are two different things. Rather, facts

⁷⁰Ibid., p. 181. In other parts, this parallelism between computation of shapes and designer's mind is more clearly vindicated. Thus, when design is considered 'as computation', "the goal of the designer's computation is to instantiate the type in a way appropriate to that moment and context." Ibid., p. 179.

⁷¹Rather naively, the authors contend that their goal is "to make explicit what earlier neo-Palladians have done by instinct" and "to teach a computer to design Palladian villas." G. Hershey and R. Freedman, *Possible Palladian Villas (Plus a Few Instructively Impossible Ones)*, 1992.

⁷²It is nevertheless paradoxical, that at a time when the inductive-deductive model was being criticized in the philosophy of science, this model constitutes the basic premise of the 'science of design' that shape grammars stand for. Precisely, what was being advocated at the time was a less objective (and more artistic) view of science, like the one postulated by Popper and also by Kuhn, according to which a scientific theory was more an conjecture that had to be corroborated by the facts than an absolute truth.

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and hypothesis are in this case the same thing. The generic shape or formula that, according to Mitchell, underlies the Palladian differs from the one proposed by Hershey and Freeman, and both are different to the one proposed earlier by Wittkower. These differences in interpretation are not irrelevant though. They are the heart of the matter, and the advocates of shape grammars have traditionally underestimated this fact.⁷³ The problem behind the interpretation of shapes points out to the whole range of issues raised already by Gestalt psychology; a field that has been traditionally ignored by the advocates of shape grammars.⁷⁴

In truth, unlike a scientific experiment, the experiment that the advocates of shape grammars are proposing, *cannot be corroborated by the facts*. For example, once a hypothesis about the Palladian plan has been formulated, a shape grammar can be devised that generates variations by modifying the rules of composition and/or the parameters of shapes. But, how then might it be possible to verify that a plan generated by the grammar is really 'Palladian'? The verification cannot be sought in the facts, as a scientist would do. Rather, the shape grammarian takes for granted that the result is a Palladian plan because it has been deduced from a formula that embeds what the author of the shape grammar considers to be the principles of the Palladian plan. That is to say, hypothesis and facts are the same thing, so that a subjective interpretation is raised to the status of objective truth.⁷⁵ This fundamental flaw raises serious doubts about the possibility of creating 'a science of architectural design' based on the shape grammar formalism.

Another objection that can be made to the application of shape grammars to architecture has to do with the representation of architectural form. In principle, the meaning of a shape grammar is to capture the most conceptual aspects of formal composition, putting aside the most 'iconic' aspects of formal representation. Thus, the initial shape in a shape grammar can be the intersection of two axes or a point; that is to say, a 'formless shape'. But what comes at the end of the process is an *iconic representation* of a villa or of a Prairie house, that is to say, a shape that can be *visually* recognized as being representative of Palladio or Wright's architecture. The shape grammarian underestimates the fact that, if we are able to identify a shape generated by the shape grammar as being a member of

⁷³Fleisher has also pointed out the relativity of hypothesis formulated by shape grammarians. In this regard he thinks that "the notion that knowledge of architectural form is representable by grammars is also a hypothesis." A. Fleisher, *op. cit.*

⁷⁴It is significant in this regard, that while Stiny and Mitchell refer to Frankl's interpretation of the centralized churches of Leonardo, they overlooked what constitutes a major issue of Frankl's *Die Entwicklungsphasen der neueren Baukunst*, namely, all the question of perception of architectural form and, especially, the notion of architecture as 'mental image' (*Vorstellung*).

⁷⁵Lionel March has warned against the risk of identifying scientific hypothesis with design hypothesis: "To base design theory on inappropriate paradigms of logic and science is to make a bad mistake. Logic has interests in abstract forms. Science investigates extant forms. Design initiates novel forms. A scientific hypothesis is not the same as a design hypothesis. A logical proposition is not to be mistaken for a design proposal. There has been much confusion over these methods, hence the illusion about scientifically testable design hypotheses and value-free proposals." March, *op. cit.*

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the class 'prairie house', for example, it is not because we recognize in the shape the rules that have been encoded in the grammar but rather, because we see in the *graphic representation* (e.g. the plan drawings) those features that we commonly associate with the Prairie houses: the cruciform plan, the intersecting roofs with projecting eaves, the piers at the end of the wings, the solid core or chimney and so on. There seems to be a certain contradiction then between, on the one hand, attempting to get rid of form -understood in this case as the visible or 'iconic' aspect of form- and on the other hand, depending on the purely iconic representation as the only tangible proof that confirms that the shape generated by the grammar belongs to the prescribed style.

Regardless of the contribution that the notion of shape grammar can bring to fields like mathematics or geometry, something we are not questioning here, the attempt to use it as a paradigm of the architectural design process is controversial, since it presupposes: 1. that design can be subsumed under mathematics 2. that architectural form can be subsumed under geometric shape 3. that design is computation of shapes. With regard to the first point, it must be said that no matter how intimate the relationship between architecture and mathematics and geometry might be, architecture is one thing, mathematics and geometry another. So, it cannot be simply assumed that architectural design can be completely subsumed under mathematics. A similar criticism can be made of the identification of architectural form with geometrical shape. Again, architectural form is one thing, geometric shape another. As we have striven to demonstrate, beginning with the discussion on the natures of architectural form in Chapter 2, architectural form is much more than what can be represented by a geometric form or shape. And, finally, regarding the third point, artistic creativity consists not only on creating variations of a theme, but in creating both the theme and the variations, as we have argued before. Furthermore, the reduction of architectural design to a combination of geometric figures constitutes an inadmissible simplification of architectural design. The purpose of architectural design is not to generate shapes but to create *meaningful form*.

