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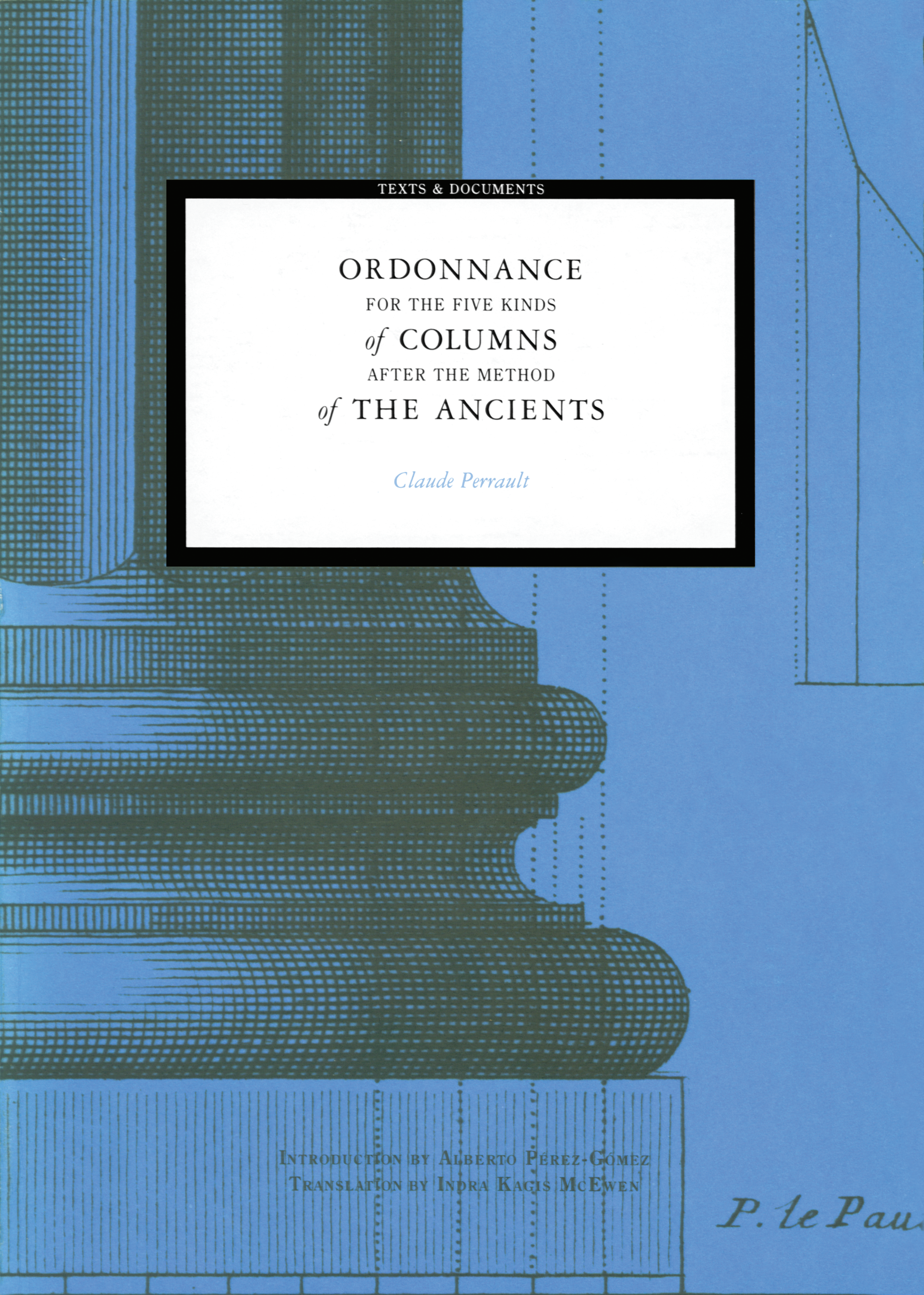
ORDONNANCE
FOR THE FIVE KINDS *of* COLUMNS AFTER THE METHOD *of* THE ANCIENTS

Claude Perrault



Introduction by Alberto Pérez-Gómez
Translation by Indra Kagis McEwen

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PUBLISHED BY THE GETTY CENTER FOR THE HISTORY OF ART AND THE HUMANITIES
DISTRIBUTED BY THE UNIVERSITY OF CHICAGO PRESS

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Published by The Getty Center for the History of Art and the Humanities,
Santa Monica, CA 90401-1455

Printed in the United States of America

99 98 97 96 95 94 93 7 6 5 4 3 2 1

Library of Congress Cataloging-in-Publication Data is to be found on the last printed page of this book.

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Acknowledgments

This edition of Perrault's *Ordonnance des cinq espèces de colonnes selon la méthode des anciens* is the result of a close collaboration between myself and the translator, Indra Kagis McEwen. The introduction is based on the research that I undertook for my book *Architecture and the Crisis of Modern Science* (MIT Press, 1983). My reading of Perrault has been challenged and enriched by the students participating in my graduate seminars on the history of architecture theory at McGill University.

The staffs of various libraries have been helpful in the preparation of this edition, especially those of McGill University and the Canadian Centre for Architecture in Montreal.

Invaluable assistance in the initial editing of the introduction came from Helmut Klassen, an architect and master's degree candidate in the history and theory program of architecture at McGill. Subsequently, Robin Middleton carefully edited the text for content, and Harry Mallgrave made important comments and suggestions. Tom Repensek was responsible for the final editing of the translation while Joan Ockman edited the introduction. Both did a wonderfully thorough job and gave us as much trouble as we deserved. I would also like to thank Lynne Kostman who provided careful and intelligent editorial fine-tuning to the book as a whole.

Last but not least, I am greatly indebted to Susie Spurdens for her help in typing and making revisions to the manuscript.

The translator owes special thanks to the library of the Faculté d'aménagement at the Université de Montréal for making its copy of the *Ordonnance* of 1683 available for this translation.

—A. P.-G.

1. Frontispiece showing three of Perrault's designs:
on the left, the triumphal arch in the faubourg Saint-Antoine (see fig. 6);
in the back, the east colonnade of the Louvre (see figs. 4, 5);
in the distance on a hill, the Observatoire. From Vitruvius,
Les dix livres d'architecture de Vitruve, *trans. Claude Perrault (Paris: Jean Baptiste Coignard, 1673).*
Santa Monica, The Getty Center for the History of Art and the Humanities.

INTRODUCTION

Alberto Pérez-Gómez

JUST OVER THREE HUNDRED YEARS AGO Claude Perrault embarked on the task of producing a scholarly translation of and commentary on Vitruvius's *De architectura libri decem* (The ten books of architecture). His careful editions of 1673 and 1684 have remained the "standard" French version of that classical Roman treatise (fig. 1).[1] The *Ordonnance des cinq espèces de colonnes selon la méthode des Anciens* (Ordonnance for the five kinds of columns after the method of the Ancients), 1683,[2] his second great contribution to architectural thought, was conceived as a necessary complement to the first endeavor. The circumstances that motivated Perrault's projects, rooted in the late seventeenth century, are now remote from us, but nonetheless they present a significant parallel with our present situation.

Perrault was concerned with nothing less than the definition and implementation of a new kind of architectural theory, a theory that challenged the nature of the discourse that had emerged in architectural treatises from Vitruvius to the mid-seventeenth century. It is well known that the discipline had been "promoted" to the sphere of the liberal—that is, "mathematical"—arts during the Renaissance.[3] Unlike that of his medieval predecessor, the Renaissance architect's task was the conception of the *lineamenti,* or overall geometric figure, of the architectural work. Architecture thereby became endowed with a specific theory, which was, nevertheless, a nonspecialized field of endeavor in the modern sense. It belonged to a universe of discourse that was founded on a totalistic understanding of reality, derived from myth and philosophy; its content was meaningless apart from the traditional understanding of a hierarchical and living cosmos (*physis*) that the Renaissance had inherited from antiquity.[4] Such theory fulfilled the important role of elucidating the orders and meanings of the cosmos that were clearly embodied in the built world. Perrault's concern was to place architecture, already well established within the European tradition of *disegno* (design as a liberal art), into the framework of the new scientific mentality inaugurated by Galileo and René Descartes. To found his endeavor on firm ground, he thought it necessary to examine the oldest surviving architecture treatise. He was convinced that a rigorous scholarly examination of this treatise, so close to the origins of the discipline, could reveal fallacies and misunderstandings about the nature of architectural theory as it was understood in his time.

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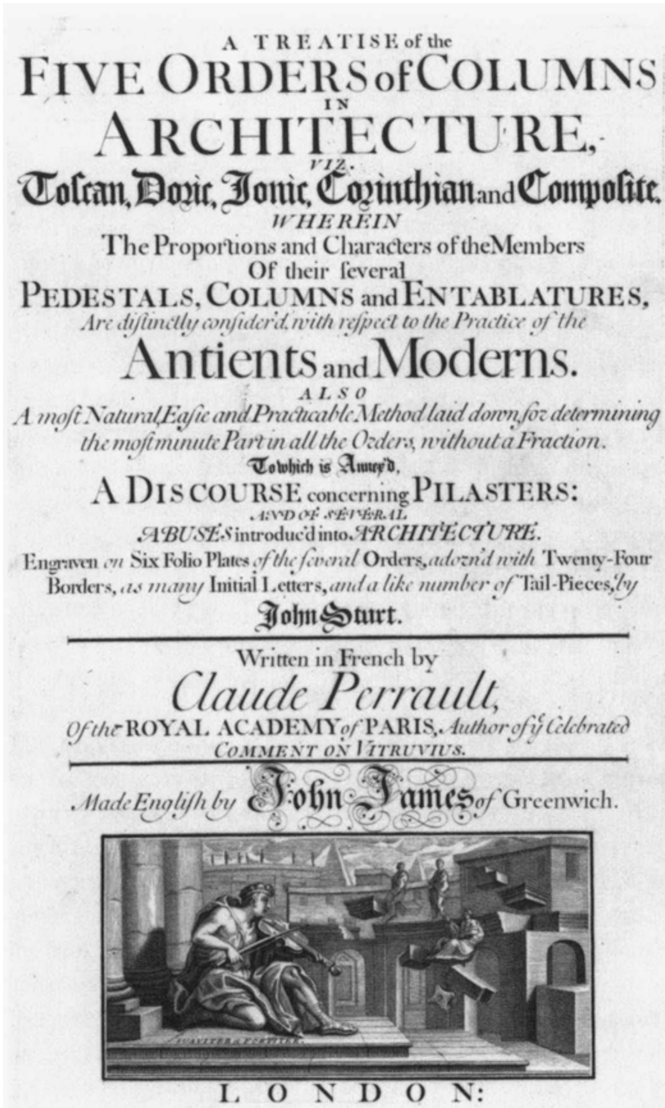


A TREATISE of the
FIVE ORDERS of COLUMNS
IN
ARCHITECTURE,
VIZ.
Tuscan, Doric, Ionic, Corinthian and Composite.
WHEREIN
The Proportions and Characters of the Members
Of their several
PEDESTALS, COLUMNS and ENTABLATURES,
Are distinctly consider'd with respect to the Practice of the
Antients and Moderns.
ALSO
A most Natural Easie and Practicable Method laid down for determining
the most minute Part in all the Orders, without a Fraction.
To which is Annex'd,
A DISCOURSE concerning PILASTERS:
AND OF SEVERAL
ABUSES introduc'd into ARCHITECTURE.
Engraven on Six Folio Plates of the several Orders, adorn'd with Twenty-Four
Borders, as many Initial Letters, and a like number of Tail-Pieces, by
John Sturt.

Written in French by
Claude Perrault,
Of the ROYAL ACADEMY of PARIS, Author of ye Celebrated
COMMENT ON VITRUVIUS.

Made English by John James of Greenwich.

LONDON:
PRINTED by Benj. Motte, MDCCVIII.
Sold by John Sturt in Golden-Lion-Court
in Aldersgate Street.

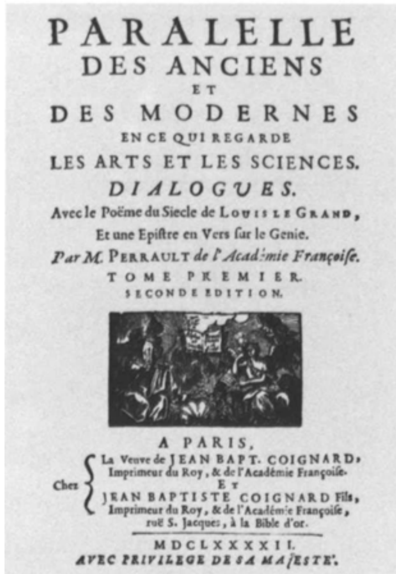
2. *Title page. From Claude Perrault,* A Treatise of the Five Orders of Columns in Architecture, *trans. John James (London: J. Sturt, 1708).*
Santa Monica, The Getty Center for the History of Art and the Humanities.

If Perrault's *Ordonnance* may be said to represent the earliest reformulation of the traditional problems of architecture in terms of a fully modern scientific theory, its failure, in my view, stems from complexities and contradictions that were already present at its inception. I hope to elucidate these in this introduction. It is this task of reformulating architectural theory at a moment of intellectual crisis that makes our concern in some ways parallel to Perrault's, although ours comes at the end of the modern epoch rather than its outset. In putting forth his "modern" theoretical position in the late seventeenth century, Perrault had to combat the prevailing understanding of theory as a "metaphysics." This was the position held by his famous opponent, François Blondel and, significantly, by the majority of Perrault's more tradition-minded successors who wrote architectural theory in the hundred years that followed the publication of his work.

Today, as the necessity of redefining the nature of architecture confronts us again, it is Perrault's understanding of theory with which we must contend: today, it is his understanding of architectural theory as a rational method of production that appears to be self-evident, just as Blondel's did in his time. A basic assumption about theory in our present-day schools and offices is that it has (or must have) the character of applied science, of technology, to be of use.[5] Architects and educators tend to believe that theory has always had this character, ignoring its fundamental role throughout history as the meaningful elucidation of practice. In the *Ordonnance*, Perrault was well aware that his opinions would appear "paradoxical" to his readers, meaning (in seventeenth-century French usage) "unorthodox." In precisely this sense, some of the present observations may be considered paradoxical with respect to contemporary theory and practice.

In fact, many of our prevalent misconceptions about "classicism" and "style," and even misunderstandings about the very essence of architecture as a historical phenomenon, may be clarified through a proper grasp of Perrault's theory. Until now a careful, scholarly English translation of the *Ordonnance* has not been available. The first English translation, entitled simply *A Treatise of the Five Orders of Columns in Architecture*, published in London in 1708 and 1722,[6] made the *Ordonnance* appear as just another book on the proportions of the classical orders, failing completely to do justice to the theoretical argument. Furthermore, the fascinating title page for the first English edition is at odds with the basic implications of the original text; it presents the creation of architecture, as if still based in the Renaissance tradition, as a quasi-magical act capable of realizing a poetic domination of gravity (fig. 2).

In any event, the far-reaching implications of Perrault's position were not fully grasped—and certainly not accepted—until Jean-Nicolas-Louis Durand


PARALELLE
DES ANCIENS
ET
DES MODERNES
EN CE QUI REGARDE
LES ARTS ET LES SCIENCES.
DIALOGUES.
Avec le Poëme du Siecle de LOUIS LE GRAND,
Et une Epistre en Vers sur le Genie.
Par M. PERRAULT de l'Académie Françoise.
TOME PREMIER.
SECONDE EDITION.

A PARIS,
Chez La Veuve de JEAN BAPT. COIGNARD, Imprimeur du Roy, & de l'Académie Françoise.
ET
JEAN BAPTISTE COIGNARD Fils, Imprimeur du Roy, & de l'Académie Françoise, ruë S. Jacques, à la Bible d'or.
MDCLXXXXII.
AVEC PRIVILEGE DE SA MAJESTE.

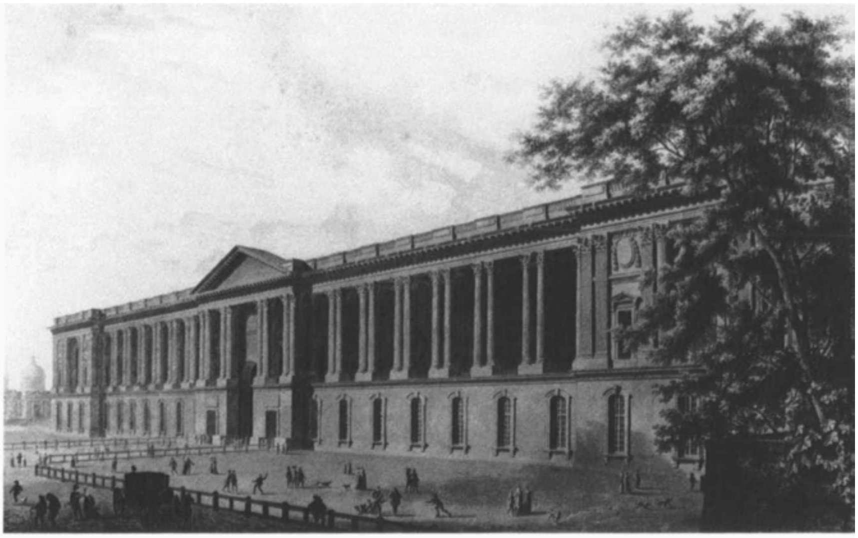
3. Title page. From Charles Perrault, Parallèle des Anciens et des Modernes, *2nd ed. (Paris: Jean Baptiste Coignard, 1692), vol. 1.*
Photo: Courtesy Slatkine Reprints, Geneva.

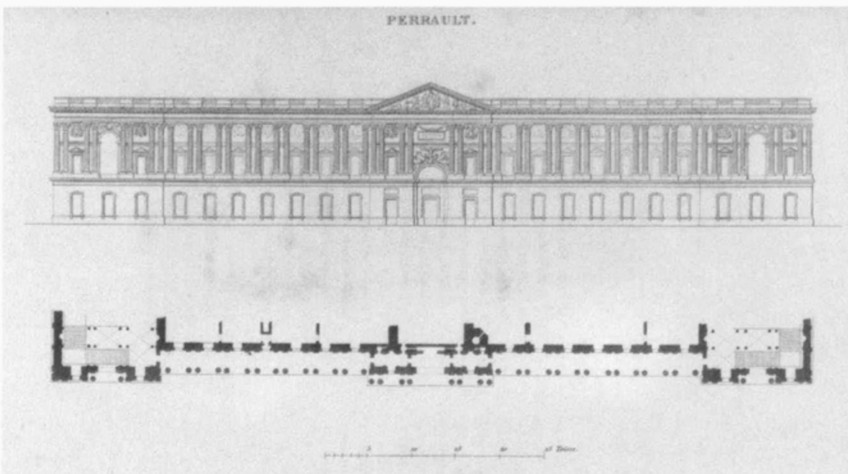
championed and radicalized the scientific outlook in architectural theory during the early nineteenth century. In the context of the triumph of modern science after the Industrial Revolution and of Durand's institutionalization of its theoretical assumptions in architecture and at a time when the old debate between Perrault and Blondel was deemed to be meaningless, a new translation of the *Ordonnance* was not of interest. Recent studies of Perrault by Wolfgang Herrmann, Joseph Rykwert, and Antoine Picon[7] have shed some light on the issues surrounding this early, fully modern architectural theory. Yet the problems it raises are so complex that the study of the primary source is paramount.

CLAUDE PERRAULT WAS BORN IN PARIS on 25 September 1613. He also died there on 9 October 1688 from an infection contracted while dissecting a camel. He was ideally qualified to postulate the first modern theory of architecture. A member of the Académie Royale des Sciences and an occasional visitor to the Académie Royale d'Architecture, he was a medical doctor by training and spent most of his time in biological research. In addition to his scientific interests and qualifications, he often collaborated with two of his four brothers, whose work reinforced the modernity of his own. They were Charles, the well-known author of fairy tales and defender of the Moderns (fig. 3) in the *querelle des Anciens et des Modernes* (quarrel between the Ancients and the Moderns), and Nicolas, a physicist who further developed the Cartesian mechanistic understanding of the cosmos. The Perrault brothers held a prominent position in the intellectual hierarchy of Louis XIV's reign, and it was through Charles's influence with Jean-Baptiste Colbert that Claude Perrault's architectural activity was furthered.