11.4.6 The link with tradition: the inductive-deductive model

In their research work, many design methodologists working within the field of computer-aided design, have assumed that architectural knowledge is embedded in individual cases and that this knowledge can be extracted and used to create new designs. As we have seen, this link analysis-synthesis constituted a basic premise of the shape grammar formalism proposed by George Stiny, and has pervaded the work of computer-aided design ever since.⁷⁶

⁷⁶Thus, Gero, for example, thinks of the 'design prototype' as "a conceptual schema for representing a class of a generalized heterogeneous grouping of elements derived from alike design cases that provides the basis for the start and the continuation of a design." Gero, op. cit. Similarly, Robert and

At this point, it is necessary to remember that the possibility to extrapolate some rules from existing works of art, with the purpose to be applied by other artists, has been considered and rejected by different art theorists in the past. By the end of the sixteenth century, Giordano Bruno reacted against the application of mathematical rules in art. He claimed 'that poetry does not spring from rules, but rules from poetry, and that there are therefore as many different kinds of rule as there are different kinds of poets.'⁷⁷ Later, in the nineteenth century, there were again authors who criticized the attempts to systematize artistic creation, like John Ruskin. In a chapter of *The Stones of Venice*, 1880, Ruskin argued that there are basically two kinds of people: 'men of facts' and 'men of design', e.g. scientific and artistically minded people. He thought that three different kinds of 'diseases' in art were produced when, first, 'men of facts despise design' (hence, the 'imitative' character of Dutch painting); second, when 'men of design despite facts', that is, when artists ignore the laws of nature (e.g. Chinese painting); and third, "when the men of facts envy design; that is to say, when, having only imitative powers, they refuse to employ those powers upon the visible world around them; but, having been taught that composition is the end of art, strive to obtain the inventive powers which nature has denied them, study nothing but the works of reputed designers, and perish in a fungous growth of plagiarism and laws of art."⁷⁸

Rivka Oxman have also proposed two different approaches by which architectural knowledge can be extracted from past cases: *typological* and *precedent-based*. R. E. Oxman and R. M. Oxman, 'Refinement and Adaptation: Two Paradigms of Form Generation in CAAD', 1991, pp. 313-328. Typological, means a 'process of refinement' in which "a generalized schema is transformed into a specific design." In a refinement process, the design is expected to begin with a 'generative schema' that includes the formal transformations that will create the final design. Precedent-based refers to the process of 'adaptation' by which "a specific precedent is transformed into a new design." Ibid. The authors seem to take for granted that such a refinement process can be formalized in a way that a computer can proceed to generate the 'design'. In the authors' words, "in knowledge-based CAAD, the representation of transformational operations of refinement may be encoded as part of the design schema." Furthermore, the reference to the 'design reasoner' in the following statement suggests that the 'reasoner' is the computer: "In this view a design reasoner in knowledge-based CAAD systems should have a capacity to work with both pre-stored specific cases and the general schema". Ibid., p. 327.

⁷⁷Quoted and translated in A. Blunt, *Artistic Theory in Italy, 1450-1600*, 1962, p. 145. Original Italian quotation published in E. Panofsky, *Idea*, 1968, p. 219: "*Conchiudi bene, che la poesia non nasce da le regole se non per leggerissimo accidente; ma le regole derivano da le poesie: e però tanti son geni e specie di vere regole, quanti son geni e speci di veri poeti.*"

⁷⁸J. Ruskin, *The Nature of Gothic*, [1977], pp. 51-56. (reprint of the 1892 edition, by W. Morris). More recent testimonies of the aversion that some authors have to the whole idea of 'rational' art, can be found in B. Allsopp, *A Modern Theory of Architecture*, 1977. Allsopp thinks that intuition is more important than rationality: "Art proceeds where reason cannot follow. Important though rationality is, art employs the mind at levels of feeling and intuition which have proved more important than reasoning in the development of the human species." Ibid. p. 14. Moreover, he thinks that "intuition is something we do not understand, but in the present context it is the power of creating, of creating what has never before existed in relation to the needs which have been apprehended. Reasoning is only valid when it follows feeling and intuition which provide essential data but there is already a lot of data in the programme and the preliminary inspection of it which must be fed back." Ibid., p. 15.

11.4.5 Architectural Theory and Computer-aided design

To forge a link between the emerging stock of ideas generated after the advent of the computer and the existing body of architectural theory, has been a goal for most of the design theorists who have worked in the area of computer-aided design. To achieve that link was already the purpose of William Mitchell's paper 'Vitruvius computatus', 1973. Later Mitchell and Stiny continued in this line, grounding the idea of shape grammar on the *Beaux-Arts* idea of formal composition. Similarly, other researchers in the area of computer-aided design, have included in their writings references to some of the most significant episodes of the architectural tradition. Vitruvius' proportions, Quatremère's type, Palladio's villas and Durand's method of composition are among the favorite examples.

Even though the original intention to create a link between past and new ideas can be plausible, this has sometimes contributed to a greater misunderstanding of the real issues involved in the application of computers in architectural design, rather than casting more light on them.

In effect, the 'continuity' that it is often assumed between past ideas and current ones is not always true. For example, in his article about the 'Design prototype', Gero mentions the work of Vitruvius and Durand, which he considers to be a precedent of the idea of 'design as a process'; an idea that, according to the author, would not receive a new impulse until the advent of new concepts derived from systems theory and operations research. Then, to illustrate the theory of the design prototype, Gero refers to the design of a window, in which "the flux transmitted, the ventilation rate, and the various solar gains" must be taken into account. Certainly, it would be difficult to demonstrate that both Vitruvius and Durand were concerned with this kind of design issues.

It is nevertheless true that there are some cases like, for example, Durand's method of composition, in which the continuity that it is assumed between the past theories and the current ones can be true. As we have already contended, the ultimate intention of Durand (i.e. to create a systematic method of design) was basically the same as the one that the contemporary advocates of computer-aided design pursue. But in most other cases, it is necessary to distinguish between a purely speculative architectural theory, whose objectives might be mostly philosophical, from a 'functionalist' design theory whose purpose is the creation of specific design methods. Otherwise, to appeal to a computer program to justify Vitruvius' system of proportions can betray the original purpose of Vitruvius' theory.