As I have emphasized elsewhere,[8] Perrault's "interdisciplinary" concerns were not unique, being the norm rather than the exception for all great architectural thinkers before the French Revolution. The connection between medicine and architecture had been self-evident since classical antiquity. It involved a relationship between the order of the microcosm and the macrocosm and the task of caring for the health and well-being of each, as well as "taking the measure" of the physical earth to provide a harmonious dwelling for the body of man. During the Renaissance, this connection resulted in architects conceiving their architectural ideas as "cuts" (that is, plans, sections, and elevations) or projections. The new architecture thus closely coincided with the development of modern anatomy and the new interest in perspective as a vehicle for measuring the mathematical depth of the world of appearances.

Perrault's fame as an architect emerged after Giovanni Lorenzo Bernini's scheme for the eastern wing of the Louvre was rejected. This event was the final outcome of a complex set of circumstances that involved the arrogance of the Italian master and his incompatibility with Colbert; the ambitious and costly nature of the proposed scheme and its failure to engage the existing parts of the palace; and, last but not least, the considerable political influence of Charles Perrault in the court. As a member of a small committee that included Louis Le Vau and Charles Le Brun, Claude Perrault was eventually assigned the responsibility for the design. A few years after his death, another of Perrault's long-time adversaries in the *querelle des Anciens et des Modernes*, Nicolas Boileau, questioned Perrault's authorship of the east colonnade, stating that it had been designed by Le Vau. Despite Boileau's later retraction, the question of authorship has never been resolved, owing particularly to a lack of evidence in the form of drawings and documents. On the basis of Perrault's theory and his discussion of the project, however, the idea for the east facade of the Louvre almost certainly seems to have originated in his radically modern and original understanding of architecture. With its paired columns and ample, elegant intercolumniations, the east facade of the





4. *Anonymous, view of the east colonnade of the Louvre, ca. 1800.*
Photo: Courtesy Photographie Bulloz.

5. *Elevation and plan of the east colonnade of the Louvre.*
From Antoine-Chrysostome Quatremère de Quincy, Histoire de la vie et des ouvrages des plus célèbres architectes *(Paris: Jules Renouard, 1830), 2: 207.*
Santa Monica, The Getty Center for the History of Art and the Humanities.

Louvre was perceived by Perrault's contemporaries as a controversial work, and it was to become highly influential in forming the taste of the following century (figs. 4, 5).

Perrault is known to be the author of a few other architectural projects in addition to the colonnade. In 1667 Colbert commissioned him to design the Observatoire in Paris, the seat of the Académie Royale des Sciences, built on a site

6. Triumphal arch in the faubourg Saint-Antoine. From Adam Pèrelle,
Veues des plus beaux bastimens de France *(Paris: Mariette, 1670), unpaginated.*
Santa Monica, The Getty Center for the History of Art and the Humanities.

south of the city, not far from Val-de-Grâce. This project gave Perrault the opportunity to synthesize his two lifelong interests, science and architecture. Formally, the building is a simple cube to which he added three octagonal towers: two at the corners of the south facade, one engaged in the center of the north elevation. The building, practically devoid of ornament, conveys the sense of having been designed as a scientific instrument, as a structure whose sole purpose was to house adequately all the measuring devices and astronomical apparatus. In the best French tradition, but also in keeping with Perrault's scientific understanding of architecture, its character is defined by the stereotomic virtuosity of its precisely executed stone vaults and magnificent staircase.

Perrault was also responsible for the design of a triumphal arch at Porte Saint-Antoine honoring Louis XIV; his design was selected by Colbert in 1669 after a competition with Le Vau and Le Brun (fig. 6). Given the unusually large dimensions of the project, however, Colbert decided to make first a large model at scale 1:1. Executed with great care by the architect Daniel Gittard, it was nearly finished in April 1670 when the king visited the site. Although Louis XIV was favorably impressed, he expressed some reservations concerning the width of the openings. For the next thirteen years, work proceeded slowly. At the time of Colbert's death in 1683 construction had proceeded only up to the stone pedestals, as debate continued to plague the project. The Académie, many of whose members had never appreciated the radical position articulated by Perrault in the *Ordonnance*, was consulted on the project in 1685. Not surprisingly, it recommended the suspension of work, mainly for economic and functional reasons.

Other projects by Perrault included an obelisk, also dedicated to the glory of Louis XIV, which was designed for a site at the Pré aux Clercs near the Louvre (1667), and a project for the reconstruction of Sainte-Geneviève (circa 1680), which prefigures the development of church architecture in eighteenth-century France. Within the context of the development of European architecture, this last project became, in fact, the most innovative of all Perrault's propositions. The disengaged classical columns carrying a trabeated structure along the length of the nave anticipate the most important feature of Neoclassical churches from Germain Boffrand to Jacques-Germain Soufflot. Furthermore, the idea of such a church precedes the important theoretical insights of the Abbé de Cordemoy and Marc-Antoine Laugier.

Further biographical information can be found in other recent sources.[9] More important for the present discussion is to sketch Perrault's epistemology. In this way we may read "the world of the work" in his writings and thereby grasp the implications of the *Ordonnance*.

PERRAULT'S WRITINGS DATE from the last third of the seventeenth century. This was a period when the implications of the Galilean scientific revolution had been generally accepted by philosophers and scientists. Yet this era was also the "golden age" of the French monarchy with its sensuous, Baroque celebrations, a time when classical mythology could still reflect the moral order and the reality of the world was still perceived as a traditional hierarchy. Both its craftsmanship and practice were traditional. Architecture still embodied the venerable values that stemmed from the perception of the world as a purposive work of God or a divinely inspired Nature. The order of man, including institutional buildings, "infinite" gardens, geometrical fortifications, ephemeral architecture, and machines, spoke directly of such a presence; it grounded and oriented man's mortality in a meaningful world. In retrospect, it is easy to grasp how, in the polarized relation between scientific thought and a traditional world, Perrault's theoretical position was deemed inconsistent by his contemporaries, not only with reference to traditional architectural treatises but also in relation to his own practice.

Perrault was among the first to believe that thought about human activities such as science and architecture was not a closed process leading necessarily to a universal truth based on divine revelation. Modern science, as opposed to its ancient and medieval counterparts, ceased to be a hermetic discipline whose transcendental conclusions were preordained.[10] In his *Novum Organum* (New organon), Francis Bacon denied the absolute authority of ancient writers. Qualifying traditional philosophical systems as "comedies" evocative of imaginary worlds, Bacon proposed a new type of knowledge derived from the observation of natural phenomena, independent of transcendental matters. This new type of knowledge was identified with the history of science, which in turn was regarded by Bacon as progressive; it involved the accumulation of experience from the past to be used by a community of intellectuals building toward the future. In opposition to the finite, mythopoeic narratives that always had a cyclical character, allowing man to become reconciled with present reality, the new knowledge became a collective task of humanity, positive but unstable, capable of being shared and transmitted, constantly increasing and growing. Implicit was the possibility of a philosophy in constant evolution, moving toward the utopian perfection of an absolute rationality.[11] In contrast to the long-standing conflict among different philosophical systems,[12] the result would be a single scientific tradition, a product of rational necessity.

The "new science" developed by Galileo and appropriated by Bacon was more than just another cosmological hypothesis; it radically subverted the traditional worldview. The new science aimed to substitute for the felt reality of the living world—infinitely diverse, constantly in motion, and defined essentially by experienced qualities—a perfectly intelligible world determined exclusively by its geometrical and quantitative properties. Galileo described in mathematical language the relations among the diverse elements of natural phenomena. An idealized, geometrical nature thus replaced the mutable and mysterious *physis*. Visible reality was diminished in importance in order to acknowledge a world of abstract relations and equations. In this world truth became transparent but only to the degree to which it avoided the irregularities of lived experience.

Galilean science thus constituted the first step in the process of the geometrization of lived space, the beginning of the dissolution of the traditional cosmos.[13] Following the work of Galileo, thinkers came to regard scientific phenomena not simply as what could be perceived but primarily as what could be conceived with mathematical clarity. Things became numbers, not understood as Platonic or Pythagorean transcendental essences but as objective and intelligible forms. The "quality" of the visible world (and architecture is a paradigm of visibility) became relative or subjective. The book of nature was rewritten in mathematical terms; man began to think that he could manipulate and dominate an objectified, external reality.

Galileo's new science and Descartes's philosophy were the first postulations of a split between the perceptual and conceptual spheres of knowledge. Later, Western science and philosophy would decisively privilege truth over reality. During the seventeenth century, however, the transcendental correspondence between the idea of the subject and the reality of the object was still understood to be guaranteed by a benevolent God, a God who had created the universe on the basis of geometrical laws. Upon this foundation of faith, scientists and philosophers built vast conceptual systems based upon a mechanistic logic of causes and effects explaining the phenomena of nature. Whereas later the value of such systems would depend on their clarity and the overt evidence of their ideas and relations, in the first half of Perrault's century these systems remained closed and ultimately concerned with final causes.

The notion of a progressive knowledge not subject to transcendental qualifications and based upon quantitative, empirical facts became more explicit in the intellectual climate of the last third of the century. The creation of the academies and the dispute between the "Ancients" and the "Moderns" are two important events that embody this transformation. In both, Perrault played a major role.

PERRAULT WAS A FOUNDING MEMBER of the Académie Royale des Sciences (1666) and the author of its original research programs in anatomy and botany.[14] The Académie, like its English predecessor, the Royal Society of London, soon became a model for institutions of modern learning, with every member contributing toward the utopia envisioned by Bacon. The importance of these new institutions cannot be overemphasized. In sharp contrast to the Christian universities that rejected

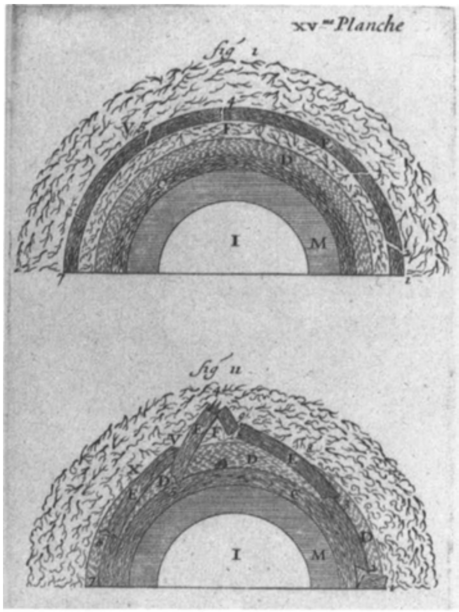
Cartesianism during the seventeenth and eighteenth centuries, the academies, patronized by the king and civil authorities, provided an ideal framework for the development of the new science.

The *querelle des Anciens et des Modernes* divided French intellectuals on the issue of ancient authority. Perrault and his famous brother Charles defended the Moderns. Their position was complex. Some authors have emphasized the literary origin of the *querelle* and the conflict of personalities that it involved.[15] The Moderns were mostly French in a time of growing national pride, and the Perrault brothers were very close to the court. Yet their passionate defense of modern science had other, more radical implications; it was an issue of fundamental values.

In his four-volume *Parallèle des Anciens et des Modernes* (Parallel between the Ancients and the Moderns), 1688–1697, Charles Perrault described the conflict (see fig. 3).[16] After acknowledging the excellence of ancient authors, he proclaimed the superiority of the Moderns. He was aware that the old order of natural philosophy had discouraged experimentation in the belief that truth could be derived from literary sources, following Aristotle and his interpreters. Charles Perrault considered such a belief uncertain, favoring instead the attitude of the Moderns who actively sought verifiable knowledge in the observation of nature.

The Perrault brothers also had reservations with respect to the thinking of Descartes.[17] Charles Perrault had credited Descartes with the refutation of Aristotelian philosophy, while Nicolas and Claude Perrault used Cartesian models for their collaborative work in physics. But Charles Perrault also criticized those who faithfully assumed that the Cartesian system disclosed the final causes of nature. His critique referred to the system of the world postulated by Descartes in the introduction to *Principia philosophiae* (The principles of philosophy), 1644,[18] a dissertation on the principles of human knowledge emphasizing the existence of certain notions "so clear in themselves . . . that they cannot be learned . . . being necessarily innate." One might question the truth of the sensible world, Descartes had written, but could rest assured that God would never intentionally fool humanity. Since knowledge is God given, all that man perceives clearly and distinctly, "with mathematical evidence," must be true. Rejected as pure imagination by the eighteenth-century philosophes, Descartes's book is a collection of amazing mechanical dreams that attempt to explain all possible phenomena, from the constitution of the universe to the essence of fire, magnetism, and human perception (fig. 7). Descartes believed that since his mechanistic system explained in a clear and true manner the phenomena of nature through causal relations, it must give man access to absolute certainty.

The positions of Descartes and the Perrault brothers thus differed over



7. Illustration showing the different densities of matter and the effects of this on Descartes's vortex theory. From René Descartes, Les principes de la philosophie, *4th ed. (Paris: Veuve Bobin, 1681), pl. 15. Notre Dame, Department of Special Collections, University Libraries of Notre Dame.*

a fundamental theological issue. Descartes proposed that "we should prefer divine authority over our reasoning," even though his work was condemned by the church.[19] The church's condemnation, like Galileo's famous trial, not only implied the rejection of a specific philosophical or astronomical system but, more importantly, pitted the church against any subversion of the traditional order, however qualified. Thus, whereas Descartes still tried to reconcile philosophy and theology in an almost medieval fashion, the Perrault brothers' more modern position clearly emerges in their effort to separate faith and reason, thereby claiming to avoid insoluble conflicts.

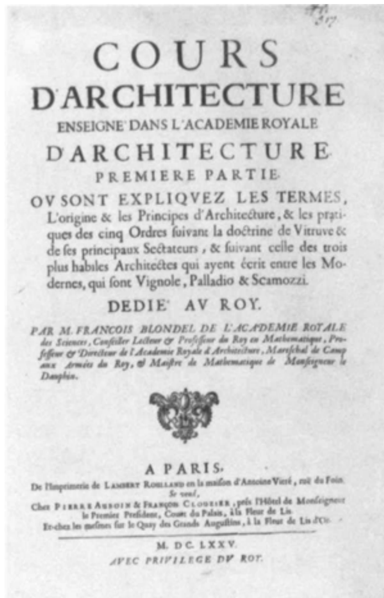
Descartes recognized the affinity of his ideas with those of Galileo, but he also criticized the "open and unsystematic" character of the Italian scientist's work.[20] The Perrault brothers, on the other hand, embraced Galileo's attitude, recognizing the limitations of closed hypothetical systems for the advancement of knowledge. This is crucial to an understanding of the implications of the *Ordon-*

nance. In the epistemology of the modern world, transcendental causes become increasingly more alien as the traditional domain of God falls further outside the realm of reason. The task of thought is thus concentrated on the explanation of how things come about, not on an understanding of why. An investigation of laws of necessary and mathematically determined relations is more useful, that is to say, applicable, than the search for final causes. Claude Perrault's definition of a phenomenon as "that which appears in Nature and whose cause is not as evident as the thing" is clearly symptomatic of this modern epistemology.

Such a stand, a true protopositivism, was evident in French intellectual circles between the last decades of the seventeenth century and the 1730s, when the natural philosophy of Isaac Newton became generally accepted in Europe. Claude and Charles Perrault redefined truth, as distinct from illusion, dissociating scientific knowledge from mythical thought. After discussing astronomy, telescopes, and microscopes in his *Parallèle*, Charles Perrault dismissed astrology and alchemy as fantastic and whimsical disciplines, lacking any real principle. "Man," he wrote, "has no proportion and no relation with the heavenly bodies infinitely distant from us."[21] He thus distinguished between the new science and traditional hermetic knowledge, disciplines that had usually been confused in the earlier part of the century.[22]

Charles Perrault also found it astonishing that some modern authors did not accept the irrefutable evidence of blood circulation—mechanistic physiology, as opposed to the humors of traditional medicine—or the astronomical systems of Copernicus and Galileo. After discussing the values of modern and ancient arts and sciences, including war, architecture, music, and philosophy, he concluded that with the exception of poetry and eloquence, the modern arts and sciences were always superior.[23]

Claude Perrault was to cast a number of his arguments in the *Ordonnance* in terms of the *querelle*. There, he questioned the "absurd" rules and proportional prescriptions that in his view had become authoritative through the mere citation of ancient examples.[24] More generally, the *querelle* was introduced into architectural polemics through the dispute between Perrault and François Blondel. The latter was a well-known architect, mathematician, and director and first professor of the Académie Royale d'Architecture. In his *Cours d'architecture* (Course on architecture), 1675–1683, a textbook for his lectures at the Académie, Blondel expressed his opinion on the *querelle* (fig. 8).[25] Believing that both sides had strong arguments, he adopted a moderate position. Antiquity, being the source of modern excellence, deserved to be esteemed, but this veneration should never be slavish. He concluded that all beautiful things should be appreciated, regardless of when



COURS
D'ARCHITECTURE
ENSEIGNE' DANS L'ACADEMIE ROYALE
D'ARCHITECTURE
PREMIERE PARTIE
OV SONT EXPLIQVEZ LES TERMES,
L'origine & les Principes d'Architecture, & les pratiques des cinq Ordres ſuivant la doctrine de Vitruve & de ſes principaux Sectateurs, & ſuivant celle des trois plus habiles Architectes qui ayent écrit entre les Modernes, qui ſont Vignole, Palladio & Scamozzi.
DEDIE' AV ROY.
PAR M. FRANCOIS BLONDEL DE L'ACADEMIE ROYALE des Sciences, Conſeiller Lecteur & Profeſſeur du Roy en Mathematique, Profeſſeur & Directeur de l'Academie Royale d'Architecture, Mareſchal de Camp aux Armées du Roy, & Maiſtre de Mathematique de Monſeigneur le Dauphin.

A PARIS.
De l'Imprimerie de LAMBERT ROULLAND en la maiſon d'Antoine Vitré, rüe du Foin.
Se vend,
Chez PIERRE AUBOIN & FRANÇOIS CLOUSIER, prés l'Hôtel de Monſeigneur le Premier Preſident, Court du Palais, à la Fleur de Lis.
Et chez les meſmes ſur le Quay des Grands Auguſtins, à la Fleur de Lis d'Or.
M. DC. LXXV.
AVEC PRIVILEGE DV ROY.

8. Title page. From François Blondel, Cours d'architecture *(Paris: L. Roulland, 1675–1683), part 1.*
Santa Monica, The Getty Center for the History of Art and the Humanities.

or where they had been produced.[26] Blondel thus upheld both the perfection of his own century and that of the Roman Empire. He also seemingly could admit, like Perrault, the possibility of progress in architecture. But Blondel's understanding of science and knowledge remained traditional; he could never accept the full consequences of assimilating the new science into architecture, particularly with respect to the way in which these consequences generated radically different values in Perrault's theory.

Indeed, the fundamental issue in Blondel's understanding was not the greater or lesser merits of ancient and modern authors, but the absolute or relative nature of architectural value. Blondel accepted the existence of diverse tastes and standards of beauty, but he rejected the notion that beauty might ultimately be the result of custom. It is the latter notion that is precociously contained in Perrault's *Ordonnance* and represents its most radical implications. Blondel disagreed with Perrault, believing "with most authors" in the existence of a natural beauty eternally capable of producing pleasure and derived from mathematical or geometrical proportions. This concept held true, according to Blondel, not only for architecture but also for poetry, eloquence, music, and dance. Harmony was, therefore, the source of true pleasure and meaning in architecture, as in the other arts.[27]

PERRAULT'S ABILITY TO QUESTION such deeply entrenched assumptions about architecture derived from his understanding of scientific truth, which he developed most clearly in his *Essais de physique* (Essays on physics), 1680–1688, written with his brother Nicolas. In this work, the Perraults distinguished between theoretical and experimental physics, emphasizing the secondary value of conceptual systems or hypotheses postulated a priori.[28] Referring to the mechanistic systems that they themselves proposed, the Perraults accepted that the value of such systems did not derive from their superiority to other similar ones; their worth, in the opinion of the authors, was instead the result of novelty. Perrault thus allowed total freedom in the construction of hypothetical systems and even justified the "extravagant imaginative discourses of some celebrated philosophers." He believed that "truth is but the totality of phenomena that can lead us to the knowledge of that which Nature wanted to hide. . . . It is an enigma to which we can give multiple explanations, without ever expecting to find one that is exclusively true."[29]

Perrault considered a precise inductive process to be much more valuable than a deductive one. His notion of system was no longer linked to a cosmological scheme; he repudiated the claim that systematic expositions of thought, such as any theory *more geometrico* (or one that may simply be cast in the form of a geometric proof), could have the transcendental power of a *clavis universalis*, a key to universal reality, as Blondel and other Baroque scientists and architects assumed.[30] System, for him, now designated merely a principle of constitution, a structural law open to change and improvement.[31] Emphasizing the distinction between perceptually evident truths and illusory causes, he pointed out that it was better to accept many hypotheses to explain the different aspects of nature than to try to postulate a single, exclusive explanation.[32] True causes, he believed, were always occult; only a relativistic idea of probability could result from reasoning.

Nevertheless, Perrault emphasized in different contexts the impossibility of philosophizing without putting forward propositions of a general character.[33] He thus grasped a dilemma of modern science: "philosophical physics" reveals an ambition of synthesis and deduction at a moment in which acquired knowledge is still insufficient, whereas "historical physics" collects precise information through an inductive method, remaining excessively modest and cautious.[34] It is significant that despite his recognition of the artificial and nontranscendental character of systems, Perrault always reduced his discoveries to a systematic understanding of nature, in the true spirit of modern science. This basic dilemma, which characterizes modern scientific epistemology and is also the ultimate source of its limitations as a paradigmatic and normative knowledge for man, was extrapolated to architectural theory by Perrault. In the *Ordonnance*, this transformed theory with all its ambiguities would become the source of the most profound contradictions present in modern architecture.

NOTWITHSTANDING THE FACT THAT PERRAULT DESIGNED very few buildings, his tremendous influence upon successive generations of architects is undeniable.[35] Beyond his formal contributions, his legacy is a theoretical approach that can only be understood in relation to the epistemological presuppositions outlined above. Perrault's writings on architecture—the preface and notes to his edition of Vitruvius and particularly the *Ordonnance*—questioned the most sacred premises of traditional theory, especially the idea that architecture was something irrefutable, given beforehand. In a note to his edition of Vitruvius in which he justified his use of double columns in the facade of the Louvre, he rejected Blondel's criticism: "[Blondel's] main objection . . . is founded on a prejudice and on the false supposition that it is not possible to abandon the habits of ancient architects."[36] Perrault admitted that to allow beautiful inventions could be dangerous, as it might encourage excessive freedom and give rise to extravagant or capricious buildings. But, he thought, ridiculous inventions would be self-evident. If the law requiring imitation of antiquity were true, "we would not need to search for new means to acquire the knowledge that we are lacking and that every day enriches agriculture, navigation, medicine, and all the other arts."[37]

In chapter 8 of part 2 of the *Ordonnance*, devoted to a discussion of "abuses," Perrault distinguished between justifiable and even "good" licenses and those that work against the order of architecture. He defended his paired columns, as he had done in the note to his translation of Vitruvius, by citing the precedent of Hermogenes' pseudodipteral column arrangement.[38] He thus argued, in the spirit of the *juste milieu*, that his proposal represented a legitimate "sixth" kind of spacing to be added to the ancient five—the paired columns were a combination of the two extremes (pycnostyle and araeostyle), truly deserving of a place in "classical" (now meaning "canonic") theory.

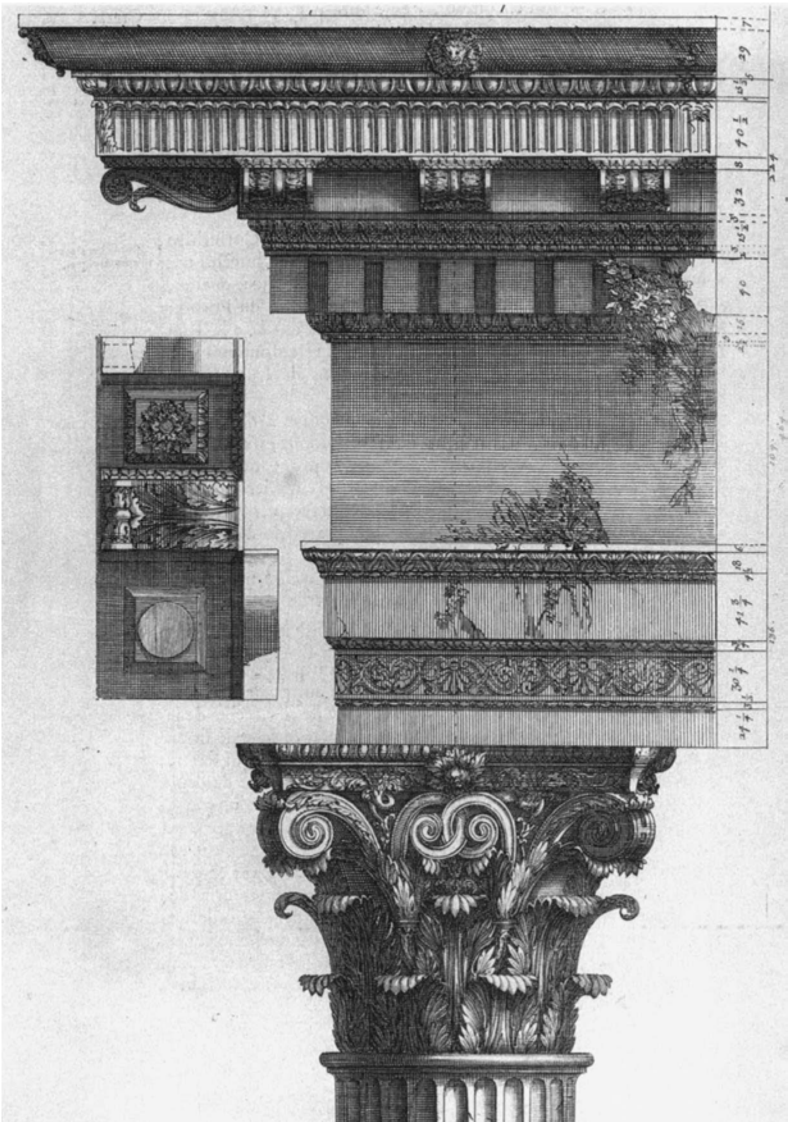
In the same context Perrault argued for other innovations or "good" licenses. The use of a monumental order, for example, was also deemed acceptable in the case of palaces like the Louvre. Many other Baroque and Mannerist abuses, however, were strongly censored. Although from a contemporary perspective Perrault's aesthetic judgments must be characterized as arbitrary or still founded on a residual faith in a transcendental taste,[39] he concluded this chapter in a manner true to his scientific spirit, claiming that he would not adhere to his "unorthodox opinions" obstinately: "I will give them up as soon as the truth gives me greater enlightenment."[40] It is interesting (and paradoxical) to note that in the mid-eighteenth century, the author of the most important treatise on French Neoclassical theory, the Abbé Laugier, judged Perrault's position to be so contradictory to his practice that, Laugier believed, in all likelihood Perrault had only defended it in the spirit of argument.

As already elaborated, in the epistemological revolution of the seventeenth century knowledge as a whole became affected by a progressive orientation toward the future, which resulted in a feeling (and acceptance) of its incompleteness in the present. The arguments that Perrault considered convincing for science were in his eyes equally valid for architecture. In the preface to the *Ordonnance*, he concluded that "one of the first principles of architecture, as in all the other arts," is that it has not yet arrived at its final perfection.[41] Notwithstanding his pride and belief in the perfection of his own theory, Perrault expressed a desire that his rules for the classical orders might some day be rendered even more precise and easier to remember. The significance of this position, in accordance with his defense of the Moderns in the *querelle*, cannot be overemphasized. Notions about the perfectibility of the arts had been expressed before—particularly during the second half of the sixteenth century—but these, as in Blondel's theory, were mostly echoes of ancient doctrines that never failed to reconcile the authority of the past with the self-evident value of work in the present, both drawing their meaning from the same transcendental order. Perrault, on the other hand, turned toward the future, conceiving his theory of architecture as a stage in a continuous line of development, as part of a process of ever-increasing rationalization. Modern architecture was necessarily superior as it possessed the accumulated experience of the past.

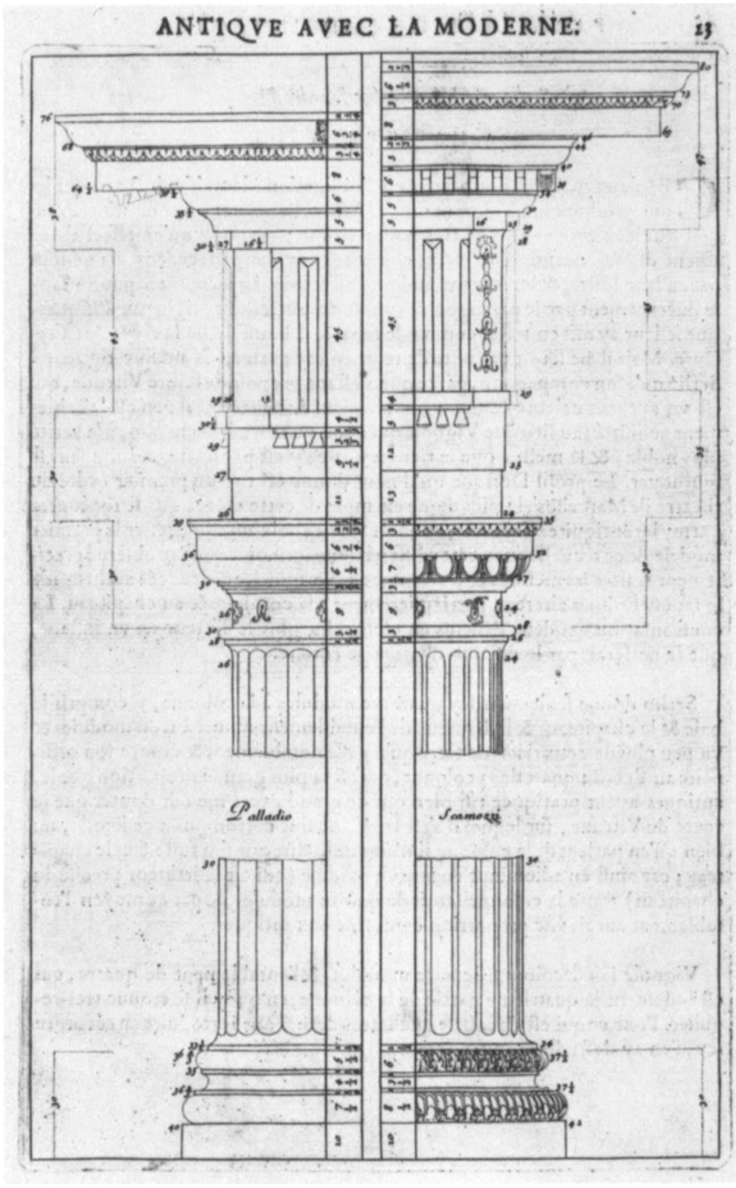
This modern ideal of a progressive architecture underlay the founding of the Académie Royale d'Architecture in 1671. The specific role that Perrault played in it has never been clear,[42] but his position was always deemed controversial by most members. Whatever his role, the Académie was indeed the first institution devoted to the rational discussion of the problems of architecture and the structured education of architects. Traditional apprenticeship and training in the mechanical arts, as provided by the medieval masonic guilds, had barely changed during the early seventeenth century, even though these institutions had become inadequate in the wake of the transformation of architecture's status during the Renaissance. The Académie taught and institutionalized an architecture that placed an unprecedented emphasis on rational theory, and this teaching postulated as its fundamental premise the superiority of modern architecture.

9. "L'origine des chapiteaux des colonnes" (The origin of capitals of columns). From François Blondel, Cours d'architecture *(Paris: L. Roulland, 1675–1683), part 2, following p. 2. Santa Monica, The Getty Center for the History of Art and the Humanities.*

The fact that this attitude did not take hold quickly attests to the precociousness of Perrault's position. In view of the inherent ambiguity of seventeenth-century philosophical systems, it is not surprising that Blondel's textbook for the Académie is totally traditional. Blondel reaffirmed the belief, commonly held since the Renaissance, in the importance of theory for the success of architecture. Realizing, however, that the writings of Vitruvius only reflected the doctrines of the



10. Corinthian capital. From François Blondel, Cours d'architecture *(Paris: L. Roulland, 1675–1683), part 2, 114. Santa Monica, The Getty Center for the History of Art and the Humanities.*



11. Doric Order according to Palladio and Scamozzi. From Roland Fréart de Chambray, Parallèle de l'architecture antique avec la moderne *(Paris: Edme Martin, 1650), 23. Santa Monica, The Getty Center for the History of Art and the Humanities.*

Greek architects that had preceded him and did not coincide with the most beautiful remains of Roman antiquity, he also cited the rules given by other masters, such as Vignola, Palladio, and Scamozzi.[43] His intention was to examine and compare these rules, showing where they concurred and differed, in order to establish those precepts that could be most widely accepted (figs. 9, 10). This was, in his opinion, the only way to fashion the contemporary architect's taste. Blondel did not believe that the difference of opinion among the great architects of the past constituted a problem. He understood their writings on proportion to be essentially true insofar as they articulated the theoretical dimension of work that was unquestionably meaningful and authoritative. The problem was one of interpretation. The architect had to choose the most appropriate rules and in each case use his genius and experience to apply them.

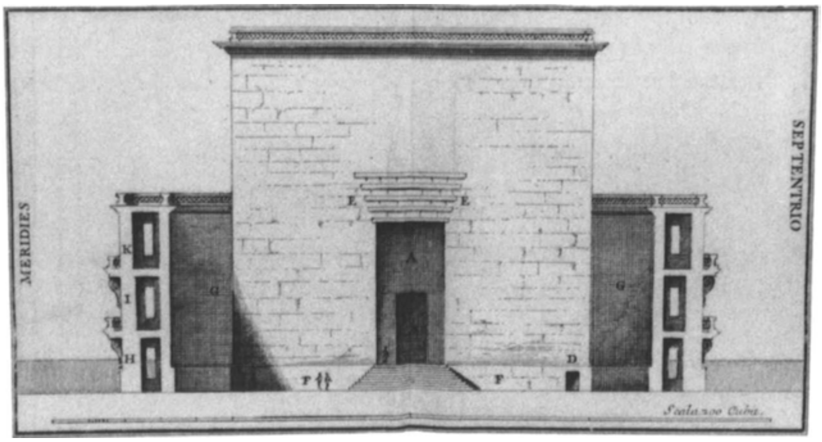
In contrast, after declaring his faith in a progressive architecture, Perrault sought to establish in the *Ordonnance* a system of proportions for the classical orders that he considered to be perfect and conclusive. His dimensional system is novel. Rejecting all other systems generally accepted in his own time and criticizing their complicated subdivision of modules, he postulated a method that consisted of dividing the major parts of the building in relation to whole numbers.[44] A considerable portion of the book is taken up with calculations of the most appropriate dimensions for each of the parts of the classical orders. Perrault's method consisted of finding an average between two extreme dimensions, taken from buildings, designs, or treatises by the best ancient and modern architects. The arithmetic mean, a most appropriate conceptual expression of the *juste milieu*, became for Perrault a rational guarantee of perfection. Believing that architectural proportions were not true in themselves and that architecture may be pleasing even without its proportions being regulated with perfect precision, he set out to establish "probable mean" dimensions that were based firmly on positive reasons, but without modifying excessively the proportions that were customarily used in his time.[45]

In fact, an examination of Perrault's text immediately betrays a great number of errors and discrepancies in his determination of average proportions. This is ultimately immaterial, however, since his theoretical conclusions are barely affected by his mathematical calculations. The system of dimensions postulated by Perrault was, in effect, an a priori invention, mindful only of the most general appearance and proportional relations of the traditional classical orders. His interest in the *juste milieu* and the invocation of famous architects were only means to render his proposals legitimate and acceptable to his contemporaries. Perrault, however, was not merely reiterating the ambiguities of traditional architectural treatises. He was fully conscious of the subversive implications of his system, which amounted to an arbitrary and conceptual construction that was, in essence, indifferent to the rules of the masters.

What, then, was the real motivation behind Perrault's complex and laborious undertaking? It was explicitly a response to what he characterizes in the *Ordonnance* as his contemporaries' "confused" opinions about the five classical orders. Remarking on the discrepancies that existed between the well-known proportional systems of Vitruvius and the Renaissance authors, he complained that there were no certain rules. Although all the treatise writers depended on the same transcendental justification, the dimensional relations among the parts of the orders always differed and never corresponded to the measurements of real buildings.

Several authors of the seventeenth century—particularly Roland Fréart de Chambray—had already remarked upon this difficulty, but it is significant that such discrepancies were never considered a fundamental theoretical problem before Perrault. In his *Parallèle de l'architecture antique avec la moderne* (Parallel between antique and modern architecture), 1650, Fréart had sought to demonstrate how the classical orders had been used in diverse manners by different authors (fig. 11).[46] But his remarks were directed precisely against those authors who "pretended to modify the classical orders through fantastic interpretations." Perrault, on the contrary, was critical of all treatises that compared proportional systems from the past without proposing a new and conclusive one.[47] From his scientific perspective, he believed that treatises that recommended only one system were better. The problem, thought Perrault, had always been that no single architect had ever had sufficient authority to establish laws that would be followed invariably. He obviously considered his proposal for a rational, "self-evident" theory to be the most "probable" solution to this problem, having the status of an authoritative rule, of an acceptable standard, norm, or legal "ordinance."

Thus finding the divergences among theoretical systems and measurements of real buildings to be unacceptable, Perrault set out to solve the problem by creating a simple and universal system of architectural proportions. It was to be a system that any architect, regardless of his ability, could easily learn, memorize, and implement. Thus, the irregularities of practice were to be controlled by prescriptive reason.[48] The proportional rules established by Perrault effectively fulfill his intentions. His *petit module*, a third of the diameter of a column instead of the traditional semidiameter, is the regulating dimension of the most important elements of each order.[49] This simplified module not only allows for perfect coordination among the pedestals, shafts, capitals, and entablatures of each order,



12. Claude Perrault, reconstruction of the Temple of Jerusalem.
From Moses Maimonides, De culto divino, *trans. Ludovicus de Compiègne de Veil*
(Paris: G. Gaillou, 1678).
Photo: Courtesy Burke Library, Union Theological Seminary, New York.

it also provides a series of dimensions that relate the five orders and all their elements, respecting the traditional sequence of increasing heights from the Tuscan to the Composite. For ease of application, all the dimensional relationships are presented as whole natural numbers, emphasizing Perrault's vision of proportions as a system of prescriptive instructions.

In order to achieve his objectives, however, it was necessary for Perrault to reject the traditional implications of architectural proportion. He criticized the spirit of submissiveness and blind respect for antiquity that was still prevalent in the arts and sciences. He found inconceivable the extent to which architects had made a religion of venerating "the works they call ancient,"[50] particularly admiring the mystery of their proportions. For him there was no question of "divine proportions," not even in Solomon's Temple, whose primordial status as a Christian symbol embodying the link between man and the great chain of being he explicitly questioned. It is interesting to note that although Perrault himself showed interest in the problem of reconstructing the divine archetype (fig. 12), his project was curiously detached from questions of faith and cosmology; instead, it was scholarly and scientific. Thus it was at odds with traditional reconstructions like Juan Bautista de Villalpando's.[51]

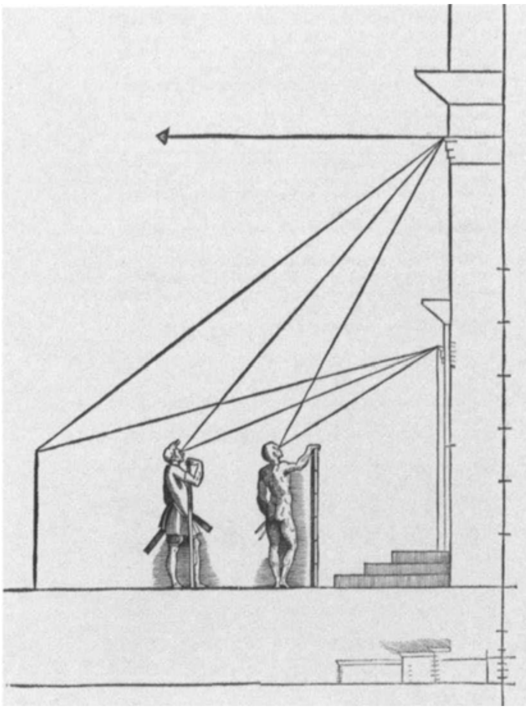
Indeed, Perrault contended that apart from the truths of religion, which should not be discussed, the remainder of human knowledge including architecture could, and should, be subjected to "methodical doubt."[52] Perrault was thus able to reduce the problem of theoretical elucidation to the immanent discourse of reason; he put into question the traditional role of proportion as the ultimate justification of praxis, enabling architecture to represent the "heavenly star dance."