11.5 Form, shape and structure

It can be contended, that the *denial of form* has been the common denominator in the theories formulated by design methodologists working within the frame of computer-aided design. The notion of design as a process, implicitly neglects the value of form understood as *concept or idea in the mind*, seeking to replace form by an abstract, systematic and mathematically amenable process. As we have already argued, design theorists have systematically ignored the fact that to design has to do not only with making an abstract formulation of a problem, but mostly with developing an idea by means of sensible representations (e.g. traditional drawings and models, computer models and images).

But, contrary to the assumptions of design methodologists, it must be remembered that form means *form in somebody's mind*. Form, therefore, is not something that can be transposed onto a computer. To conceive and to perceive form is the exclusive attribute of the mind. The same applies to design. To design is to conceive a form. Therefore, design, cannot be carried out by a computer since the computer does not *know* what form is; and 'know' is here the right word to use. What can be implemented in a computer is a shape or a structure, from which other shapes can be generated. However, this process of generating shapes should not be confused with design.

Peter Eisenman has recently shown some enthusiasm about the capacity of a computer to invent forms, architectural forms. At first sight, the convergence of Eisenman's ideas with the computer seems to be the most natural thing. In fact, Eisenman's notion of design as a process of transformation stems from the same sources as many of the ideas developed in the field of computer-aided design: cybernetics, generative grammar. However, the appeal that the computer has for Eisenman does not stem from the possibility to implement on it the sort of transformational processes on which the earlier House projects were based. Rather, Eisenman sees in the computer the possibility to liberate the designer from the so much feared 'preconceived image'. In this regard, he thinks that it would possible to "set up a series of rule structures for inputting into the computer not knowing a priori what the formal results will be."⁷⁹

Eisenman sees then in the computer a chance to fulfill what seems to be the ultimate goal of his theory: the elimination of the preconceived image, idea or type, and together with it, the elimination of the designer with all his images and preconceptions. Instead, Eisenman envisions a computer that "also has in its mind images, organizations, rules, structures and patterns that are not known to the architect."⁸⁰ It is nevertheless paradoxical, that whereas Eisenman is advocating a 'depersonalization' of design, replacing the designer by a systematic design process,

⁷⁹Interview with P. Eisenman, Proceedings of Ars Electronica' 94, vol.1., p. 44.

⁸⁰Ibid.

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he is 'personalizing' at the same time the computer, by attributing to this electronic device a mind and a capacity to create form.

In this connection, it is necessary to ask whether the systematic and anonymous design process that Eisenman postulates can ever exist. In fact, Eisenman's own work seems to indicate that it cannot. Because, even in the case that his buildings are understood as the result of a systematic processes, independent from the author's subjectivity, the resulting projects still have the aesthetic that is characteristic of Peter Eisenman's work. This means, that in spite of Eisenman's deliberate attempt to get rid of form, form nevertheless remains. A similar commentary can be made with regard to the possibility of a computer-generated 'design'. Even if a computer program has the capacity to generate new and original architectural 'forms' (i.e. shapes), it would be still necessary the mind of a designer to perceive the most promising *form* in the shapes created by the computer. In this scenario, a design would still be the creation of the designer, rather than of the computer.

11.6 Conclusions

Among the researchers working within the fields of problem-solving, information theory and artificial intelligence, there seems to be agreement in the consideration that the creative processes of the mind depend on the existence of certain patterns or mind structures. Moreover, there is also agreement on the fact that the mind can only be creative when it operates within a restricted territory or conceptual space. Both, the notion of pattern and the notion of a conceptual space, conform to the idea of Type held in the past by some architectural theorists. In particular, the parallelism between the theories proposed by the researchers of the mind and Quatremère's theories is striking.

The denial of form stands out as the common denominator behind the different theories of design postulated by design methodologists, in particular, by those working within the sphere of computer-aided design. Some theorists, like Alexander, have thought of form or type as a hindrance that limits the creativity of the designer, preventing him from arriving to the most functional solution. In the case of Eisenman, a patterned process of transformation is presented as the alternative to the preconceived image, form or type that mediates the creative process of the architect. Similarly, in the shape grammar formalism the fixed form or type gives place to a transformation process controlled by a series of rules.

A common assumption among design methodologists, is to consider that geometric shape is the same as architectural form. Theorists like Jones, considered form (i.e. the graphic representation of a design) the end product of an abstract, mathematically-based design method. Such a view of architectural form is, as we

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have striven to show, misleading, since it implies a simplification of the nature of architectural form and of the design process in general. Form, it has been argued, means always *form in the mind*, and therefore, form cannot be transposed onto a computer. Shapes, as opposed to forms, can indeed be generated on a computer from a given structure previously implemented on it. But neither shape nor structure should be confused with architectural form, nor the process of generating shapes on a computer should be confused with the design of meaningful architectural form.

Epilogue

An attempt to draw some definitive conclusions about the concept of Type in architecture would be contrary to the spirit that has inspired this work. Because, as we have stated in the introduction, Type, like Form, is eminently a philosophical question. This means that we can look at it from a variety of viewpoints but, in the end, we are still left with the feeling that the essence of Type has repeatedly escaped all the 'nets' we have set to trap it. Therefore, rather than drawing conclusions, we will attempt in this epilogue to summarize some of the ideas that have arisen in the course of the present study and, in some cases, to suggest the consequences that can be derived from them.

The meanings of form-type

If we adopt a non-restrictive view of Type and consider this as one of the many expressions of the most generic notion of Form, then at least the following meanings of Type have emerged in the course of this study:

1. as an ideal, primeval form; as archetype (Platonic Idea).
2. as an idea in the mind; with aesthetic, epistemological and metaphysical connotations (Renaissance Idea, or *disegno*).
3. as an idea in the mind; with aesthetic and epistemological connotations (Morris' idea; Boullée's conception of architectural form as geometric solids).
4. as a sensible model; as prototype (Vitruvius' wooden hut; Quatremère's threefold model: hut, tent and cave; Quatremère's *modèle*).
5. as fundamental principle inherent both to natural forms and to art forms (Quatremère's *type*). A variant of this is the idea of Type as primitive principle subjected to the influence of outward factors (Semper's notion of Type in the context of his doctrine of Style).
6. as a taxonomic category, used in classification of buildings according to form, function or other criteria (Durand's diagrams; typological studies in the 1960's and 1970's; functional and morphological classifications in general). This includes the notion of Type as a fundamental principle for the creation of an epistemology of architecture (Rossi's notion of Type).
7. as a two-dimensional geometric figure or diagram (Serlio's drawings of temples; Palladio's plan drawings of villas; Durand's geometric diagrams).

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8. as a geometric solid (Boullée, Le Corbusier, Eisenman).

9. as mental image, or Gestalt (Laugier's *cabane*; Arnheim's 'structural skeleton').

10. as a patterned process of design, amenable to systematization (Durand's method of composition; Eisenman transformational process).

11. as a theme, or conceptual space, that makes creativity possible (Leonardo's sketches; Palladio's villas; Wright's Prairie houses; Quatremère's *type*; Arnheim's 'structural skeleton'; as well as concepts formulated in the realms of information theory and artificial intelligence, like 'frame', 'schema', 'script', and others).

12. as an impediment to creativity (Van Doesburg's notion of form-type; Alexander's pattern theory; Eisenman's transformational process).

If we are to restrict the concept of Type in architecture to the definition given by Quatremère de Quincy, then Type basically means 1. a principle inherent to natural and art forms, in the spirit of Aristotelian philosophy 2. an abstract object of imitation, as the one already considered in the philosophy of Plato. 3. an inherited art form. However, to consider Quatremère's *type* as the canonical definition would certainly imply a simplification of the real meaning that Type has in architecture.

Therefore, a first consequence of the broad view of Type that we have adopted in this study, should be a reconsideration of the value that, particularly in the last three decades, has been attributed to the definition of Type given by Quatremère. When the notion of Type is seen against the broad background we have portrayed here, then Quatremère's *type* loses much of its privileged status. Seen in this overall picture, Quatremère's *type* constitutes one more manifestation, and perhaps not even the most original one, of a permanent concern with Form that has pervaded the thoughts of architects and architectural theorists ever since.

The natures of architectural form

It has been our contention, that architectural form consists of three different natures: structural or functional, sculptural or ornamental, and geometric or perceptual. According to this view, architectural form would *not* have developed progressively from a pure construction (the primitive hut) to an artistic form (the Greek temple). Rather, the first architectural form (the primitive form from which architecture is supposed to derive) already included these three different natures *at once*. Furthermore, we have suggested that in Western architecture the actual primitive form was not the primitive hut, but the Greek temple. It is in the Greek temple where architectural form achieved an unsurpassed balance between the three different natures. For that reason, the Greek temple became the model for later architecture.

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The notion of a primitive form, considered as the model or principle from which architecture derives, is one of the fundamental ideas associated with the notion of Type. Every theorist, who has been concerned with the issue of the origins of architectural form, has assigned to the primitive form a different meaning, in accordance with the conceptual framework within which he operated. Vitruvius, for example, was working within the frame of the Greek doctrine of imitation. According to this, the original form or model from which architecture would have derived was provided by nature. Laugier's frame of reference was the emerging epistemology of the seventeenth and eighteenth centuries, which put the emphasis on the relation between perception and acquisition of knowledge. Accordingly, his primitive hut was more a concept in the mind than a physical structure created by nature. Quatremère's theory of Type emerged in the context of the rise of scientific knowledge, and his idea of *type* was a reflection of the theories of form that had been developed by the natural sciences. In an cultural atmosphere that exalted reason and empiricism, Viollet-le-Duc stressed the rationality of the first builders, as well as the logic intrinsic to the methods of construction and the materials employed in the construction of the first house. In the transition from the nineteenth to the twentieth century, the psychology of form exerted a profound influence in art theory and history. About the same time, Le Corbusier came up with an interpretation of the origins of architecture that emphasized the mentalistic nature of the first architectural invention. For Le Corbusier the first house was a primitive thought, rather than a primitive construction. Finally, in this century, the field of cybernetics and computing has provided the framework within which notions like 'design process' emerged. Architects and theoreticians, like Alexander and Eisenman, rejected the idea that a design starts with a preconceived image or type. Instead, they proposed the consideration of design as a 'patterned design process', in which the initial image or type plays no significant role.

Each one of the different interpretations of the origins of architecture stresses a different aspect of architectural form. For Vitruvius, and for the Renaissance theorists, architecture was basically imitative. Accordingly, they stressed the ornamental and sculptural natures of architectural form. Viollet-le-Duc was interested in finding out the causes that gave rise to architectural forms. He thought that the positive rules from which form derive should be found in the construction techniques and in the materials employed. Consequently, he assigned the utmost importance to the structural (in the physical and conceptual sense) nature of architectural form. For Le Corbusier, architecture was basically a creation of the mind. Correspondingly, he stressed the geometric/perceptual natures of architectural form.

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Idea, Type and Structure: form paradigms and architectural form

Each one of the three 'form paradigms' that we have referred to in the course of this work -Idea, Type and Structure- bears a strong connection with the characteristics of architectural form in the period when the paradigm was the prevalent one. For Plato, the concept of Form encompassed, among others, metaphysical, aesthetic, epistemological, logical and ethical meanings. In Plato's philosophical system, the concept of Form or Idea had all of these connotations *at once*. Similarly, the architectural forms of the Greek temple also had a multiplicity of meanings. In effect, the temple encompasses, *simultaneously*, the three different natures of architectural form: structural or functional, sculptural or ornamental, and geometric or perceptual.