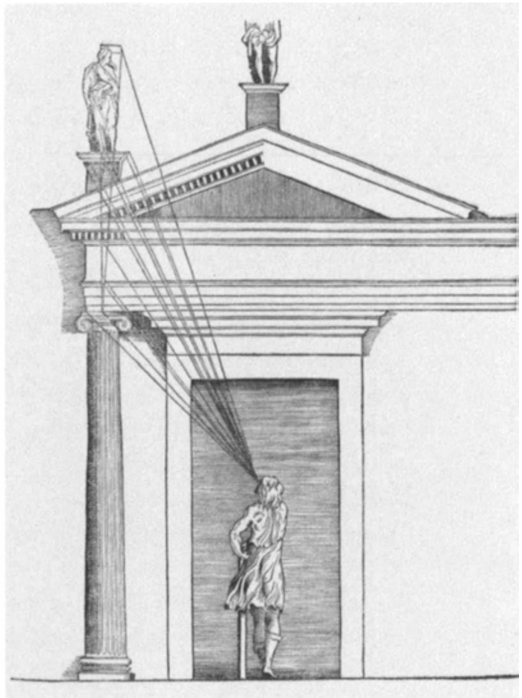
Not surprisingly, Perrault rejected the traditionally recognized relation between architectural proportion and musical harmony. In the preface to the *Ordonnance*, he asserted that "positive" beauty did not depend directly on an invisible proportion but was generated by visible aspects alone. He cited three fundamental categories: the richness of building materials, the exactness and propriety of execution, and general symmetry or disposition. The authority of numerical proportions, on the other hand, which traditionally referred to the harmonic tones and intervals of music, could not be accepted as a guarantee of architectural beauty. According to Perrault, proportions changed constantly in architecture, "like fashion," and were dependent only on custom.[53] For the first inventors of proportion, imagination was the only rule, and when "their *fantaisie* altered, they introduced new proportions, which in turn were found pleasing."[54]

That proportions had been modified throughout history was also pointed out by Charles Perrault in the section on architecture in his *Parallèle*. He assertively rejected the existence of any kind of relation between human proportions and the dimensions of columns, attributing this modern belief to a false interpretation of Vitruvius's *De architectura libri decem*.[55] Vitruvius had considered the perfection of human proportions, being dictated by nature, to be a model for architecture. In Charles Perrault's opinion, however, this did not imply that buildings were to derive their proportions from the human body.

Examining another aspect of the same argument, Claude Perrault wrote an essay on ancient music. In this short piece, he bluntly denied the mythical perfection of this art, traditionally a symbol of established harmony in the Aristotelian cosmos.[56] Thus, it is clear that in Claude Perrault's theory architectural proportion lost for the first time, in an explicit way, its character as a transcendental link between the microcosm and the macrocosm.

THE USE OF OPTICAL CORRECTIONS, another fundamental part of traditional theory, was also questioned by Perrault (figs. 13, 14). Vitruvius had recommended the use of optical adjustments to correct the distortion of dimensions that occurred when buildings were viewed from certain positions. This argument had been taken up by most architects before Perrault to justify the discrepancies between the propor-





13. Optical corrections. From Vitruvius, Architecture; ou, Art de bien bastir, *trans. Jean Martin (Paris: Jacques Gazeau, 1547), 39r. Santa Monica, The Getty Center for the History of Art and the Humanities.*

14. Optical corrections. From Vitruvius, Architecture; ou, Art de bien bastir, *trans. Jean Martin (Paris: Jacques Gazeau, 1547), 42r. Santa Monica, The Getty Center for the History of Art and the Humanities.*

tions stipulated by theory and the dimensions of real buildings. The sanctioning of these adjustments meant that the resolution of differences between the ideal and real worlds had never been a problem for architects; rather, such adjustments were seen as proof of the architect's ability to respond to the specific and individual character of each building task. Blondel, for example, discussed the problem of optical corrections at great length. Using as evidence some famous buildings, he emphasized the need to adjust their dimensions so that the proportions would appear correct in perspective.[57] He went so far as to assert that the successful determination of the real dimensions of a building, having allowed for an increase or reduction of the ideal proportions, was precisely that aspect which revealed the architect's intellect (*esprit*): "The result depends more on the vivacity and genius of the architect than on any rule that might be established."[58]

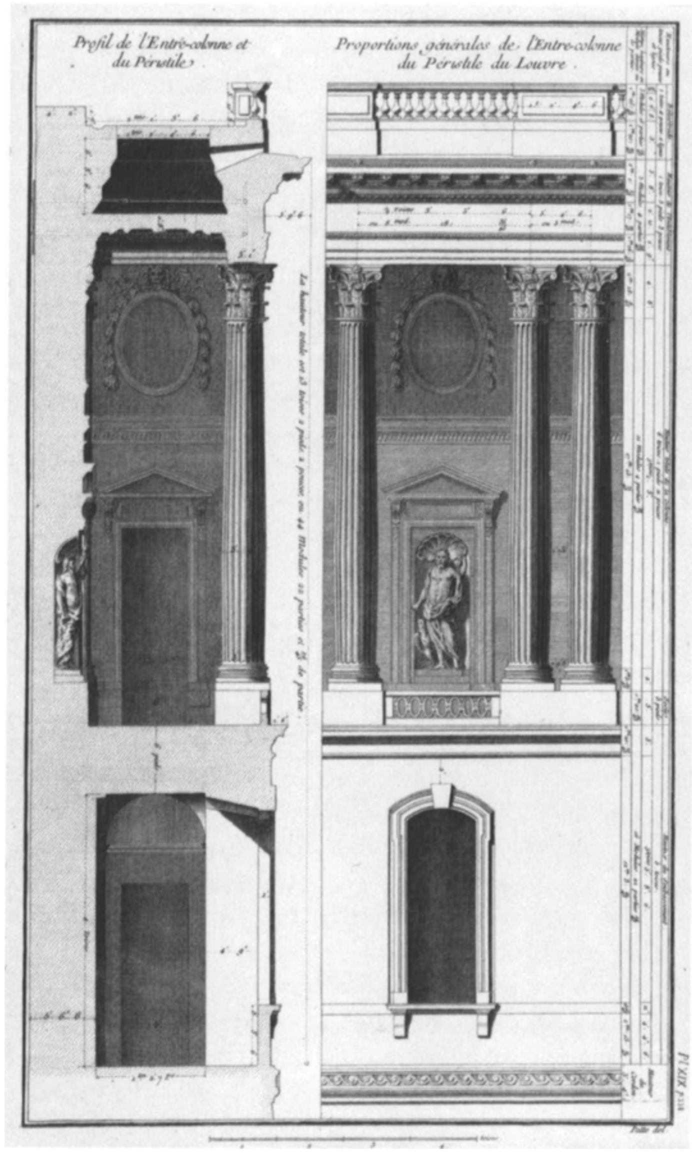
In chapter 7 of part 2 of the *Ordonnance*, Perrault systematically refutes this interpretation. First, he demonstrates how, in most cases, such discrepancies between theory and practice were not intentional. When they were intentional, they merely created absurd effects. Optical correction was not required. The truth, Perrault states, is that the senses, particularly hearing and sight, cannot be deceived. At the base of this claim is the distinction between truth and illusion fundamental to the modern scientific outlook. Perrault can thus assert that even Baroque trompe l'oeil paintings were not very successful "in the attempt to deceive us," concluding that the viewer is not deceived by the illusionism of painting because of "the certitude of sight." This Cartesian belief in the ability of the eye to perceive the phenomena of the world as clear ideas leads Perrault to state that "proportions cannot be changed without our noticing it"—a blatant contradiction, in fact, of his earlier argument for simplifying and changing slightly the proportions of the classical orders.[59] Almost in the spirit of modern psychology, he states that the mind's eye has the capacity to measure, not in an absolute sense but by comparison and association. Thus, any optical corrections are bound to appear as distortions. Because the eye always changes position, corrections are only effective for a specific viewing point. According to Perrault, if previous architects believed in corrections, it was only on account of Vitruvius's assumed authority on this issue and owing to discrepancies between theory and practice that were, in actuality, caused by faulty workmanship. In an argument similar to the one about acceptable "abuses," he states that the only justifiable optical corrections are those based on a conceptual intention, such as the desire to make something appear larger than it actually is by reason of its significance.

We may conclude that in light of his epistemological position, Perrault was confident in man's ability to perceive directly the undistorted mathematical and geometrical relations of a world that was already "given" in geometrical perspective. The tradition of optical correction, *perspectiva naturalis*, belonged to a world where visual aspects of perception were not assumed to have absolute supremacy.[60] The optical dimension had to be matched to the primordial or preconceptual embodied perception of the world, with its predominantly motor and tactile dimensions. In Perrault's theory, the visual had absolute priority over embodied reality. He recognized that this "paradox" might be even more difficult for his contemporaries to accept than his first "unorthodox opinion" about architectural beauty not being a natural principle and, therefore, not dependent, like musical harmony, on fixed proportions. Indeed, his position could be perceived as true only after the transformed nature of theory itself had been accepted, only after architectural theory was admitted to be a set of technical instructions whose fundamental objective was to be easily and directly applicable. Once the *ars fabricandi* of architecture had been established with all the clarity and self-evidence of mathematical reason, there was no reason to change or "adjust" proportions.

IN PERRAULT'S THEORY, as we have seen, architectural beauty was defined in terms of its visible aspects. He clearly distinguished the visible phenomenon from the invisible, or speculative, cause of things, with the former always taking priority over the latter. Thus, for the first time in history, the inherent connection between a visible form and an invisible content becomes an issue, one that led eventually to the "crisis of representation" of our own day. The disparity between the perceptual and conceptual dimensions could arise only after the inception of the Cartesian worldview, and many of the contradictions apparent in Perrault's work derive precisely from this new tension. Perrault could seemingly accept the conventional forms of traditional architecture while rejecting numerical systems as the invisible cause of beauty.

Living at a time when the imperial myths associated with Louis XIV permeated the whole sociopolitical hierarchy, it is not surprising that Perrault had faith in the notions of structure and ornament derived from classical antiquity. He never questioned the validity of the classical orders themselves and appeared to accept their essential role in architectural practice. He even tried to justify his new system of proportion by declaring that it only modified minimally a few details "not important for the overall beauty of buildings."[61] "I will admit," he wrote, "that I have indeed not invented new proportions; but this is precisely what I take pride in."[62] Using his favorite analogy, that of the human face, he emphasized that exact proportion was inconsequential for the appeal or attraction that a visage may exert upon us.[63] Perrault was not prepared to deny the reality of a beautiful building's meaning, its unquestionable power of attraction upon us, indeed similar to that of a seductive face. But in his theory mathematical reason had already overstepped its bounds, trying to account for a perceived reality that could only be articulated in the traditional terms of mythopoeic discourse. Thus we may understand the many contradictions—all the more explicit in the context of Perrault's still traditional world—that anticipate those of modern architecture.

Another contradiction is Perrault's frequent use of ancient authority to



15. Colonnade of the Louvre, detail showing paired columns.
From Pierre Patte, Mémoires sur les objets les plus importans de l'architecture *(Paris: Rozet, 1769), 338, pl. xix.*
Santa Monica, The Getty Center for the History of Art and the Humanities.

justify his theory. He even affirms that his system of proportion, being the most rational, was a type originally recommended by Vitruvius.[64] This antique proportional system, based on whole numbers and easy to remember, was abandoned by modern architects, states Perrault, only because it did not coincide with the artifacts and ruins of antiquity. Significantly, he blames careless craftsmanship for this lack of correspondence, again assuming the possibility of an instrumental, one-to-one relationship, consistent throughout history, between a rational theory and architectural practice.[65]

Perrault never questioned the traditional and rhetorical use of the classical orders. But it is important to emphasize that in the late seventeenth century, architecture's meaning was never generally perceived in terms of its stylistic coherence. Perrault used the term "Gothic Order" to describe a church in Bordeaux and admitted that French taste was somewhat Gothic, differing from that of the ancients: "We like airiness, lightness and the quality of freestanding structures."[66] His "sixth order" of coupled columns reflected this taste, an anticipation of Neoclassical attitudes (fig. 15). Moreover, a good number of Perrault's contemporaries, both his immediate predecessors and his successors in France and England, were prepared to admit and appreciate the value of alternative systems of ornamentation, for example, Gothic and Chinese. Thus, beyond the issue of style or form, what governed a work's coherence and meaning was above all the presence of an invisible *mathesis* (a mathematical proportion symbolic of the ontological continuity between being and becoming), which assured the role of architecture as representation, as an art of imitation. In this perspective, the radical subversiveness implicit in Perrault's theory of proportion is easier to appreciate. The question about the origins of modern architecture is not simply a matter of evaluating the extent to which the classical orders were used or rejected.

In a sense, Charles Perrault took an even more extreme position than his brother. In his critique in the *Parallèle,* in which he acknowledged the historical relativism of the forms and ornaments of classical architecture, he suggested that architectural ornamentation had the same character as rhetorical figures in language,[67] which is why all architecture must use it. The merit of an architect was not in his ability to use columns, pilasters, and cornices, however, but in "the placement of these elements with good judgment in order to compose beautiful buildings." The actual form of ornamentation "could be totally different . . . without being less pleasant, if our eyes were equally accustomed to it."[68] Charles Perrault seemed ready to declare that beauty derived only from formal or syntactic relations among the elements of a given ornamental system. In the *Ordonnance,* Claude Perrault echoed this position noting the importance of "skillful disposition of the elements" in determining "the character of the different orders."[69] Although the Perrault brothers never followed this argument to its inevitable conclusion, reducing meaning to pure visible appearance, to pure aesthetics, they opened the way for future architects to question the traditional symbolic role of architecture and, in the nineteenth century, to equate the issue of meaning and beauty with formal "composition."

THE PERRAULT BROTHERS BELIEVED STRONGLY in the historical preeminence of their own time.[70] In the preface to his edition of Vitruvius's *De architectura libri decem*, Claude Perrault identified the age of Louis XIV with the mythical perfection of the Roman Empire. Architecture had to be conceived in terms of Roman prototypes. Perrault particularly admired the richness and splendor of Imperial Rome and believed that modern architecture had to recover the grandeur of that ancient culture. This ideal, as well as his conviction that theory was absolutely essential to the making of architecture, brought him to translate and comment upon Vitruvius's treatise, of which there was no adequate French edition (fig. 16).[71] Perrault believed that ignorance of architecture's "original precepts" was a great obstacle to its revival.

Perrault was aware that the rules established by Vitruvius constituted only one possibility among many. He pointed out that the authority attributed to the Roman architect should not be based on a blind veneration of antique perfection, and yet, there was a need for rules: "Beauty has no other foundation than the imagination. . . . It is [therefore] necessary to establish rules that would form and correct the idea [that each one of us has of perfection]."[72] Perrault was convinced that rules were so necessary that if nature did not provide them for certain disciplines, then it was the responsibility of human institutions to supply them, "and for that there should be agreement on a certain authority as having the character of positive reasons."[73]

Certainly Perrault would not have taken on the immense task of translating and commenting upon Vitruvius had he not thought that it was the original source of architectural rules and that "the precepts of this excellent author . . . are absolutely necessary to guide all those who want to attain perfection in the art of architecture."[74] Particularly in ephemeral architecture such as "historical representations . . . in painting or sculpture, or in the scenery for theater, ballet, tournaments, and royal processions," the orders must be rigorously used according to precedent, stated Perrault.[75] On the other hand, in practical, "modern" buildings, a scrupulous imitation of antiquity was not necessary.

LES DIX LIVRES

D'ARCHITECTURE

DE VITRUVE.

LIVRE PREMIER.

PREFACE.

* A LORSQUE je conſidere, [1] Seigneur, que par la force de voſtre divin genie vous vous eſtes rendu maiſtre de l'Univers, que voſtre valeur invincible en terraſſant vos ennemis, & couvrant de gloire ceux qui ſont ſous voſtre Empire, vous fait recevoir les hommages de toutes les nations de la terre, & que le peuple Romain & le Senat fondent l'aſſurance de la tranquillité dont ils joüiſſent ſur la ſeule ſageſſe de voſtre gouvernement, je doute ſi je dois vous preſenter cet ouvrage d'Architecture. Car bien que je l'aye achevé avec un tres-grand travail en m'efforçant par de longues meditations de
B rendre cette matiere intelligible, je crains qu'avec un tel preſent je ne laiſſe pas de vous eſtre importun, en vous interrompant mal-à-propos dans vos grandes occupations.

Toutefois lorſque je fais reflexion ſur la grande étenduë de voſtre eſprit, dont les ſoins ne ſe bornent pas à ce qui regarde les affaires les plus importantes de l'Eſtat, mais qui deſcend juſqu'aux moindres utilitez que le public peut recevoir de la bonne maniere de baſtir, & quand je remarque que non content de rendre la ville de Rome maîtreſſe de tant de Provinces que vous luy ſoumettez, vous la rendez encore admirable par l'excellente ſtructure de ſes grands Baſtimens, & que vous voulez que leur magnificence égale la majeſté de voſtre Empire; je crois que je ne dois pas differer plus long-temps à vous faire voir ce que j'ay écrit ſur ce ſujet, eſperant que cette profeſſion qui m'a mis autrefois en quelque conſideration auprés de l'Empereur voſtre pere, m'obtiendra de vous une pareille faveur, de
C meſme que je ſens que l'extreme paſſion que j'eus pour ſon ſervice, ſe renouvelle en moy pour voſtre auguſte perſonne, depuis que vous luy avez ſuccedé à l'Empire, & qu'il a eſté receu parmy les Immortels: Mais ſur tout lorſque je vois qu'à la recommandation de la

1. SEIGNEUR, Il y a *Imperator Cæſar* dans le texte. Quelques-uns doutent quel eſt l'Empereur à qui Vitruve dedie ſon Livre, parce qu'il n'y a point d'adreſſe dans les anciens exemplaires qui nomme Auguſte, Philander eſtant le premier qui a intitulé cet ouvrage *M. Vitruvii Pollionis de Architectura lib. X. ad Cæſarem Auguſtum.* Ce n'eſt pas neanmoins ſans fondement que l'on croit qu'Auguſte eſt l'Empereur à qui cette Preface eſt addreſſée de meſme que celles de tous les autres livres: Car il y a pour cela des conjectures que l'on peut tirer de pluſieurs particularitez qui ſont dans cet ouvrage; comme entre autres lors qu'au 3. chap. du 9. liv. Vitruve parle des plus celebres auteurs Romains, & faiſant le denombrement des grands Poëtes, il fait mention ſeulement d'Ennius, de Pacuvius & de Lucrece. Mais il y a un endroit qui marque plus preciſement le temps auquel Vitruve a vécu, c'eſt au 4. chap. du 8. liv. où il parle d'une converſation qu'il eut avec C. Julius fils de Maſiniſſa; car on ſçait que Maſiniſſa a vécu ſi long-temps avant Auguſte, qu'il faut que Vitruve fuſt déja bien âgé quand il a écrit ce livre, pour avoir veu le fils de Maſiniſſa, quand meſme ce fils auroit eſté celuy qui naſquit ſon pere ayant 92. ans au rapport de Florus.