In the Renaissance, the architectural form also reflected the form paradigm that was peculiar to the time, i.e. Idea. Unlike the Platonic Idea, the Renaissance Idea is not an essence existing in its own separate world, but an *idea* in the mind of the artist. This emphasis on the mind, which stresses the epistemological and aesthetic meanings of form, began to separate the different meanings of Form that were unified under the Platonic Idea. Similarly, the balance between the three natures of architectural form that was achieved in the Greek temple, began to be broken in the Renaissance buildings. The sculptural-ornamental and the geometric-perceptual natures of form were now more relevant than the structural-functional one.

In the centuries after the Renaissance, the epistemological meaning of Form becomes more important than the aesthetic one. In the seventeenth century, the perception of form in the aesthetic sense (i.e. beauty) had already been equated to the perception of form in the epistemological sense (i.e. idea, understood as concept in the mind). As the aesthetic experience requires, the idea had to be perceived instantly, *at a single glance*. The forms that can be more easily apprehended are geometric figures, like cubes and cylinders. Hence, architectural form became more 'geometric'. The designs of Boullée respond to the will to create architectural forms that a beholder can grasp easily. For Boullée, geometric forms were beautiful because they were *understandable*, that is to say, easily apprehensible. Architectural form, therefore, in much the same way as the paradigm of form prevalent in the eighteenth century, had mostly an epistemological meaning.

In the transition from the eighteenth to the nineteenth centuries, Type replaced Idea as the prevalent form paradigm. Then, the remaining aesthetic connotations of Form were definitely lost. Type stood, almost exclusively, for the epistemological meaning of Form. Laugier's *cabane* is the expression of a basic form (i.e. type) that the beholder can derive from those buildings that bear a visual similarity to the Greek temple. The distinction between an inner form (i.e.

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structural skeleton in the conceptual sense) and an outer form, springs naturally from Laugier's *cabane*. In this regard, Laugier's conception of architectural form announces the eclecticism of the following century. In the nineteenth century, architectural form was thought in terms of an inner form that was clothed with ornament, that is with style. This is, in fact, the conception of form held by Hübsch, who thought of architectural form as being composed of an objective form (*Grundgestalt*) and a subjective form (i.e. the details).

At the beginning of the twentieth century, the psychology of form was postulating a connection between the object's actual form and an objective form that the beholder constructs in the mind. The term *Gestalt* was used to refer to these two kinds of form. After the advent of Gestalt psychology, the traditional inductive view of perception gave place to another view in which seeing and conceiving were considered two inseparable moments of the act of perception. The ideas and buildings of Le Corbusier, equally reflect this identity of perception and conception. Le Corbusier did not only *perceive* the columns of the Greek temple as cylinders; he also *conceived* his buildings as if they were made of the same geometric solids.

In the twentieth century, as Structure replaced Type as form paradigm, Form began to abandon the realm of the mind. The meaning of Form that the notion of Structure conveys is more methodological than epistemological. Unlike Type, the notion of Structure, aims at eliminating the perceiving subject. In the realm of architectural form, the emergence of Structure as Form paradigm is reflected in the appearance of expressions like *design process*. Design methodologists, like Alexander, tried to get rid of both form and the designer, replacing them with a mathematically-based design process. Eisenman also attempted to get rid of form and type -the 'preconceived image'- and proposed, for this reason, a view of design as a transformation process derived from the generative grammar of Chomsky. When compared to Alexander's, the intention of Eisenman's theories is still more aesthetic than scientific. His notion of design as a transformation process does not really do away neither with the designer nor with form (in the aesthetic sense). The designer is still Eisenman and the forms of his buildings evoke the aesthetic of the Modern Movement.

Following the advent of the computer, speculations regarding the possibility of creating artificial models of the design process started. The Ideas, that Plato had placed in a separate and eternal world of essences and that the Renaissance moved down to the mind, seem to have found now its ultimate destiny in the computer. A 'form', represented in a computer, becomes the expression of a universal from which an infinite number of instances or variations can be generated.

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Type and typology: the systematization of architectural knowledge

There is always the temptation to trace the origins of typology back to the Renaissance, and to see the treatises of Serlio and Palladio as an early attempt to arrive at a systematization of architectural knowledge. However, it must be kept in mind that the notion of Type as a principle amenable to scientific investigation, could only emerge after the rise of science in the eighteenth and nineteenth centuries and, therefore, it should not be projected back onto the Renaissance. In spite of the systematic spirit of Serlio's books, it would probably be wrong to attribute to the Renaissance architect the same 'scientific' spirit that later characterized the work of nineteenth and twentieth century theorists. It seems more reasonable to think, that rather than attempting to establish an epistemology of architecture, Serlio was giving expression to the Renaissance conception of Idea, an Idea that in spite of other connotations, was still essentially Platonic. Serlio, therefore, could not have considered classification as a technique to derive a fundamental principle or type from a series of individual buildings, as Durand would have later intended. In the Renaissance, the Idea, in spite of its inherent epistemological connotations, was still an a priori principle. The first temple shown by Serlio in the fifth book (the circular temple) was already the expression of the Idea: the circle as the Ideal form.

Similar contentions can be made with regard to Palladio's *Quattro Libri*. The classification and ordering of the villas was not done with the same systematic spirit that characterized later advocates of typology. It is therefore equally misleading to interpret Palladio's work as a precedent of typology. Rather, what Palladio tried to express with the illustrations of his work was the Idea that *participated* in his projects, to use a Platonic expression. This is the reason why Palladio submitted the drawings of plans and elevations of the villas to a process of simplification and regularization. He wanted to approximate the real to the Ideal, the graphic representation to the Ideal form.

Also, the alleged continuity between the theories of Type held by Quatremère, in the nineteenth century and the later ones postulated by the advocates of typology in the 1960's needs to be questioned. Quatremère thought of Type as a principle derived from the systematic study of nature. It was an abstract object of imitation which allowed him to defend the view of architecture as imitative art. The theory of Type of Rossi is no longer concerned neither with nature nor with the question of mimesis, as the one of Quatremère. For Rossi, the most important aspect of Type, or typology, is the possibility to construct a scientific basis for the discipline of architecture; a purpose that has to be considered alien to Quatremère's theoretical framework.

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The instrumentalization of architectural knowledge

At different times in history, architectural theorists have believed that a principle or formula derived from the systematic study of precedents could become the generative principle to create new forms. In this context, the idea of Type has been considered as the nexus between analysis and synthesis, between the systematic study of existing of forms and the invention of new ones.

An early application of this inductive-deductive model to architecture is found in the work of Durand. In the development of his theory, Durand systematically followed these different stages: 1. classification of the buildings of the past (*Recueil*) 2. derivation of the essential types (*Précis*) 3. use of the types (e.g. geometric diagrams, schemes) as generative principles for the invention of new designs (*Partie Graphique*). Durand was able to arrive at a certain systematization of architecture, even though at the price of undervaluing the meaning of architectural design, transforming it into an abstract composition of shapes. It cannot be properly contended though, that the theory that Durand attempted to build was eminently scientific, in the sense of being independent of taste and time. On the contrary, it was still dependent on a neo-classic taste that permeates the illustrations of his books.

The idea of Type as a link between analysis and synthesis was also a basic premise of the work on typology developed in the 1960's and 1970's by architects like Aymonino and Rossi, among others. About the same time, the same inductive-deductive model was being invoked by design methodologists, particularly those working in the area of computer-aided design. The shape grammar formalism proposed by Stiny was based on the belief that from the analysis of existing shapes it would be possible to make certain rules explicit which in turn could be used for creating new shapes. Like Durand's method of composition, the application of shape grammars to design is based on the misconception that architectural form is the same as geometric shape, and that architectural design is basically composition of geometric figures.

The attempt to use shape grammars to create designs that belong to a certain class of architectural works (Palladian villas, Prairie houses) raises other sort of questions regarding the validity of the inductive-deductive model in architectural design. In spite of their alleged scientific character, the rules of a grammar are dependent on the interpretation that a particular author makes of a coherent body of architectural works. This eminently subjective interpretation, is given then scientific status by the mere fact of being expressed through a set of rules.

Several objections can be raised against this inductive-deductive model on which the application of shape grammars to architectural design relies. Basically, it can be objected that 1. unlike in a scientific experiment, there can be no objective

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facts against which the prediction made by the grammar (the final design) can be tested. In shape grammars, facts and hypothesis are the same, so the scientific value of the theory might be questioned 2. the notion of shape grammar underestimates the value of representation in architecture, and in particular the 'iconic' or sensible meaning of form. Thus, a design generated by the shape grammar will be recognized as a member of a certain class (the Prairie house, for example) not because one is able to recognize in the design the rules out of which this has been created, but because the drawing presents the essential features that distinguish Wright's designs: the projecting eaves, the cruciform plan, the piers at the end of wings, the vertical core or chimney.

Type and artistic creativity

The sources of the idea

One of the underlying themes in any discussion about Type in architecture is the understanding of artistic creativity. To explain the process by which an architect is able to create novel forms, has been a permanent quest for theorists. The explanations that have been provided depend on the conceptual framework within which the architectural theorist has worked at a given period. In the philosophy of Plato, the craftsman was a demiurge who, like the divine artificer, had the capacity to create original forms. This power did not come from the mind itself, but from having privileged access to the eternal world of Ideas or Forms. Vitruvius did not make any special mention to man's capacity to create forms, an attributed to nature alone the power to create them. It was not until the Renaissance, that the creative power of the individual mind was explicitly acknowledged by architectural theorists. Alberti spoke of the lines and angles conceived in the mind (*lineamenta*), and of the connection between the idea in the mind and the sensible means of representation (e.g. drawings and models); that is to say, *disegno*.

To the question of where the Renaissance artist derived the idea from, different answers have been proposed. Some authors, among them Wittkower, have stressed the eminently Platonic character of the Renaissance Idea. Others, like Panofsky, have contended that the Renaissance Idea is not strictly Platonic, but rather, it is the result of the artist's own experience in his confrontation with nature. For the Renaissance theorist, nature included not only the natural creations but the creations of man as well, particularly, the works of the classical antiquity. Then, to say that the Renaissance architect derived the idea from nature is tantamount to saying that he derived it from the buildings of the past. However, it would be misleading to contend that Palladio, for example, went through a systematic process of analysis of the ancient buildings with the intention of extracting from them a pattern or schema that he then applied to the creation of his own designs. Regardless of the influence that the classical buildings exerted on

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Palladio, the forms of his buildings denote not only an epistemological intention, but an aesthetic and metaphysical (i.e. religious) one as well, in accordance with the different meanings of the Renaissance Idea.

One the purposes behind the theories of Laugier and Quatremère, was to come up with a theory of artistic creativity. In this regard, Laugier's *cabane* can be interpreted as a metaphor of the idea that guides the architect in the design process. Similarly, Quatremère's *type* would stand for an inherited model, a precept or rule which the architect's creation must ultimately conform to.

The influence that previous art works exert on the creation of new architectural forms needs to be taken always into account, even in those cases, like in modern art and architecture, in which a deliberate break with tradition has been sought. The creative experience of Wright and Le Corbusier confirms this contention. Le Corbusier did not reject the architectural tradition. On the contrary, he studied the most relevant works of the past, regardless of their style or epoch. The knowledge thus derived influenced even his most original creations. What Le Corbusier did not do, however, was to submit the works of the past to a process of systematic analysis, with the intention to derive from them an idea for a new design. In the case of Le Corbusier, analysis is not followed by synthesis. Nevertheless, with his buildings Le Corbusier succeeded in giving expression to some of the universal issues that have been present in the architecture of all times.

Type as the expression of the necessary limits of creation

The belief that an artist can only be creative working within some established limits, has been made manifest at different times by authors who have been concerned with the question of creativity. In the field of architectural theory, Quatremère de Quincy denied that *creatio ex nihilo* existed in art, and contended that artistic creation could only exist within the limits established by existing forms or types. Other authors, who have addressed the issue of creativity within the fields of information theory and artificial intelligence, have coined expressions like 'problem space' or 'conceptual space' to convey a similar idea of limits that make creativity possible.