A

16. *First page of preface. From Vitruvius,* Les dix livres d'architecture de Vitruve, *trans. Claude Perrault (Paris: Jean Baptiste Coignard, 1673), 1. Santa Monica, The Getty Center for the History of Art and the Humanities.*

AT THIS POINT IT IS IMPORTANT TO MENTION another influence on Perrault that may shed some light on the contradictions in his work. Pierre Nicole, a Jansenist who taught philosophy and literature at Port-Royal, was the author of a small treatise entitled "Traité de la vrai et de la fausse beauté" ("Treatise on true and false beauty"), 1659.[76] Although the work was written in Latin and was not translated into French until the eighteenth century, Nicole was a friend of the Perrault family, and Claude Perrault may well have read Nicole's book in its original form.[77] More than half of it was devoted to demonstrating the contingency of beauty upon "first impressions," chance, and custom. According to Nicole, reason, and not pleasure, should be taken as the criterion of beauty in order to transcend potential subjective judgments. Ultimately, Nicole wrote, "there is nothing so bad as to be to no one's taste, and nothing so perfect as to be to everyone's taste."[78]

Nicole was also a close collaborator of Antoine Arnauld, and as might be expected, his system posited a theological dimension as the ultimate source of meaning in aesthetics. Beauty was never simply a question of "objective visibility," as it would become more explicitly in Perrault's work, but, according to Nicole, belonged to both the "nature of things" and the "nature of man." In an almost medieval sense, he postulated an idea of beauty that was dependent on the relationship between object and subject. So, while believing that beauty was not "mutable and transient" but rather appropriate to the "taste of all epochs," being based on an ultimate divinity of nature, Nicole also admitted contingency, encouraging writers to "adapt to the taste of the moment" rather than work in the hope of immortality. He understood that owing to the inherent weakness of the human mind, the same thing would not always please and therefore would have to change. Referring particularly to music and literature, he justified dissonance, metaphor, and innovation as devices for dispelling tedium. Nicole thus tried to accommodate the tide of subjectivism that had begun to overtake reflection on artistic problems in the wake of Cartesian philosophy.

It is possible to see an echo of the Jansenist's ambivalence in Perrault's notion of absolute and arbitrary beauty and in his emphasis on rational innovation and "judicious license." However, we must remember Perrault's emphatic declaration that unlike in music there were no natural beauties in architecture dependent on mathematical harmony and that it was therefore up to man to establish rules. The beauty of architecture was thus seen as independent of transcendental givens in a far more radical way than in literature or music. Nicole's own attempt to resist subjectivism was ultimately unsuccessful, and the clarity of his account of the contingency of beauty finally worked against the spirituality that he was trying to sustain. Perrault probably took from him the arguments that were more akin to his own assimilation of architectural theory and scientific thought.

As ALREADY MENTIONED, PERRAULT BELIEVED that although the rules of proportion derived from custom, and no author of the past had sufficient authority in this regard, they were absolutely essential for excellent architecture. It is here that the most revealing contradiction in Perrault's attitude appears. He believed with Vitruvius that proportion was more essential for distinguishing the orders than the "shape of the parts that determine their characters."[79] Accordingly, a thorough knowledge of these rational rules was fundamental because it formed the architect's taste.[80] In Perrault's definition, "positive beauty" was visible, and it was precisely for this reason that it could be discerned by anyone with a minimum of common sense. It was simple enough to distinguish between rich and poor architecture, between a building executed with excellent craftsmanship and a badly constructed one.[81] But to design successfully, the architect must know the subtler rules governing "arbitrary beauty," and it was this knowledge that distinguished him from the layman. Although proportion might be arbitrary—established through custom and use—and although it might not necessarily lead to positive beauty, it was still essential for the practicing architect. The accord or consensus derived from custom thus remained a positive frame of reference for Perrault. This ambiguity, never fully understood by most eighteenth-century architects and theoreticians, was made explicit by Perrault in a footnote to his translation of Vitruvius in which he asserted that custom was sufficiently powerful in the case of some architectural proportions to warrant belief in them as being "naturally approved and loved."[82] He explained that because they were identified with musical harmony, these proportions had been, and were still, assumed by most architects to possess positive beauty.

Thus, somewhat paradoxically in the context of Perrault's laborious discussion attempting to instrumentalize and demystify proportions, dimensional relationships end up relating to positive beauty in architectural praxis, but this time only through a mechanism of intellectual association. Hence, we may conclude that Perrault was the first architect to question the traditional belief that meaning appears immediately through perception, in the primary dimension of erotic depth, in the intertwining of the work as presence and the spectator's embodied experience. Lacking a transcendental reference point, his position diverges from Nicole's. Instead, his associative, conceptual explanation of architectural value and his understanding of perception are already evocative of modern psychology: optical, tactile, and auditory sensations are separate phenomena—*partes extra partes*—synthesized only in the mind.

Because the writings of Vitruvius were believed to elucidate the visible aspects of classical architecture, Perrault invoked the Roman's authority in an effort to escape the contradictions of his theory. But proportion, the essential invisible cause of beauty (still obviously operating in music), became as relative as any other conceptual explanatory system in Perrault's scientific thought. In the end, as suggested, the most crucial and polemical aspect of Perrault's theory was this splitting of the architectural "phenomenon" that would be taken for granted only in the practice of nineteenth- and twentieth-century architecture.

In conclusion, Perrault seemed to understand the importance of *mathesis* in architecture. But conscious of the scientific revolution and its implications, he gave number a totally different role, using it as an operational device, a positive instrument to simplify the process of design and avoid the irregularities of practice. Although Perrault's understanding of the issue ultimately stemmed from the still prevalent traditional belief that proportion, as the essence of aesthetic value, was directly related to the Vitruvian idea of *venustas*, or beauty, his associationist interpretation effectively created the possibility for beauty itself to become subjective, a matter of aesthetics.[83] Interestingly, Perrault clearly distinguished between the proportions of the orders and those "required in military architecture and in the construction of machines, where proportion is of the utmost importance."[84] Whereas the dimensions of a detail of the orders could be changed without detriment to the general appearance of the building, lines of defense in fortifications or the dimensions of levers had to be absolutely fixed to operate properly. Perrault here distinguishes speculative causes from observed phenomena. This aspect of his argument emerges sharply in the dispute with Blondel.

Like Perrault, Blondel could also admit the mutable character of some architectural elements, such as the capitals of columns, which, in his opinion, did not derive from nature, their pleasure being dependent upon custom. But Blondel steadfastly believed that number and geometry, the regulating principles of nature and the embodied human being, linked both poles of creation and were, therefore, a cause of positive beauty: "External ornaments do not constitute beauty. Beauty cannot exist when the proportions are missing."[85] Even Gothic buildings could be beautiful when they were determined by geometry and proportion. Relying on the traditional perception of the world as a projection of the human body, Blondel maintained that geometry and proportion, as transcendental entities, guaranteed the highest architectural meaning, independent of the particularities of ornament or style. He argued that geometry and mathematics, being invariable, assured the truth and beauty of architecture at all levels. By relating man's immediate perception of the world to absolute values, geometry and mathematics became a tool for assuring architecture's fundamental symbolic role.

Perrault, as we have seen, believed that the systems of architectural proportion were not "true" but merely "probable." Blondel, however, insisted that despite its being invisible, number was a primordial source of beauty: "Although it is true that there is no convincing demonstration in favor of proportions, it is also true that there are no conclusive proofs against them."[86] Blondel devoted a chapter of his *Cours* to substantiating his belief scientifically by trying to prove that proportions were the "cause" of beauty and that this cause was to be found in nature. Using well-known physical phenomena in mechanics and optics as examples, he showed how invisible causes of a mathematical nature (such as the relation between a force and the dimensions of a lever or that between angles of incidence in reflection and refraction) proved and explained effects that occurred in the real world. Applying his observations to architecture, he showed through "experience" that there are proportions in beautiful buildings that are not found in ugly ones. He felt that his affirmation of proportions as the cause of beauty should not be surprising: "Architecture, being a part of mathematics, should possess stable and constant principles, so that, through study and meditation, it might be possible to derive an infinite number of consequences and useful rules for the construction of buildings."[87]

Blondel failed to distinguish between proportional relationships in architecture and the mathematical laws of optics and mechanics. In both cases invariable principles derived from "induction and experience." He also failed to distinguish between the proportions of a building demanded by technical concerns and those motivated by aesthetic considerations. This "confusion," which permeated traditional architectural practice and allowed for its meaning to be articulated in the terms of traditional European philosophy, is precisely what Perrault's protopositivistic theory finally dispelled; the notion of "scientific" clarity was thus at the heart of the argument, substituting a scientific logos for traditional mythic discourse. Blondel saw quite clearly that Perrault's position amounted to a questioning of the metaphysical justification of architecture. Architecture, Blondel believed, was impossible without absolute principles; repeatedly, he stressed that the human intellect would be gravely affected if it could not find stable and invariable principles in architecture. Without them, man would have no sense of unity and would lead a restless, anguished life. Blondel's precocious diagnosis of the consequences of modern relativism were indeed prophetic.

In summary, Perrault's theory aimed to provide a set of perfect, rational rules whose objective was to be easily and immediately applicable. The very title of the *Ordonnance* has legalistic overtones. The word "ordinance," originally a command of God or a decree of fate, was used in the late seventeenth century to name the rational political decrees that led to the regimentation of life under the reign of Louis XIV. Architectural theory acquired the status of human law, the only possibility for it in the absence of absolute, natural, or divine principles. The etymology of the title becomes especially significant if considered in relation to the more traditional meaning of *ordonnance* in late medieval French, when it implied literary or stylistic coherence; even in modern English the word denotes a correct arrangement of parts, as in a picture, so as to produce the best effect. Although, as said, the question of classical architecture could not yet be perceived as a purely formal problem of "style" in Perrault's time, his title also prefigures the nineteenth-century reduction of architectural history and composition to "conventional" formal styles and typologies of preexisting buildings.[88]

Perrault himself pursued the matter no further. He did not attempt to mathematize human behavior or the structural stability of buildings. But he did lead the way toward a progressive architecture and theories that would eventually reduce architecture's creation to the solution of a complex equation, however all-encompassing and intelligently formulated. Since Perrault the idea of "progress" has been synonymous with the increasing reduction of architecture to mathematical reason, even in terms of such apparently contradictory attitudes as aesthetic formalism, on the one hand, and, more blatantly, structural determinism or functionalism on the other.

The technological dream of effective domination of matter through number and geometry became a reality only after the Industrial Revolution. But as soon as philosophy had divested number of its symbolic connotations toward the end of the seventeenth century, the new notion was to find its way into the domain of architecture in Perrault's proportional system. Posited as perfect and universal as reason itself, his system postulated as "natural" a one-to-one relationship between theory and practice.

Perrault's theoretical work helped break the link between the visible and the invisible, between the experience of value and its judgment, between faith and reason, between the macrocosm (now inanimate matter rather than *physis*) and the microcosm (now a thinking machine, or *res cogitans*). By shifting, in short, the very nature of theory from the elucidation of preexisting meanings in the world of practice—a metaphysical discourse—to the fulfillment of architecture as a rational instrument of control and efficiency that could "legitimately" ignore the real issue of poetic making in the original sense of *poesis*, by turning theory into methodology or applied science, he propelled architecture into the modern world.

Although it is impossible to outline here the sequel to Perrault's theory,[89] it is important to emphasize that the real implications of his position could not be grasped in an eighteenth century imbued with deism and the natural philosophy of Newton.[90] Architects and writers almost invariably adopted Blondel's opinion on the importance of proportions as the source of architectural meaning. Only Jean-Nicolas-Louis Durand was to understand fully the consequences of Perrault's theory, embracing it in his *Précis des leçons d'architecture* (Summary of the lessons of architecture), 1802–1805, perhaps the most influential architectural text of the nineteenth century.[91] The architects of the modern movement generally adopted the implicit technological values of this theory.

From our perspective, grasping Perrault's theoretical position, its complexities and contradictions, allows us an insight into the reasons underlying the impoverishment of the world of architecture; these reasons help explain the contemporary loss of faith in the existence of meaning in the embodied order of the present. This has resulted in the skeptical position so common today in most architectural practice, and, perhaps more significantly, in the seeming impossibility of reconciling the political and the symbolic or creative tasks of architecture. Although it is now recognized that the perception of the limit of an autonomous reason, ostensibly capable of operating meaningfully in the absence of a mythopoeic narrative, is at least as old as the inception of positivism in the early nineteenth century, the collective social world still operates on the assumption that the links severed in Perrault's theory are indeed an illusion. Society generally expects meaning to emerge through a rational consensus of Cartesian minds. The buildings of postindustrial cities, often the work of architects, speak about technology and instrumentality, supposedly the only values associated with democracy and a liberal economy, but usually reveal a pathetic emptiness of purpose. The inhabitant remains a passive consumer or voyeur rather than a true participant in an order that would allow him or her to transcend individual mortality through a sense of belonging.

Even recent architectural theory under the influence of deconstructive discourse tends to deny the possibility of a ground of meaning, one that, although necessarily immanent and experiential—and thus impossible to describe in absolute terms—may allow art and architecture to embody traces of being and truth and thus continue to provide existential orientation for humanity at the close of the twentieth-century. Rather than resulting in a *praxis* that ends in a negative formalism, denying ethical concerns, the nihilism of modern theory already incipient in Perrault's questioning of transcendental values, must be "de-structured," not simply nostalgically denied or falsely overcome. The operation alone may open up new horizons for a fully embodied architecture, one that may carry out the age-old task of representing (that is, finding a recognizable form for) the order of human dwelling, a place for humanity's dreams of permanence and continuity in an ephemeral world, now outside of Perrault's progressive linear history as the "grand narrative" of science.

Our need is nothing less than the formulation of a new understanding of the task of the architect, a redefinition of theory and practice, of the relationship between thinking and making within a technological world. It is now evident that a careful study of Perrault's work—particularly the preface to the *Ordonnance* and chapters 7 and 8 of part 2, dealing with optical correction and "abuses" respectively—taken in the context of his other writings and scientific interests, is crucial for any architect or historian seriously interested in understanding the existential possibilities and limits of contemporary architecture. The future of an architecture that can reconcile its age-old dimensions as poetic vision and political reality, that can therefore exist in our cities beyond tyranny and anarchy, depends on the resolution of the dilemma that was first revealed in the work of Perrault.

Notes

1. [Marcus] Vitruvius [Pollio], *Les dix livres d'architecture de Vitruve*, trans. Claude Perrault (Paris: Jean Baptiste Coignard, 1673; 2nd ed., revised and enlarged, 1684).

2. Claude Perrault, *Ordonnance des cinq espèces de colonnes selon la méthode des Anciens* (Paris: Jean Baptiste Coignard, 1683).

3. Architectural theory became a discipline with its specific universe of discourse during the fifteenth century. In Renaissance treatises the ontological foundation of architecture is always mathematical, that is, based on the numerical proportions present in the *disegno*. Proportions were believed to disclose the transcendental order of the built work.

4. See Georges Gusdorf, *Les origines des sciences humaines* (Paris: Payot, 1967).

5. Fortunately, this position is being challenged in the better schools and by many leading architects in Europe and North America. My statement, however, refers to the general state of architectural practice and education. Often, even well-intentioned architects fail to adopt a critical attitude vis-à-vis their *techne*. Failing to realize, for example, that the simple use of systematic drawings is not neutral and that technology itself is value-laden becomes an obstacle keeping architecture from transcending the deterministic parameters of an instrumentalized theory.

6. Claude Perrault, *A Treatise of the Five Orders of Columns in Architecture*, trans. John James (London: J. Sturt, 1708; London: J. Senex, 1722).

7. Wolfgang Herrmann, *The Theory of Claude Perrault* (London: A. Zwemmer, 1973); Joseph Rykwert, *The First Moderns* (Cambridge, Mass.: MIT Press, 1980); and Antoine Picon, *Claude Perrault, 1613–1688; ou, La curiosité d'un classique* (Paris: Picard, 1989). See also chapter 1 of Alberto Pérez-Gómez, *Architecture and the Crisis of Modern Science* (Cambridge, Mass.: MIT Press, 1983).

8. See Pérez-Gómez (see note 7), chap. 1.

9. For a good account of Perrault's life and work and the most extensive discussion of his *Ordonnance*, see Herrmann (see note 7) and Picon (see note 7).

10. In the Middle Ages, truth was believed to be contained in the Bible and in the writings of Aristotle. The problem consisted in the interpretation of these works. During the Renaissance, the number of texts used as sources increased greatly. In the sixteenth century, philosophers and mathematicians such as Simon Stevin, Daniele Barbaro, and Petrus Ramus seemed to realize that no science attained perfection through the work of a single individual. But Renaissance science consisted of a closed universe of knowledge, founded on the veneration of a mythical past. See Georges Gusdorf, *De l'histoire des sciences à l'histoire de la pensée* (Paris: Payot, 1966); and Paolo Rossi, *Philosophy, Technology and the Arts in the Early Modern Era* (New York: Harper & Row, 1970).

11. See Georges Gusdorf, *La révolution galiléenne* (Paris: Payot, 1960), 1: pt. 2, chap. 1.

12. See Rossi (see note 10), chap. 2.

13. It is well known that architects and painters since the Renaissance had been interested in revealing the geometrical order of the city of man through their works. This order had a clear ontological significance in the context of an Aristotelian universe. The harmony of proportions and the representation of perspectival depth echoed the mathematical structure of the cosmos and propitiated, like magical amulets, the appropriate life following the heavens in the sense described by Marsilio Ficino (1433–1499) and other authors. The "concept" of space and perspective as an architectural idea controlling the physical, "built," reality, however, could only emerge in the seventeenth century as a consequence of the scientific revolution and the Cartesian dualistic conception of reality with its confrontation of *res cogitans* and *res extensa*. See Pérez-Gómez (see note 7), chap. 5.

14. J. L. F. Bertrand, *L'Académie des sciences et les académiciens de 1666 à 1793* (Paris: J. Hetzel, 1869).

15. See Antoine Adam, *Grandeur and Illusion* (Middlesex: Penguin, 1974), 158–64.

16. I have consulted the following edition: Charles Perrault, *Parallèle des Anciens et des Modernes*, 2nd. ed. (Paris: Jean Baptiste Coignard, 1692–1696).

17. A biography of Descartes appears in Charles Perrault, *Les hommes illustres qui ont paru en France pendant ce siècle* (Paris: Antoine Dezallier, 1696). His critique is most

explicitly articulated in his *Parallèle* (see note 16), 1: 47.

18. I have consulted the following edition: René Descartes, *Les principes de la philosophie*, 4th ed. (Paris: Veuve Bobin, 1681).

19. Ibid., 53.

20. Gusdorf (see note 11), 1: pt. 1, chap. 1.

21. Charles Perrault (see note 16), 4: 46–59: "*L'homme . . . n'a null proportion et nulle liason avec ces grands corps infiniment éloignez de nous.*"

22. It may be remembered, in this connection, that between 1570 and 1630 approximately fifty thousand women accused of witchcraft were burned at the stake. Aside from the sociological implications, this atrocity was a consequence of the confusion between magic and science, which was linked to the Renaissance discovery of man's power to transform his internal and external reality. It was not until 1672 that Colbert passed a decree stipulating the illegality of such accusations. Sorcery and the belief in miracles clearly declined toward the end of the seventeenth century, coinciding with the increasing empiricism in natural philosophy. The perception of angels and demons was a "true illusion" in the traditional cosmos, where every aspect of reality was related to a transcendental order. Magic and sorcery were linked to the essence of religious life. The witch craze was clearly related to the most critical period of transition between the old cosmic order and the new mechanistic world picture.

23. This belief was also shared by Bernard Le Bovier de Fontenelle (1657–1757), the long-lived and famous historian of the Académie Royale des Sciences. Fontenelle's rejection of both Cartesian metaphysics and Newton's natural philosophy is a clear indication of the protopositivistic epistemology of the period. See Fontenelle, "Digression sur les Anciens et les Modernes," in *Oeuvres* (Paris: 1767), 4: 170, 190.

24. Claude Perrault (see note 2), xvi.

25. François Blondel, *Cours d'architecture* (Paris: François Blondel, 1698), 168–73.

26. Ibid.

27. Ibid.

28. The version of the *Essais de physique* that I have consulted is to be found in Claude and Nicolas Perrault, *Oeuvres diverses de physique et de méchanique*, 2 vols. (Leiden: P. van der Aa, 1721).

29. Ibid., 1: 60: "*Car la veritè est, que l'amas de tous les Phenomenes, qui peuvent conduire à'quelque connoissance de ce, que la nature a voulu cacher . . . qu'un Enigme, à qui l'on peut donner plusieurs explications; mais dont il n'y aura jamais aucune, qui soit la veritable.*"

30. See Paolo Rossi, *Clavis universalis* (Milan: Ricciardi, 1960). Rossi's brilliant study traces the influence of this notion from Raymond Lull to Gottfried Wilhelm Leibniz. During the seventeenth century, logic was understood as a "key" to universal reality. The pansophic ideal depended upon this key, which allowed a direct reading of the geometrical essence of reality. The real world and the world of knowledge appeared to be linked by a substantive identity of structure.

31. This corresponds to the concept of system as it was understood generally in the discussions of the Académie Royale des Sciences and the Royal Society of London.

32. Claude and Nicolas Perrault (see note 28), 1: 60.

33. Claude Perrault, *Mémoires pour servir à l'histoire naturelle des animaux* (Paris: Impr. Royale, 1671), preface: "*Il est certain que dans la premiére qui explique les Elemens, les Premieres Qualitez et les autres causes des Corps Naturels par des hypotheses qui n'ont point la plûpart d'autre fondement que la probabilité; l'on ne peut acquerir que des connoissances obscures et peu certaines.*"

34. Claude and Nicolas Perrault (see note 28), 1: 513: "*Que mes systemes nouveaux ne me plaisent pas assez par les trouver beaucoup meilleurs que d'autres, et que je ne les donne que pour nouveaux mais je demande en recompense qu'on m'accorde, que la nouveauté est presque tout ce que l'on peut pretendre dans la Physique, dont l'emploi principal est de chercher des choses non encore vûës, et d'expliquer le moins mal qu'il est possible les raisons de celles, qui n'ont point été aussi bien entendues qu'elles le peuvent être. Et ma pensée est que cela se peut faire non seulment avec une entiere liberté de supposer tout ce que ne repugne point à des faits averez . . . mais . . . si les examples des celebres Philosophes peuvent donner quelque droit, qu'il est permis d'y employer les imaginations les plus bizarres. . . . Car la verité est, que l'amas de tous les Phenomenes, qui peuvent conduire a quelque connoissance de ce, que la nature a voulu cacher, n'est a proprement parler qu'un Enigme, a qui l'on peut donner plusiers explications; mais dont il n'y aura jamais aucune qui soit la veritable.*"

35. See Rykwert (see note 7), chap. 2; Herrmann (see note 7), chap. 5; and Pérez-Gómez (see note 7), chap. 2.

36. Vitruvius, 1684 (see note 1), 78–79, n. 16: "*La principale objection sur laquelle on appuye le plus est fondée sur un prejugé et sur la fausse supposition qu'il n'est pas permis de se departir des usages des anciens.*"

37. Ibid.: "*il ne faudroit point chercher de nouveaux moyens pour acquerir les connoissances qui nous manquent, et que nous acquerons tous les jours dans l'Agriculture, dans la Navigation, dans la Medicine, et dans les autres Arts.*"

38. In classical architecture, the pseudodipteral column arrangement has one row of free columns surrounding the cella; this differs from the dipteral arrangement in that the omission of one row of columns leaves a wide passage around the cella.

39. In this regard, one may cite the possible influence of Jansenist aesthetics on Perrault, particularly through the work of Pierre Nicole. See p. 32 in this volume.

40. Claude Perrault (see note 2), 124: "*Sçavoir, que je n'entens point que les Paradoxes que j'ay avancez, soient considerez comme des opinions que je veuille soûtenir opiniatrément, estant prest de les abandonner, quand je seray mieux éclaircy de la verité, supposé que je me sois trompé.*"

41. Ibid., XXIV.

42. Perrault's name appears in the minutes of important sessions, but no direct contributions are credited to him in the *Procès-verbaux*; see Henry Lemonnier, ed., *Procès-verbaux de l'Académie Royale d'Architecture, 1671–1793*, 10 vols. (Paris: J. Schemit, 1911–1929).

43. Giacomo da Vignola (1507–1573), Andrea Palladio (1508–1580), and Vincenzo Scamozzi (1552–1616) were Italian Renaissance architects.

44. Claude Perrault (see note 2), pt. 1, chap. 2.

45. Ibid., XIII–XIV.

46. I have consulted the following edition: Roland Fréart de Chambray, *Parallèle de l'architecture antique et de la moderne*, 2nd ed. (Paris: C. Jambert, 1711). The first edition was published in 1650, and an English translation by John Evelyn appeared in 1664 under the title *A Parallel of the Ancient Architecture with the Modern* (London: T. Roycroft for J. Place, 1664).

47. Claude Perrault (see note 2), XIV.

48. Ibid., XX.

49. Ibid., pt. 1, chap. 2.

50. Ibid., XVII.

51. See Wolfgang Herrmann, "Unknown Designs for the 'Temple of Jerusalem' by Claude Perrault," in Douglas Fraser, Howard Hibbard, and Milton J. Lewine, eds., *Essays in the History of Architecture Presented to Rudolph Wittkower* (London: Phaidon, 1967).

52. Claude Perrault (see note 2), XIX.

53. Ibid., XVII.

54. Ibid., X: *"De maniere que ceux qui les premiers ont inventé ces proportions, n'ayant gueres eu d'autre regle que leur fantaisie, à mesure que cette fantaisie a changé, on a introduit de nouvelles proportions qui ont aussi plû à leur tour."*

55. Charles Perrault (see note 16), 1: 132.

56. Claude and Nicolas Perrault (see note 28), 2: 295ff.

57. Blondel (see note 25), 714ff.

58. Ibid., 721: *"Et qu'enfin cela depend plus de la vivacité de l'esprit et du genie de l'Architecte que de regles que l'on en puisse donner."*

59. Claude Perrault (see note 2), 105: *"Cette exactitude du jugement de la vûë, & la certitude de la connoissance qu'il nous donne estant donc aussi precise qu'elle est, il n'y a pas beaucoup de difficulté à concevoir que l'éloignement des objets n'estant pas capable de tromper & de surprendre, ces proportions ne peuvent estre changées qu'on ne s'en apperçoive."*

60. See Erwin Panofsky, *La perspective comme forme symbolique* (Paris: Les Editions de Minuit, 1975); William Ivins, Jr., *Art and Geometry* (Cambridge, Mass.: Harvard Univ. Press, 1946).

61. Claude Perrault (see note 2), XIV.

62. Ibid., XXI: *"J'avoüeray que je n'ay point inventé de nouvelles proportions: mais c'est de cela que je me loüe."*

63. Ibid., XVII.

64. Ibid., XVI–XVII.

65. Ibid., XXI–XXII.

66. See Vitruvius, 1684 (see note 1), 79 n. 16. For an excellent account of the interest in the Gothic during this period, particularly in France, see Robin Middleton, "The Abbé de Cordemoy and the Graeco-Gothic Ideal," *Journal of the Warburg and Courtauld Institutes* 25 (1962); 26 (1963).

67. Charles Perrault (see note 16), 1: 128–29.

68. Ibid., 132: "*n'est pas aussi d'employer des colonnes, des pilastres et de corniches mais de les placer avec jugement, et d'en composer de beaux edifices*" and "*pourroit estre toute differente de ce qu'elle est, et ne nous plaire pas moins, si nos yeux estoient également accoustumez.*"

69. Claude Perrault (see note 2), XXIII: "*La maniere de décrire agreablement les Contours & les Profils, & l'adresse de disposer avec raison toutes les parties qui font les caracteres des differens Ordres: ce qui est, ainsi qu'il a esté dit, la seconde partie, laquelle estante jointe à la Proportion comprend tout ce qui appartient à la beauté de l'Architecture.*"

70. Charles Perrault believed that the excellence of his contemporaries was such that there would not be many things to envy in times to come. See Charles Perrault (see note 16), 1: 98–99.

71. In Perrault's time, the only translation of Vitruvius available was that by Jean Martin (*Architecture; ou, Art de bien bastir* [Paris: J. Gazeau, 1547]), whose text and illustrations are very inaccurate.

72. Claude Perrault (see note 1), preface: "*Car la beaute n'ayant guere d'autre fondement que la fantaisie . . . on a besoin de regles qui forment et qui rectifient cette Idée.*"

73. Ibid.: "*et que pour cela on convienne d'une certaine autorité que tienne lieu de raison positive.*"

74. Ibid.: "*les preceptes de cet excellent Auteur [Vitruvius] . . . étoient absolument necessaires pour conduire ceux qui desirent de se perfectionner dans cet Art.*"

75. Claude Perrault (see note 2), XXIV.

76. The text was published as an introduction to a collection of Latin epigrams in 1659. The French translation appeared in 1720. Both Herrmann and Rykwert have related Nicole's work to Perrault. For an introduction to Nicole's position see Wladyslaw Tatarkiewicz, *History of Aesthetics*, ed. C. Barrett, 3 vols. (The Hague: Mouton, 1974), 3: 363–365.

77. Antoine Picon has emphasized the close links between Nicole and the Perrault family in his recent catalog. He questions the nature of the relationship while greatly expanding the debate about the possible influences on Perrault's work. See Picon (see note 7).

78. Tatarkiewicz (see note 76), 3: 375: "*Il n'y a rien d'assez mauvais pour n'être au goût de personne, et il n'y a rien d'assez parfait pour être au goût de tout le monde.*"

79. Claude Perrault (see note 2), pt. 1, chap. 1, 3: "*Ce qui fait voir, que selon Vitruve, la proportion est plus essentielle pour determiner les Ordres, que ne sont les caracteres singuliers de la figure de leurs parties.*"

80. Ibid., XII.

81. Ibid.

82. Vitruvius, 1684 (see note 1), 78–79. n. 16.

83. Claude Perrault (see note 2), XV.

84. Ibid.

85. Blondel (see note 25), 774: "*La beauté produite par la proportion est convaincante parce qu'elle plaist a tous. . . . Les proportions sont necessaires parce que toute la beauté perit quand les proportions essentielles sont changées.*"

86. Ibid., 768: "*S'il n'y a point de demonstration convaincante en faveur des proportions, il n'y en a point aussi de convaincantes au contraire.*"

87. Ibid., 771: "*Je ne voy pas que l'on doive s'étonner si je prononce hardiment que ce sont ces proportions qui sont la cause de la beauté et de l'elegance dans l'Architecture, et que l'on doit faire un principe stable et constant pour cette partie de Mathematique, afin que par l'étude et la meditation l'on puisse tirer dans la suite une infinité de consequences et de regles utiles à la construction des batimens.*"

88. I owe to the translator, Indra Kagis McEwen, the idea of considering the etymology of the title. Perrault himself alludes to the rules of civil law as "dependent on the will of legislators and on the consent of nations" rather than on a "natural understanding" of fairness. Claude Perrault (see note 2), XIV.

89. For this see Herrmann (see note 7), chap. 5. Herrmann devotes a significant part of his book to examining the reactions to Perrault's theory in seventeenth- and eighteenth-century architectural treatises.

90. See Pérez-Gómez (see note 7), especially chaps. 2, 8, and 9.

91. Jean-Nicolas-Louis Durand, *Précis des leçons d'architecture* (Paris: Jean-Nicolas-Louis Durand, 1802–1805).

ORDONNANCE FOR THE FIVE KINDS OF COLUMNS AFTER THE METHOD OF THE ANCIENTS

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PREFACE

THE ANCIENTS rightly believed that the proportional rules that give buildings their beauty were based on the proportions of the human body and that just as nature has suited a massive build to bodies made for physical labor while giving a slighter one to those requiring adroitness and agility, so in the art of building, different rules are determined by the different intentions to make a building more massive or more delicate. Now these different proportions together with their appropriate ornaments are what give rise to the different architectural orders, whose characters,[1] defined by variations in ornament, are what distinguish them most visibly but whose most essential differences consist in the relative size of their constituent parts.

These differences between the orders that are based, with little exactitude or precision, on their proportions and characters are the only well-established matters in architecture. Everything else pertaining to the precise measurement of their members or the exact outline of their profiles still has no rule on which all architects agree; each architect has attempted to bring these elements to their perfection chiefly through the things that proportion determines. As a result, in the opinion of those who are knowledgeable, a number of architects have approached an equal degree of perfection in different ways. This shows that the beauty of a building, like that of the human body, lies less in the exactitude of unvarying proportion and the relative size of constituent parts than in the grace of its form, wherein nothing other than a pleasing variation can sometimes give rise to a perfect and matchless beauty without strict adherence to any proportional rule. A face can be both ugly and beautiful without any change in proportions, so that an alteration of the features—for example, the contraction of the eyes and the enlargement of the mouth—can be the same when one laughs as when one weeps, with a result that can be pleasing in one case and repugnant in the other; whereas, the dissimilar proportions of two different faces can be equally beautiful. Likewise, in architecture, we see works whose differing proportions nevertheless have the grace to elicit equal approval from those who are knowledgeable and possessed of good taste in architectural matters.

One must agree, however, that although no single proportion is indispensable to the beauty of a face, there still remains a standard from which its proportion cannot stray too far without destroying its perfection. Similarly, in architecture, there are not only general rules of proportion, such as those that, as we have said, distinguish one order from another, but also detailed rules from which one cannot deviate without robbing an edifice of much of its grace and elegance. Yet these proportions have enough latitude to leave architects free to increase or decrease the dimensions of different elements according to the requirements occasioned by varying circumstances. It is this prerogative that caused the Ancients to create works with proportions as unusual as those of the Doric and Ionic cornices of the Theater of Marcellus or the cornice of the Facade of Nero,[2] which are all half again as large as they should be according to the rules of Vitruvius. It is also for this very reason that all those 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.

This shows just how ill-founded is the opinion of people who believe that the proportions supposed to be preserved in architecture are as certain and invariable as the proportions that give musical harmony its beauty and appeal, proportions that do not depend on us but that nature has established with absolutely immutable precision and that cannot be changed without immediately offending even the least sensitive ear. For if this were so, those works of architecture that do not have the true and natural proportions that people claim they can have would necessarily be condemned by common consensus, at least by those whom extensive knowledge has made most capable of such discernment. And just as we never find musicians holding different opinions on the correctness of a chord, since this correctness has a certain and obvious beauty of which the senses are readily and even necessarily convinced, so would we also find architects agreeing on the rules capable of perfecting the proportions of architecture, especially when, after repeated efforts, they had apparently explored all the many possible avenues to attaining such perfection. The case of the different projections given to the Doric capital readily demonstrates this. Leon Battista Alberti makes this projection only two and one-half minutes where the column's diameter is sixty; Scamozzi makes it five minutes; Serlio seven and one-half; it is seven and three-quarters in the Theater of Marcellus, eight in Vignola and in Palladio nine, in Delorme ten, and in the Colosseum seventeen.[3] Thus, for nearly two thousand years architects have tried out solutions varying in dimension from two and one-half to seventeen minutes, some making this projection as much as seven times as large as others without being disconcerted by the preponderance of proportions at variance with the one they would like to have accepted as true and natural. And disconcerted they should have been had any one of these proportions indeed been true and natural, since a true and natural proportion would have had the same effect as do things that offend or give pleasure without our knowing why.

But we cannot claim that the proportions of architecture please our sight for unknown reasons or make the impression they do of themselves in the same way that musical harmonies affect the ear without our knowing the reasons for their consonance. Harmony, consisting in the awareness gained through our ears of that which is the result of the proportional relationship of two strings, is quite different from the knowledge gained through our eyes of that which results from the proportional relationship of the parts that make up a column. For if, through our ears, our minds [*esprit*] can be touched by something that is the result of the proportional relationship of two strings without our minds being aware of this relationship, it is because the ear is incapable of giving the mind such intellectual knowledge.[4] But the eye, which can convey knowledge of the proportion it makes us appreciate, makes the mind experience its effect through the knowledge it conveys of this proportion and only through this knowledge. From this it follows that what pleases the eye cannot be due to a proportion of which the eye is unaware, as is usually the case.

A true comparison between music and architecture demands that one consider more than harmonies, which are all by nature unchangeable. One must also consider the manner in which they are applied, which differs with different musicians and countries, just as the application of architectural proportions differs with different authors and buildings. For just as it is impossible to claim that any single way of using harmonies is necessarily and infallibly better than another or to demonstrate that the music of France is better than that of Italy, so it is also impossible to prove that one capital, because it has more or less of a projection, is necessarily and naturally more beautiful than another. And the case is not the same as that of a simple chord, where one can demonstrate that a string played with another that is a little longer or a little shorter than half its length is unbearably discordant, because such is the natural and necessary effect of proportion on sounds.

There are still other inherent and natural effects produced by proportions, such as the movement of bodies in mechanics, but neither should these be compared to the effects produced by proportions for the pleasurable satisfaction of sight. For if one arm of a balance is a certain length relative to the other so that one weight will necessarily and naturally prevail over the other, it does not follow that a certain proportional relationship between the parts of a building must give rise to a beauty that so affects the mind that it transports it, so to speak, and compels it to accept that proportion as inevitably as the relative length of the arms of a balance makes that balance tilt in the direction of the longer arm. Yet that is what most architects claim when they would have us believe that what creates beauty in the Pantheon, for example, is the proportion of that temple's wall thickness to its interior void, its width to its height, and a hundred other things that are imperceptible unless they are measured and that, even when they are perceptible, fail to assure us that any deviation from these proportions would have displeased us.

I would not linger unduly over this question—even though it is a problem whose solution is of the utmost importance for the work I have undertaken and even though I am convinced that anyone who takes the trouble to examine the issue will find no great difficulty in judging that I need not argue my point of view any more than I already have—were it not for the fact that most architects hold the opposite opinion. This shows that we must not consider the problem unworthy of examination, for even though reason appears to be on one side, the authority of architects on the other balances the issue and leaves it undecided; in truth, though, the question is architectural only insofar as certain details and examples taken from architecture serve to show that there are many things that do not fail to please us despite common sense and reason. However, all architects agree on the truth of these examples.

Now, even though we often like proportions that follow the rules of architecture without knowing why, it is nevertheless true that there must be some reason for this liking. The only difficulty is to know if this reason is always something positive, as in the case of musical harmonies, or if, more usually, it is simply founded on custom and whether that which makes the proportions of a building pleasing is not the same as that which makes the proportions of a fashionable costume pleasing. For the latter have nothing positively beautiful or inherently likeable, since when there is a change in custom or in any other of the nonpositive reasons that make us like them, we like them no longer, even though the proportions themselves remain the same.

In order to judge rightly in this case, one must suppose two kinds of beauty in architecture and know which beauties are based on convincing reasons and which depend only on prejudice. I call beauties based on convincing reasons those whose presence in works is bound to please everyone, so easily apprehended are their value and quality. They include the richness of the materials, the size and magnificence of the building, the precision and cleanness of the execution, and symmetry, which in French signifies the kind of proportion that produces an unmistakable and striking beauty. For there are two kinds of proportion. One, difficult to discern, consists in the proportional relationship between parts, such as that between the size of various elements, either with respect to one another or to the whole, of which an element may be, for instance, a seventh, fifteenth, or twentieth part. The other kind of proportion, called symmetry,[5] is very apparent and consists in the relationship the parts have collectively as a result of the balanced correspondence of their size, number, disposition, and order. We never fail to perceive flaws in this proportion, such as on the interior of the Pantheon where the coffering of the vault, in failing to line up with the windows below, causes a disproportion and lack of symmetry that anyone may readily discern, and which, had it been corrected, would have produced a more visible beauty than that of the proportion between the thickness of the walls and the temple's interior void, or in other proportions that occur in this building, such as that of the portico, whose width is three-fifths the exterior diameter of the whole temple.

Against the beauties I call positive and convincing, I set those I call arbitrary, because they are determined by our wish to give a definite proportion, shape, or form to things that might well have a different form without being misshapen and that appear agreeable not by reasons within everyone's grasp but merely by custom and the association the mind makes between two things of a different nature. By this association the esteem that inclines the mind to things whose worth it knows also inclines it to things whose worth it does not know and little by little induces it to value both equally. This principle is the natural basis for belief, which is nothing but the result of a predisposition not to doubt the truth of something we do not know if it is accompanied by our knowledge and good opinion of the person who assures us of it. It is also prejudice that makes us like the fashions and the patterns of speech that custom has established at court, for the regard we have for the worthiness and patronage of people in the court makes us like their clothing and their way of speaking, although these things in themselves have nothing positively likable, since after a time they offend us without their having undergone any inherent change.