The sketches of Leonardo for the centralized churches constitute a tangible manifestation of the need an artist has to set some limits to his artistic exploration. Some critics, like Frankl, have interpreted Leonardo's designs as being variations on a given theme. According to this interpretation, Leonardo would have chosen first a theme (e.g. the centralized church) and then would have proceeded to create different variations of it, in a mechanical way. We have argued that this interpretation of the relation between the generic theme and the individual designs might not be necessarily true. In fact, rather than thinking that the selection of the theme is the first step of the creative process, it can also be

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contended that a theme can only exist after the individual variations have been created. A similar comment would apply to Wittkower's interpretation of Palladio's villas. Wittkower contended that the villas derived from a generic formula. But the fact is that only after Palladio had created a coherent series of architectural works (i.e. the villas) it was possible to speak about the common theme underlying the individual designs (i.e. the Palladian model). But, to assume that Palladio went through the same sequence of analysis-synthesis in his creative process, would probably be inappropriate.

The history of architecture shows, that in all the times there have been patterns, forms or types underlying the most diverse architectural works. The 'Palladian model' is one of these 'architectural universals'. The villa-type, to which Palladio gave expression through his villas, transcends the scope of his own work. In effect, the 'Palladian model' has pervaded in Western architecture well until the twentieth century. Its influence is manifest in many of the architectural treatises published in England and France during the eighteenth and nineteenth centuries. Most of the illustrations contained in those treatises are distinguished by having a square plan, a simple volumetric envelope, and a central space. The 'Palladian model' was still in the mind of Wright when he built the first Prairie house. And it was also in Le Corbusier's mind, as the sketches of the early stages for the designs of the villa Stein and villa Savoye show.

Type as an obstacle for creativity

In the course of the twentieth century, form and type have been often considered an obstacle to creativity, rather than what makes creativity possible. This negative view of form and type can be traced back to the beginning of modern art and architecture. At that time, architects thought that only after breaking the ties with tradition could a new artistic movement emerge. In that context form, type, and also style, represented tradition and, therefore, had to be rejected.

For the architects of the Modern Movement, functionalism provided the key to get rid of inherited styles (e.g. forms). The idea that form was the result of functional demands was already part of the intellectual baggage of nineteenth century architectural theorists, like Viollet-le-Duc. Modern architects, like Le Corbusier or Gropius, adopted a similar functionalist credo. But, in spite of their adherence to functionalism, the architects of the Modern Movement did not leave out the aesthetic significance of form. As a matter of fact, functionalism alone cannot explain the forms of modern buildings. It is necessary, besides, to take into account the formal aesthetic that gave expression to the functionalist ideas.

It is precisely this aesthetic meaning of Form, which has been neglected by design methodologists who, in the 1960's, postulated a more radical functionalism. Alexander thought that form was an obstacle that prevented the designer from

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creating artifacts that effectively respond to functional demands. A designer, according to Alexander, has to start always with a preconceived image in mind, an image that he derives from the forms he knows. This image prevents him from addressing the whole complexity of the *design problem* and, for that reason, the modern designer fails to create original and functional forms. To overcome the limitation of the preconceived image, Alexander proposed a systematic *design process*, based on the set theory of mathematics.

Even though the goal of Alexander was to do away with the preconceived form, his method does not completely succeed in achieving this. According to Alexander's theory, form (i.e. pattern) is implicit in the functional requirements the design has to fulfill. Paradoxically, Alexander's method does not help to derive the form or pattern from the function. This is a task that he assigns to the designer. But to invoke the designer at this point contradicts the basic premises on which Alexander's theory is based, namely, 1. that form is a consequence of function 2. that the preconceived image that the designer has in mind hinders the creation of functional forms. Thirty years after this extreme (or naive) functionalism had been advocated by design methodologists, it has become obvious that form cannot be removed from the design process, and that either as a preconceived form, as a formal language or style, or as a conceptual tool (e.g. graphic representation), form is always part of the creative process.

Eisenman has also given support to this view, according to which type and form would hinder the creative process in architecture. Instead of a preconceived image that constrains the creativity of the architect, Eisenman proposes an open-ended design process based on a series of transformations. According to Eisenman, this view of design as a process of transformation would make the preconceived image unnecessary. At the starting point of the design process there is a geometric figure, for example, a cube. The systematic application of a series of design rules transforms the initial figure into the final design. Nevertheless, the contention that a systematic design process gets rid of the preconceived image is not completely accurate. There are some concrete forms, like for example, the grid in Terragni's Casa del Fascio, that pervades in Eisenman's projects. Furthermore, the contention that a cube is a pure neutral form, with no aesthetic meaning, can also be questioned. In the context of the formal aesthetic of the Modern Movement, which constitutes the ultimate source of Eisenman's work, a cube (like other geometric solids) does have an aesthetic meaning.

The idea of design as a process of transformation is well suited to the capacities of current computers. In principle, the transformational processes of the early House projects of Eisenman could be transposed onto a computer, so that the design would be 'automatically' generated. In this event, the computer would represent the consummation of Eisenman's attempt to get rid of the preconceived image, and of the designer. But once again, it might be questioned whether form

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can actually be removed from the design process, even in the hypothetical case in which a computer could carry out a systematic design process. Provided that a computer is capable to generate a multiplicity of design variations (e.g. shapes) the designer should still decide which shapes are aesthetically meaningful. This recognition of a *form* in a *shape* is something that only the mind can do.

The geometrization of architectural form

The abandonment of the classical vocabulary originated in the Greek temple and its subsequent replacement by a vocabulary consisting of geometric forms, constitutes one of the most intriguing aspects of the historical development of architectural form. One of the arguments that have been maintained throughout this work, is that the pursuit of the identity of conception and perception has been a constant driving force in the development of architectural form, from the Renaissance to Modern Movement architecture. According to this, the geometrization of architectural form would have arisen from the desire to achieve this identity between *form as conceived* and *form as perceived*.