It is the same in architecture, where there are things such as the usual proportions between capitals and their columns that custom alone makes so agreeable that we could not bear their being otherwise, even though in themselves they have no beauty that must infallibly please us or necessarily elicit our approval. There are even some things that ought to appear misshapen and offensive in light of reason and good sense but that custom has rendered tolerable. Such is the case of modillions in pediments, of dentils under modillions, of the richness of the ornamentation of the Doric cornice and the simplicity of the Ionic, and the positioning of columns in the porticoes of ancient temples, where they are not plumb but tilted toward the wall. For all these things, which should cause displeasure because they contravene reason and good sense, were tolerated at first because they were linked to positive beauties and ultimately became agreeable through custom, whose power has been such that those said to have taste in architectural matters cannot bear them when they are otherwise.

In order to realize how many rules there are in architecture for things that please, albeit contrary to reason, we must consider that the reasons that ought to carry the greatest weight in regulating architectural beauty should be based either on the imitation of nature, such as the correspondence between the parts and the whole of a column, which reflects the correspondence between the parts and the whole of a human body; or on the resemblance of an edifice to the first buildings that nature taught men to make; or on the resemblance that the echinus, cymatium, astragal, and other elements have to the things whose shape they have adopted; or, finally, on the imitation of practices in other crafts, such as carpentry, which provide the model for friezes, architraves, and cornices and their constituent parts, as well as for modillions and mutules. Nevertheless, the grace and beauty of these things do not depend on such imitations and resemblances, for if they did, the more exact the imitation, the greater would be their beauty.[6] Nor is it true that the proportions and the shape that all these things must have in order to please and that cannot be changed without offending good taste faithfully reproduce the proportions and the shape of the things they represent and imitate. For it is obvious that the capital, which is the head of the body represented by the entire column, has nothing like the proportion a human head should have with respect to its body, since the squatter a body is, the fewer heads make up its length; whereas, on the other hand, the squattest columns have the smallest capitals and the slenderest ones, proportionally, the largest. By the same token, columns do not meet with greater general approval the more they resemble the tree trunks that served as posts in the first huts that men built, because we generally like to see columns that are thicker in the middle, which tree trunks never are, as they always diminish toward the top. Nor would cornices please us more were their constituents to represent more exactly the shape and disposition of the elements of wood construction that are their origin. If they did, dentils would appear above modillions, which represent struts in the cornices of the entablature; and modillions, which in the cornices of pediments represent purlins, would be perpendicular not to the entablature as is usual but to the slope of the pediment, just as the ends of purlins are perpendicular to the slope of gables. And finally, if the echinus more closely resembled a chestnut in its prickly shell, the cymatium the waves of a stream, and the astragal the heel of a foot, good taste would not prefer them. If reason ruled good taste, it would also follow that Ionic cornices be richer and more ornate than Doric ones, since it is reasonable for a more delicate order to have more ornamentation than a coarser one; and we would never have been able to bear that columns be out of plumb, as was once the practice, if custom had not made tolerable something so at odds with reason.

Hence, neither imitation of nature, nor reason, nor good sense in any way constitutes the basis for the beauty people claim to see in proportion and in the orderly disposition of the parts of a column; indeed, it is impossible to find any source other than custom for the pleasure they impart. Since those who first invented these proportions had no rule other than their fancy [*fantaisie*] to guide them,[7] as their fancy changed they introduced new proportions, which in turn were found pleasing. Thus the proportion of the Corinthian capital that was considered beautiful by the Greeks, who gave it a height of one column diameter, was not approved by the Romans, who added another one-sixth column diameter. It can be claimed, I know, that the Romans were right to increase the height of this capital since a short, wide dimension, unlike the greater height, gives a more pleasing form to the caulicoles and volutes. This is why the capitals of the large columns on the Louvre facade were made even higher than those of the Pantheon, following the example of Michelangelo, who, in the Capitol, made them higher still than at the Louvre. This only shows, however, that the taste of the architects who approved, or still approve, of the proportion that the Greeks gave their Corinthian capitals must be based on some principle other than that of a positive and convincing beauty, pleasing of itself, inherent in the thing as such—that is, dependent on its having this proportion and no other—and that it is difficult to find any reason for such taste other than prejudice or custom. Indeed, as we have said, the basis for this prejudice is the fact that when countless convincing, positive, and reasonable beauties occur in a work that has this proportion, these positive beauties succeed in making a work so beautiful that although the proportion itself may add nothing to its beauty, the reasonably founded love born to the entire work is transferred to each constituent part individually.

The first works of architecture manifested richness of materials; grandeur, opulence, and precision of workmanship; symmetry (which is a balanced and fitting correspondence of parts that maintain the same arrangement and position); good sense in matters where it is called for; and other obvious reasons for beauty. As a result, these works seemed so beautiful and were so admired and revered that people decided they should serve as the criteria for all others. And in as much as they believed it impossible to add to or to change anything in all these positive beauties without diminishing the beauty of the whole, they found it unimaginable that the proportions of these works could be altered without ill effect; whereas, they could, in fact, have been otherwise without injury to the other beauties. In the same way, when a person passionately loves a face whose only perfect beauty lies in its complexion, he also believes its proportion could not be improved upon, for just as the great beauty of one part makes him love the whole, so the love of the whole entails love of all its parts.

It is therefore true that in architecture there is positive beauty and beauty that is only arbitrary, even though it appears to be positive due to prejudice, against which one guards oneself with great difficulty. It is also true that even though good taste is founded on a knowledge of both kinds of beauty, a knowledge of arbitrary beauty is usually more apt to form what we call taste and is that which distinguishes true architects from the rest. Thus, common sense is all that is needed to apprehend most kinds of positive beauty, there being no great difficulty in judging a large edifice built of cleanly and precisely cut marble more beautiful than a small one of carelessly cut stone, where nothing is plumb, level, or square. No great architectural competence is required to know that the courtyard of a house should not be smaller than the bedrooms, that the cellar should not be better lit than the stairs, and that columns should not be wider than their pedestals. However, good sense will never convey the knowledge that the height of a column base should be neither more nor less than half the diameter of the column, that the modillions and dentils of pediments should be perpendicular to the horizon, that dentils should appear beneath modillions, that the width of triglyphs should be half the diameter of a column, and that metopes should be square.

Yet it can be readily appreciated that all these things could have different proportions without affronting or wounding even the most refined and delicate sensibility, which is certainly not the same thing as when a troubled disposition harms a patient without his knowing the precise extent of the disorders that are making him ill. For to be offended or pleased by architectural proportions requires the discipline of long familiarity with rules that are established by usage alone, and of which good sense can intimate no knowledge, just as in civil law there are rules dependent on the will of legislators and on the consent of nations that a natural understanding of fairness will never reveal.

Thus, as we have said, if when considering works with differing proportions, true architects approve only those that are the mean between the two extremes of the examples cited earlier, they do so not because such extremes offend good taste for some natural and positive reason that is contrary to good sense. Rather, they approve the mean only because the excessive proportions of our examples are not in keeping with the usage [*maniere*] that we have become accustomed to find pleasing in the fine works of the Ancients, where such extremes are not usually present and where the ancient usage is not so much pleasing in itself as pleasing because it is linked to other positive, natural, and reasonable beauties that make it pleasing by association, so to speak.

However, usage of the mean, equally distanced from the extremes observable in the examples put forward, still varies considerably and is not precisely defined in ancient works, which, for the most part, meet with uniform approval. Now even though there is no compelling reason for such usage to be perfectly regulated in order for it to please and, consequently, even though in architecture there are, strictly speaking, no proportions that are true in themselves, it still remains to be investigated whether it is possible to establish probable mean proportions that are founded on positive reasons but that do not stray too far from those that are accepted and in current use.

Modern architects who have written down the rules for the five orders of architecture have treated the subject in two ways. Some have done nothing more than assemble the most highly esteemed and illustrious examples from ancient and modern works alike and, as these works contain varying rules, have been content to present and compare them all, concluding almost nothing as to which to choose. Others, however, in order to avoid making the wrong choice from among the diverse views regarding the proportions of each order, have found it admissible to pronounce judgment on the opinions held by men of considerable authority and have even found it acceptable to put forward their own personal opinion as a rule. One may say that this was the practice of Palladio, Vignola, Scamozzi, and most of the other celebrated architects who have taken no pains either to follow strictly the Ancients or to fall in line with the Moderns.

The latter group of architects, at least, had commendable intentions in that they attempted to establish fixed and certain rules that would be consulted in all matters where they were applicable. On the other hand, it would have been desirable if one of them had either had sufficient authority to establish laws whose observance was unalterable or had discovered rules that were endowed with self-evident truth or that at least were endorsed by probabilities and reasons that made them preferable to all the other precepts being put forward. Thus, in one way or another, there would have been something fixed, constant, and established in architecture, at least insofar as the proportions of the five orders are concerned. And this would not be very difficult to do; for unlike matters pertaining to the durability and convenience of buildings,[8] where it is still possible to introduce innovations of considerable utility, these proportions are things for which no study or research need be undertaken nor any discovery be made. Nor are they at all of the same nature as the proportions required in military architecture and in the construction of machines, where proportion is of the utmost importance.

For clearly it is not essential to the beauty of a building that in the Ionic Order, for example, the height of the dentil be precisely equal to that of the second fascia of the architrave, that the rosette of the Corinthian capital not descend below the abacus, and that the central volutes extend to the upper edge of the drum or bell of the capital, since even though these proportions were observed by the Ancients and prescribed by Vitruvius, they have not been followed by the Moderns. The sole explanation for this is that these proportions were not based on positive and necessary reasons, as they are in such things as fortifications and machines, where, for example, the line of defense cannot be longer than the range of the artillery nor one arm of a balance shorter than the other without making these things absolutely wrong and completely ineffectual.

That is why we can regard the two currently accepted and practiced ways of treating the proportions of the five orders as not the only ones that can be implemented, and we hold that nothing should hinder the acceptance of a third. In order to explain what this third way entails, I will use a comparison that I have already used, which is quite appropriate to the subject at hand. Those who follow the first method are like those who, in order to prescribe the proportions for a beautiful face, would cite exactly the proportions of the faces of Helen, Andromache, Lucretia, and Faustina,[9] saying that in them, for example, the forehead, the nose, and the space between the forehead and the end of the chin are equal within a few minutes of each other but vary with each face. The architects who follow the second method would say that for a face to be beautiful, the proportions should be nineteen and one-half minutes from the root of the hair to the top of the nose, twenty and three-quarters minutes from the top of the nose to its tip, and nineteen and three-quarters minutes from the tip of the nose to the end of the chin. The third method would be to make these three spaces equal, giving twenty minutes to each.

In applying this comparison to architecture, if one were to ask what, for instance, should be the proportion of the height of the entire architrave in relation to that of the entire frieze, the answer, according to the first method, would be that in the Temple of Fortuna Virilis, the Theater of Marcellus, and nearly everywhere else, they are equal within a few minutes of one another, with the frieze a little higher on some of these buildings and the architrave a little higher on others. If one were to consult proponents of the second method, one would find that they prescribe a similar equality of frieze and architrave but that their dimensions differ from those of the Ancients and that some have made them equal in one order but not in another. According to the third method, however, one would always make them equal in the Ionic, the Corinthian, and the Composite Orders.

Now it is easy to see that the third method is at least simpler and more convenient than the others, for if it is obvious that $\frac{1}{120}$ of a face added to or subtracted from a forehead, nose, or chin will make that face neither more nor less agreeable; it is equally obvious that nothing is easier than this method for finding, retaining, and imprinting on the memory the proportion a face should have. As a result, even if one may not be able to claim that this proportion is the true one, since a face can possess all possible attractions without it and still lack any appeal when it is present, it should at least be considered a likely proportion, since it is founded on the regular division of a whole into three equal parts. This is the method followed by the Ancients and the one Vitruvius has used to justify the proportions he has established in his writings, where he always employs easily remembered, methodical divisions. The method has been abandoned by the Moderns only because they could not make it correspond to the irregular dimensions of the elements in the beautiful works of antiquity, which are very different from what Vitruvius has left us, so that it would have been necessary to alter the dimensions of these ancient works in some way in order to reduce them to the regular proportions the method requires. And most architects are convinced that these works would have lost all their beauty had even a single minute been added to or subtracted from any one of the elements in which the worthy craftsmen of antiquity once deposited these dimensions.

The extent to which architects make a religion of venerating the works they call ancient is inconceivable. They admire everything about them but especially the mystery of proportions. These they are content to contemplate with profound respect, not daring to question why the dimensions of a molding are neither slightly greater nor slightly smaller, which is something one can presume was unknown even to those who established these dimensions. This would not be so surprising if one could rest assured that the proportions we see in these works had never been altered and differed in no way from those that the first inventors of architecture established. Nor would such veneration astonish us if we were of the same mind as Villalpando,[10] who claims that God, through a special revelation, taught all these proportions to the architects of Solomon's Temple and that the Greeks, who are considered their inventors, learned them from these architects.

Yet, preposterous as it may be, the exaggerated respect for antiquity, which architects hold in common with those who profess the humanities [*sciences humaines*] and believe that nothing done today can match the works of the Ancients, originates in the genuine respect for sacred things. Everyone knows that the cruel war waged on scholarship [*sciences*][11] by the barbarism of past ages spared theology alone of all the branches of learning it obliterated and that as a result what little remained of culture [*litterature*][12] took refuge, in a sense, in the monasteries. In these places, where intelligence was obliged to seek the noble substance of knowledge concerning nature and antiquity, the art of reasoning and of training the mind was practiced. Yet this art, which by nature is proper to all branches of learning [*sciences*], had for so long been practiced only by theologians, whose every belief is bound and captive to ancient wisdom, that the habit of utilizing the freedom needed for scrupulous investigation was lost. Several centuries passed before people in the humanities were able to reason in anything other than a theological way. This is why, formerly, the only aim of learned inquiry was the investigation of ancient doctrine [*opinions*]; whereby, greater pride was taken in discovering the true connotation of the text of Aristotle than in discovering the truth of that with which the text deals.[13]

The docility characteristic of men of letters so sustained and reinforced the spirit of submission ingrained in their way of studying and treating the arts and sciences that they had great difficulty divesting themselves of it. They could not bring themselves to distinguish between the respect due to sacred things and the respect warranted by things that are not: things that, when the truth is to be ascertained, we are permitted to examine, criticize, and censure with moderation and whose mysteries we do not consider as being of the same kind as the mysteries of religion, which we are not surprised to find unfathomable.[14]

Because architecture, like painting and sculpture, was often dealt with by men of letters, it was also ruled by this spirit of submission more than the other arts. These people professed to argue from authority in architectural matters, laboring under the assumption that the authors of the admirable works of antiquity did nothing without reasons to justify it, even though these reasons remain unknown to us.

There are those, however, who will not accept as necessarily unfathomable the reasons that make us admire these fine works. After examining everything relevant to this subject and being instructed in it by those who are most expert, they will, if they also consult good sense, be persuaded that there is no great obstacle to believing that the things for which they can find no reason are, in fact, devoid of any reason material to the beauty of the thing. They will be convinced that these things are founded on nothing but chance and the whims of craftsmen who never sought any reason to guide them in determining matters whose precision is of no importance.

I am well aware that whatever I may say, people will have trouble accepting this proposition, and it will be taken as an unorthodox opinion [*Paradoxe*][15] apt to provoke a great many adversaries. Although there are a few honest people who, perhaps because they have not given the matter enough thought, genuinely believe that the glory of their beloved antiquity rests on its being considered infallible, inimitable, and incomparable, there will be many others who know very well what they are doing when they cloak in a blind respect for ancient works their own desire to make the matters of their profession into mysteries that they alone can interpret.

Although I may have thoroughly substantiated this unorthodox opinion, my intention is not to profit by it in any way other than to gain leave to change a few proportions that differ from ancient ones only in minor and unremarkable ways. Therefore, I do not believe that people will take issue with me, especially after having declared that I hold for ancient architecture all the veneration and admiration it deserves. If my discussion of it differs from others, my aim is simply to avert the objections that overly scrupulous admirers of the past may raise concerning the drawbacks that they see in my not following to the letter the examples of the great masters and in the risk I run in not gaining credence for my new proposals.

Those who want neither to quibble nor to use the authority of antiquity in bad faith will not extend its power to matters that have no need of it, such as the thickness of an astragal, the height of a corona, or the exact dimension of a dentil, since the exactitude of these proportions is not what makes the beauty of ancient buildings. The significance of their being altered is outweighed by the importance of having proportions that are truly balanced in all parts of every order in such a way as to establish a straightforward and convenient method.

Should the outcome of my project not be successful, the disgrace should not be a cause of great concern to me, for I would be in illustrious company. Despite considerable abilities, neither Hermogenes, nor Callimachus, nor Philo, nor Chersiphron, nor Metagenes,[16] nor Vitruvius, nor Palladio, nor Scamozzi was able to obtain sufficient approval to have his precepts constitute the rules of architectural proportion. If the objection is raised that the system I propose, even if approved, was not very difficult to discover, that I have hardly changed proportions at all, and that most of them can be found in one or another of the works of the Ancients or Moderns, I will admit that I have indeed not invented new proportions; but this is precisely what I take pride in. I say this because my work has no other aim than to show, without disturbing the conception architects have of the proportions of each element, that they can all be reduced to easily commensurable dimensions, which I call probable. For it seems very likely that the first inventors of the proportions for each order did not determine them as we see them in ancient buildings, where they only approximate such readily commensurable dimensions. Rather, it would appear that they actually made them exact and that, for example, they did not give the Corinthian column a height of nine and one-half diameters, sixteen and one-half minutes, the way it appears on the portico of the Pantheon, nor ten diameters, eleven minutes, as it appears on the three columns of the Roman Forum, but instead made it sometimes precisely nine and one-half diameters and sometimes ten. The carelessness of those who built the ancient buildings we see is the only real reason for the failure of these proportions to follow exactly the true ones, which one may reasonably believe were established by the first originators of architecture.

I cannot see how one might object to this opinion, because I neither know, nor believe that one can know, the reasons that made architects use difficult and fractional proportions unnecessarily and contrive to change the original ones, which were simple whole numbers. Why, for example, when the Ancients before Vitruvius always made the plinth of the Attic base one third of the entire base, did the architect of the Theater of Marcellus add one and three-quarters minutes to this third, which is ten minutes? Why, when the Ancients always made the Doric architrave equal to half a column diameter, did the architect of the Baths of Diocletian decide to add a fifth part and Scamozzi a sixth? And finally, for what mysterious reason do no two columns of the portico of the Pantheon have the same thickness? Nor do I believe it possible to guess why Scamozzi, in his treatise on architecture, establishes proportions that are so confused that they are not only difficult to remember but even to understand.[17]

I therefore have cause to believe that if the alterations in proportion introduced by architects after Vitruvius were made for reasons unknown to us, those I propose will be founded on reasons that are clear and explicit, such as the ease of subdividing and remembering them. I also contend that whatever innovations I introduce are intended not so much to correct what is ancient as to return it to its original perfection. I do this not on my own authority, following only my own insight, but always in reference to some example taken from ancient works or from reputable writers. My use of argument [*des raisons*] and inference [*des conjectures*] is sparing and even when used cannot be objected to, since I submit all my arguments in total deference to all knowledgeable people who care to take the trouble to examine them.

And finally, if the works that survive from antiquity are like books from which we must learn the proportions of architecture, then these works are not the originals created by the first true authors but simply copies at variance with one another, with some of them accurate and correct in one thing, others in another. Therefore, in order to restore the true sense of the text in architecture, if one may so speak, it is necessary to search through these different copies, which, as approved works, must each contain something correct and accurate, and obviously base one's choice on the regularity of divisions, which are not fractional for no reason but simple and convenient as they are in Vitruvius.

As for the skeptics who may question that the works of antiquity are defective copies whose proportions differ from those of the originals, I believe that I have sufficiently established the legitimacy and acceptability of this contention through the arguments elaborated at some length in this Preface. Here, I have attempted to prove that the beauty of ancient works, admirable though it may be, is not enough to justify the conclusion that the proportions to which they conform are true proportions. This I have demonstrated by showing that the beauty of these buildings does not consist in the exactitude of such true proportions, since plainly something may be omitted from them without the beauty of the work being diminished by it. In addition, I have demonstrated that the work would not have more appeal were it to conform to these true proportions while lacking other things wherein true beauty consists, such as the agreeable tracing of profiles and contours and the skillful disposition of all the elements that determine the character of the different orders.