In the Renaissance, the preoccupation with form perception was manifest in the theories of Alberti, as well as in the ideas and buildings of Palladio. The buildings of Palladio, in particular the villas, are distinguished by an harmonic integration of parts within the whole, that the beholder can easily grasp. In Palladio's villas, this harmony is achieved in spite of the strong contrast that exists between two different conceptions of architectural form: the classical forms of the temple front, and the geometric volume to which this is attached. Besides the visible forms, in the Palladian villa there is an invisible geometric framework that holds together the distinct parts that make the building. This invisible framework is the expression of the symbolic and perceptual natures of architectural form in the Renaissance.

In later artistic periods (Mannerism, Baroque, Rococo), the invisible framework that held together the different parts of a Renaissance building was lost. The self-contained classical forms gave place to more expressive forms, no longer so easily perceivable. There is no invisible geometric framework that can hold together the uncontrollable forms of the buildings of the Baroque or the Rococo. Later, the architecture of the seventeenth century represented a return to the classical ideal, according to which, the idea of the building -that is, its form- should be easily apprehended by the mind's eye. In that time, the important issue was not so much to perceive form in the aesthetic sense, as was still the case for Palladio, as to perceive form in the epistemological sense. This emphasis on the epistemological meaning of form is one of the reasons why architectural forms became visibly geometric during the eighteenth century. In effect, geometric forms lend themselves to that ease of apprehension that architects like Boullée considered a requisite of a true work of architecture. In Boullée's designs, the classical forms

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were relegated to a secondary role, while the geometric solids became the visible expression of the symbolic and perceptual natures of architectural form.

The identity of perception and conception, that Renaissance architects had first postulated and Boullée had anticipated, was finally achieved in the buildings of Le Corbusier. Palladio wanted the viewer to grasp the inner harmony of the building and Boullée wanted the forms of the building be in direct harmony with the perceptual mechanisms of the viewer. But neither Palladio nor Boullée expected that the viewer could reproduce in his mind the process of creation that the architect had first carried out. This was, in fact, what Le Corbusier sought. A building like the villa Savoye is an invitation to the beholder to reproduce, in his mind, the creative process of the architect. In effect, the building is perceived in much the same way as it has been conceived: as a system made out of sub-systems, continuously interacting among them, without ever reaching a state of equilibrium.

The current and future stages of development of architectural form

An unprecedented emphasis on the geometric nature (in the conceptual sense *only*) of architectural form is taking place currently in some architectural circles. An evident risk of this emphasis on geometric form, is that other aspects of architectural form (perceptual, structural, functional, symbolic and ornamental) can be undervalued or even ignored. Thus, some of today's architecture no longer aims at achieving a balance between conceptual and perceptual form. For some of today's architects, architectural forms do not have to be intelligible, but puzzling; they should not be a source of intellectual pleasure, but mostly should intrigue the beholder. Furthermore, architectural scale, understood as the relation between the form of the building and the beholder, has stopped being a concern for some architects. As a result of this denial of scale, a finished building is likely to appear to the eye of the spectator as an enlarged object rather than as a properly scaled architectural form. The advocates of an eminently geometric conception of architectural form ignore the fact that architecture takes place precisely in the dividing line that separates a geometric object from the actual building. A geometric form can have an interest as an object, but this is no guarantee for the object to become a meaningful architectural form, once the building is built.

Furthermore, the relation between architectural form and functional or structural requirements has been more and more neglected in recent times. Modern engineering techniques are expected to get almost everything built: structural frames whose form does not respond to any structural logic; walls that intersect in the most bizarre way; and in general, all sort of formal arbitrariness in which the relation between the building's form and the logic of the construction plays no longer a role. The only thing that seems to be important for some of today's *avant-garde* architecture is to create the most complicated (as opposed to

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complex) form. These contemporary advocates of 'formal complexity' seem to ignore that complex (as opposed to complicated) architectural forms have existed in almost every time, and that in most cases, formal complexity was achieved without having necessarily to remove issues like architectural scale, symbolism, structural logic and functional adequacy from the architectural discourse (e.g. Gaudí's Casa Milà, Le Corbusier's Ronchamp).

With regard to the symbolic meaning of today's architectural forms, this needs to be found in the ingenious mechanisms that the architect has devised to come up with the supposedly original and revolutionary forms. In other cases, the symbolic meaning is supposed to lie in the inextricable philosophical discourses that the architect invokes as the cause giving rise to the forms (incidentally, a fallacy that simply ignores the fact that forms have an independent life, and do not need literary discourses, either to be born or to die). Yet, there are other cases, among the most recent architectural productions, in which the symbolism of a building form is so evident that this can only be seen as an enlarged version of the object it represents. In any case there is an intention to endow architectural forms with subtle symbolic meanings, that invites the complicity of the beholder (e.g. villa Rotonda, villa Savoye).

The emphasis on pure geometry form, and the corresponding negation of all other natures of architectural form, might become more accentuated as a result of an inappropriate use of computers in architectural design. Some of today's architects might feel the temptation to create the most arbitrary forms with the aid of a computer, ignoring basic architectural issues like scale, function and tectonics. But, regardless of the role that computers might play in the present and future conception of architectural form, they should not be blamed for the simplification of the architectural form. The origins of this tendency to convert architectural form into *only* geometric form have to be found in architecture itself; particularly, in the very roots of the modern conception of architecture. Nevertheless, it is certain that a frivolous use of computer tools will contribute to accelerate the process of vulgarisation of architectural form.

Finally, one last reflection to conclude this study on the concept of Type and the nature of architectural form: in spite of the different theories that have been formulated in the past, and the ones that will continue being formulated in the future, whose purpose is to explain the causes by which forms come in to being, the world of FORM, and in particular the world of ARCHITECTURAL FORM, is likely to remain a mystery for human reason. We know that we have the capacity to invent forms, but we cannot explain how and why we are able to invent them. Perhaps, we do not need explanations after all. It might be enough, to attain a true knowledge of form, simply to exercise our capacity to create it.

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