For, as we have said, the correct disposition of these elements is secondary to proportion as one of the two parts that together encompass everything pertaining to the beauty of architecture.

I have given a general explanation of the reasons that justify the liberty that I have taken in proposing some changes in the proportions of the orders and am reserving for the treatise that follows the details of each alteration. It now remains for me to state my reasons for making changes in the characters that distinguish the orders, which is to take even greater license than to tamper with proportions, since such changes are more easily recognized, the eye being able to detect them without the aid of ruler or compass.

Those who find it unjustifiable to change anything in the rules that they believe were established by the Ancients may take the liberty of deriding my arguments and censuring the boldness of my project. It is not to them I speak, for there is no arguing with those who deny principles. And I maintain one of the first principles in architecture, as in all the other arts, should be that since no single principle has ever been completely perfected, even if perfection itself is unattainable, one may at least approach it more closely by reaching for it. I also maintain that those who believe in the possibility of reaching for perfection are more likely to aspire to it than those who believe the opposite.

The orders of architecture are utilized in two kinds of works, that is to say, either in edifices built for current use, such as temples, palaces, and other buildings, both public and private, which require ornamentation and a magnificent aspect, or in historical representations involving architecture, such as those in painting or sculpture, or in the scenery for theater, ballet, tournaments, and royal processions [*Entrées des Princes*]. Now clearly, in the latter type of architecture one must advocate following to the letter all the typical usages of ancient architecture. In a narrative about Theseus or Pericles,[18] for example, if one uses the Doric Order, the columns must be without bases; if one represents the Ionic Order, the large torus should be at the top of the base; and if one uses the Corinthian Order, the capital should be compressed, the abacus pointed at the corners, and the cornice without modillions. When one designs an order for an edifice today, however, such scrupulous imitation of antiquity is unnecessary. Using characters like those seen on ancient Roman medals to make the lettering on a medal of the king or on an inscription dated 1683 would not be acceptable, since Roman characters differ from those we have perfected and do not have their beauty. Nor should one condemn an architect who carefully observed, took heed of, and even welcomed all the changes those skilled in his profession have introduced judiciously and with reason.

Among those who have written about the architectural orders, there is no one who has not added to or corrected something in what it is claimed the Ancients established as inviolable rules and laws. These writers, who, apart from Vitruvius, are all modern, made such alterations after the example of the Ancients themselves, who, instead of books, left works of architecture into which each put something of his own invention. Now these innovations have always been considered the fruit of studious research undertaken by able and inventive minds [*des genies inventifs*] in order to perfect those things in which the Ancients had left some flaw. Although some of the changes were not approved, others affecting matters of even considerable significance were accepted. In fact, enough of them were applied to show that a change of opinion in affairs of this kind is in no way a reckless undertaking and that a change for the better is not as difficult as the ardent admirers of antiquity would have us believe.

Bases that are called Ionic, the only ones used by the Ancients for all the orders that had bases, displeased the architects who came after Vitruvius so much that they were almost never used. The Ionic capital was found clumsy and disagreeable by a change in taste so universal that it left no room to doubt that it had some reasonable foundation. The Ionic capital of his own invention that Scamozzi substituted for the Attic one was not only so well received that now it is almost the only one used for this order, but architects since Scamozzi have, in turn, introduced changes in this capital that much improved it, as will be explained in due course. The same thing may be said of the Composite capital, which is none other than the Corinthian capital corrected and improved, for it too only recently has obtained the perfection it lacked not only in antiquity but also in all the modern authors who have dealt with the orders.

I therefore have reason to hope that my purpose in this work, which may seem very bold to many, will not seem completely reckless to those who consider that I am proposing nothing without precedent in example or in the work of illustrious authors. If, for this reason, anyone should wish to claim that my book contains nothing new, because, as it turns out, both the proportions and characters of the orders have been modified throughout history, I would agree. I would say that my purpose is simply to extend change a little further than before, to see if I might cause the rules for the orders of architecture to be given the precision, perfection, and ease of retention they lack by attempting to persuade those who have more knowledge and ability than I to work toward making the outcome of this project as successful as the project is itself useful and reasonable.

This work is divided into two parts. In the first part, I establish general rules for proportions common to all the orders, such as those for entablatures, the heights of columns, pedestals, etc., by showing either that their sizes, such as the height of all entablatures, are the same or that they increase by equal proportions. In the second part, I determine the sizes and the particular characters of the elements that make up the columns of each order. This I do by referring equally to examples from ancient works and modern writers. Now, although what I refer to in antiquity is more difficult to verify than what I take from the Moderns, the book that Monsieur Desgodets has recently published on the ancient buildings of Rome will greatly facilitate the task of interested readers in their discovery,[19] just as it has helped me to learn exactly what the different proportions were that this architect has recorded with such great precision.

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ORDONNANCE
FOR THE FIVE KINDS
of COLUMNS
AFTER THE METHOD
of THE ANCIENTS

PART ONE
Things Common to All the Orders

Chapter I
Ordonnance and the Architectural Orders

THE ORDONNANCE, according to Vitruvius,[20] is what determines the size of each of the parts of a building according to its use. By parts of a building we understand not only the rooms that it is composed of, such as the courtyard, vestibule, or hall, but also the parts that are involved in the construction of each room, such as entire columns, including the pedestal, the column, and the entablature, which itself is made up of the architrave, frieze, and cornice. These are the only parts dealt with here, and it is their proportions that the ordonnance regulates, giving to each part the dimensions appropriate to its intended application, such as a greater or lesser size calculated for the support of a great weight or a greater or lesser capacity for accommodating delicate ornaments, which may include sculpture or moldings; these ornaments also belong to the ordonnance and provide an even more visible sign than proportion for designating and regulating the orders. Nevertheless, the most essential difference between the orders, according to Vitruvius, is that of proportions.

Hence, the architectural order is what is regulated by the ordonnance when it prescribes the proportions for entire columns and determines the shape of certain parts in accordance with their different proportions. The proportions of columns vary as their height is greater or lesser relative to their thickness. And the shape of individual elements [*membres*] appropriate to these proportions varies with the simplicity or richness of the ornaments of the capitals, bases, and flutings and of the modillions or mutules, which are placed in the cornices.

Thus, of the three orders of the Ancients—the Doric, the Ionic, and the Corinthian—the Doric, which is the most massive, is distinguished from the others by the ruggedness and simplicity of all its parts. Its capital has neither volutes, nor leaves, nor caulicoles; the base, when it has one, is made up of very large tori without astragals and with a single scotia; its flutings are flat and fewer in number than in the other orders; and its mutules are like a simple abacus with no console or foliage. On the other hand, the Corinthian Order has several delicate sculptural ornaments in its capital with two rows of carved leaves from which project stalks or caulicoles topped by volutes; its base is enriched with two astragals and a double scotia; its modillions are delicately carved into consoles ornamented with the same leaves as those of the capital. The ornaments of the Ionic Order are midway between the extremes of the other two orders: its base being without a torus at the bottom, its capital having no leaves, and its cornice having only dentils instead of modillions.

To the three orders of the Ancients, the Moderns have added two more, whose ordonnance they have established by proportion to that of the ancient orders. They have made the one that they have named Tuscan even more simple and rugged than the Doric and the one called Composite more complex than the Corinthian, with a capital composed of the Corinthian capital, whose leaves it has, and the Ionic capital, whose volutes it adopts. One may likewise say that the Corinthian is composed of the Ionic, whose two scotias and whose astragals appear in its base, and the Doric, whose capital has a throat or bell, which does not occur in the Ionic. These two orders are taken from Vitruvius. Although he prescribed the proportions of the Tuscan, he never numbered it among the orders, and when he invented the Composite, he said that the capital of the Corinthian column could be altered to one including parts taken from the Ionic and Corinthian capitals. He also said, however, that this alteration of the Corinthian capital does not establish a new order, because it does not change the proportions of the column; the altered capital is the same height as the Corinthian Order. The Corinthian Order does differ from the Ionic Order, whose smaller capital makes the whole column shorter. This shows that according to Vitruvius, proportion is more essential for distinguishing the orders than the shapes of the parts that determine their characters.

Chapter II
The Dimensions Regulating the Proportions of the Orders

ARCHITECTS have used two methods to determine the dimensions that establish the proportions of the elements that make up a column and that constitute the principal difference between the orders. The first is to take a known dimension, which is either average [*mediocre*] or very small. The average dimension, which is the diameter of the base of the column shaft and is called a module, is used to establish dimensions that are much greater than this diameter or module: to determine the height of a column, for example, by taking eight or nine diameters and the intercolumniation by taking two, three, or four. The very small dimension, which is called a part or a minute and is usually one-sixtieth part of the module, is used when dimensions smaller than the module are called for, such as when, for instance, ten minutes are given to the plinth of the Attic base, seven and one-half to the large torus, five to the small one, etc.

In the second method, we use neither minutes nor any other fixed part of the module but rather divide the module or some other dimension, itself established either by the module or by other means, into as many equal parts as are necessary. In this way the dimension of the Attic base, which is one half of a module, is divided either into three parts to obtain the height of the plinth, into four to obtain that of the large torus, or into six to obtain that of the small one.

Both methods have been practiced as much by the Ancients as by the Moderns, but the second one, which the Ancients used, seems to me preferable to the first. This is not so much because it always supposes the correlation of a whole to its parts, for I do not believe that this correlation in itself results in anything that might please the sight, which is satisfied only by the inherent order and regularity of such correlations, since other proportions are not even affected by it. Rather, what I find most to recommend this method of the Ancients is the facility that it affords memory for retaining dimensions. This is so because it is a method founded on reason, which can produce what we call recollection [*reminiscence*], which is much more reliable than the memory capacity for simple factual recall [*la simple apprehension de la memoire*].[21] For once we have learned that the third part of an Attic base is the dimension of its plinth, that the fourth part is that of its lower torus, and that the sixth part is that of the other torus, it is almost impossible to forget the proportions of this base. Such is not the case with the ten, the seven and one-half, and the five minutes used to measure these parts, since the relationships between these numbers are only known and retained because ten is the third part, seven and one half is the fourth part, and five is the sixth part of the thirty minutes that determine the overall height of the base.

The reason the Moderns always use fixed dimensions in minutes is the frequent need to record dimensions that are proportional neither to the dimension of the entire module nor to that of its parts, such as when the plinth of the Attic base measures only nine and one-half minutes instead of ten or when it measures ten and one-half. What accounts for this practice is the fact that the Moderns thought only to give the dimensions of those works that have come down to us from the Ancients. And since these works are evidently not the true originals,[22] their proportions could not have the exactitude of the proportions that the first inventors of architecture gave them, there being no indication of why the dimensions in these surviving works approach an even subdivision so closely without making it exact.

Even as our intention in this work is to provide proportions based only on dimensions that have some relationship to one another and thereby, as much as possible, approach the true proportions of the Ancients, so will we also use only their method of measurement. Therefore, just as Vitruvius made the module of the Doric Order smaller by reducing the large module (in the other orders based on the diameter of the base of the column shaft) to half a diameter, so do we reduce the module to a third.[23] We do this, as Vitruvius did, for the convenience of using no fractional dimensions. For in the Doric Order, the mean module [*module moyen*, i.e., one half-diameter of a column] determines not only the height of the base, as it does in all the other orders, but also the heights of the capital, the architrave, the triglyphs, and the metopes. The usefulness of our small module, however, taken as a third of the diameter of the base of the column shaft, extends much further. We use it to determine without fractions the heights of pedestals, columns, and entablatures in all the orders.

Therefore, since the large module, which is the diameter of the column, has sixty minutes and the mean module has thirty, our small module has twenty. As a result, the large module contains three small ones, and the mean module contains one and one half. Two large modules make six small ones, two mean modules make three, etc., as is shown in the following table.

What we usually call a part—the thirtieth part of half a column diameter—will always be called a minute in this treatise in order to avoid the confusion the word *part* might cause. Here, *part* does not signify a fixed part, as the word *minute* does, but rather a relative part, such as the third, the fifth, etc., of another part.

TABLE OF MODULES

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<tr><th>Large Module</th><th>Minutes</th><th>Mean Module</th><th>Minutes</th><th>Small Module</th><th>Minutes</th></tr>
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<tr><td rowspan="6">V.</td><td rowspan="6">300</td><td rowspan="3">IX.</td><td rowspan="3">270</td><td rowspan="2">XIII.</td><td>250</td></tr>
<tr><td>260</td></tr>
<tr><td rowspan="2">XIV.</td><td>270</td></tr>
<tr><td rowspan="3">X.</td><td rowspan="3">300</td><td>280</td></tr>
<tr><td rowspan="2">XV.</td><td>290</td></tr>
<tr><td>300</td></tr>
</table>

Chapter III
The General Proportions of the Three Main Parts of Entire Columns

THE ENTIRE COLUMNS of each order are made up of three main parts: the pedestal, the column, and the entablature. Furthermore, each of these parts is itself made up of three parts. The pedestal has its base, its dado or drum, and its cornice; the column has its base, its shaft or stalk, and its capital; and the entablature is made up of the architrave, the frieze, and the cornice. The overall height of each of these three main parts is determined by a fixed number of our small modules. For since, as I postulate, we make the entablatures of all the orders equal, we give to each six small modules, which is two large modules, or diameters. The height of the pedestal, like that of the column, however, is different in each order and therefore increases proportionally as the orders become slighter and less massive. The increment is always by one module in the pedestals and by two in the columns, so that the Tuscan pedestal, which is equal to its entablature, has six modules, the Doric seven, the Ionic eight, the Corinthian nine, and the Composite ten.

Because, as we have said, the height of columns with their base and capital increases by two modules, it follows that the Tuscan should have twenty-two modules, the Doric twenty-four, the Ionic twenty-six, the Corinthian twenty-eight, and the Composite thirty.

Finally, the proportions of the three parts that make up pedestals are also the same in all the orders. The base is always the fourth part of the pedestal, and the cornice the eighth part, while the plinth of the base is always two thirds of the base. As a result, the height of the dado comprises what is left of the overall height of the pedestal, which has already been established.

The base of the column, too, is the same height in all the orders, that is to say, one and one-half modules, which is one half of the diameter of the base of the column shaft. Capitals in the Tuscan and Doric Orders are also the same height, which is equal to that of the base. Likewise, in the Composite and Corinthian Orders, capitals have the same height of three and one-half modules. Only the Ionic capital has a proportion particular to itself.

The heights of the parts of entablatures have less regular proportions. What they do have in common in all orders save the Doric is their architrave and frieze; each of these parts is six twentieths of the entablature, with the cornice being eight twentieths. In the Doric Order, the proportions of the entablature are necessarily different, since they are regulated by the triglyphs and the metopes.

As for widths or projections, they are determined by the part obtained when the small module is divided by five, so that, for example, the diminution of columns is by five parts. Similarly, one of these five parts, measured from the surface of the base of the column shaft,[24] determines the projection of the lip of that base. The projection of the base itself is three of these five parts, each of which contains four minutes. Other projections are treated in a similar way.

The explanation and justification of all these proportions will be found in the following chapters.

Chapter IV
The Height of Entablatures

THERE IS NOTHING about which architects are less in agreement than the proportion of the height of entablatures to the thickness of columns. Nearly no two works, ancient or modern, give the same proportion for it, and some entablatures are almost twice the size of others, as is that of the Facade of Nero compared to that of the Temple of Vesta near Tivoli.

Yet this proportion ought to be the best regulated of them all, as there is none more important or more disturbing to us when it is wrong. One is more readily aware of incorrectness in this proportion than in any other. It is certain that chief among the rules of architecture are those concerning durability [*solidité*]. Nothing destroys the beauty of a building more than when, in its constituent parts, we observe proportions contrary to what should establish durability, such as when these parts appear to be unable to support what they carry or appear unable to be supported by what carries them. Now this is primarily noticeable in entablatures and columns, since the thickness of columns is what makes them capable of giving support, and by the same token, the height of entablatures relative to this thickness is what makes them capable of, and appear to be capable of, being supported. From this it follows that the height of entablatures should be regulated by the thickness of columns. Therefore, if it were necessary to vary the entablatures of the different orders, where columns of the same thickness are longer in some than others, one would have to give entablatures less height when columns are longer, because greater length in a column makes it weaker and makes it appear weaker. Yet the opposite occurred when the architects of ancient works gave entablatures much greater height in proportion to column thickness in the Corinthian and Composite Orders, where columns are longest, than in the Doric and Ionic orders, where they are shortest.

There are three kinds of architecture: ancient architecture as taught to us by Vitruvius, ancient architecture as we study it in the works of the Romans, and modern architecture as we have it in the books that have been written for the past 120 years. Among these three, it so happens that insofar as the proportions of entablatures are concerned, Vitruvius and most of the Moderns have, for the most part, opposed the practice of ancient architects who made entablatures of a size that makes them appear unable to be supported, as they do on the Facade of Nero and on the three columns of the Roman Forum, commonly called the Campo Vaccino. In fact Moderns such as Bullant[25] and Delorme, who based their entablatures on the rules of Vitruvius, made theirs too small by giving them half the size of the ancient ones. So it would appear that the Romans, who are the authors of ancient architecture, found the entablatures prescribed by Vitruvius too small and, wishing to correct this shortcoming, plunged into another, perhaps equally perverse, extreme. Similarly, it would appear that when some of the Moderns noticed these excesses, they once more adopted the ancient approach, when what they ought to have done was to approve the Roman aim of correcting the shortcomings of the Ancients and content themselves with condemning only their excesses.

In seeking the reason for this great diversity in the height of entablatures, some have claimed that the different sizes of buildings, together with the nature of the orders themselves, some of which are more massive than others, might be the cause for this divergence in proportion, since, according to Vitruvius's rules, the architrave of a column measuring twenty-five feet should be higher by one twelfth than that of a column measuring fifteen feet. It appears, however, that architects paid no attention to this argument, since they made the entablatures of small columns proportionally larger than those of large columns. Thus, in the Pantheon the columns of the altars, which are only one quarter the height of those of the portico, have proportionally a much larger entablature. Nor were people guided by the general proportions of the orders, since those that are most massive (such as the Tuscan and the Doric), which should therefore have the largest entablatures, have proportionally smaller ones than the Corinthian and the Composite.

I do not set myself up as the arbiter in a dispute between such great protagonists, and if I voice my opinion on this and on the subject of other proportions that have been utilized, I do not wish my judgment to be considered anything other than what jurists call the judgment of peasants. This judgment, known as splitting the difference,[26] was rendered where matters were so confused that even the most en-

TABLE OF ENTABLATURES

Tuscan			Doric			Ionic			Corinthian			Composite		
minutes			minutes			minutes			minutes			minutes		
Vitruvius	15		Colosseum	26	more	Temple of Fortuna Virilis	18		Temple of Peace	8		Arch of the Lions	34	more
Scamozzi	11		Scamozzi	27		Vignola	18	more	Portico of Septimius	12		Serlio	30	
Vignola	15		Vitruvius	15		Theater of Marcellus	25		Delorme	19	more	Vignola	30	
Palladio	16	less	Bullant	15		Colosseum	26		Temple of Nerva	24		Arch of Septimius	19	less
Serlio	3		Serlio	13	less	Palladio	11		Three Columns	36		Arch of Titus	19	
			Palladio	12		Serlio	13		Facade of Nero	47		Temple of Bacchus	2	
			Vignola	10		Scamozzi	15	less	Scamozzi	0		Palladio	0	
			Barbaro	8		Delorme	16		Palladio	6		Scamozzi	3	
			Theater of Marcellus	7		Vitruvius	19		Vignola	12	less			
			Delorme	5		Bullant	35		Serlio	14				
									Vitruvius	19				
									Temple of the Sibyl	21				

lightened judges were unable to know the truth of the case. Since there is no apparent explanation for such great diversity in the size of entablatures, the only way to establish a rule with some degree of probability is to take the middle course, using a dimension that has some affinity to that of the column, such as double its diameter, and that is equally distanced from the extremes found in ancient works.

If anyone reproaches me by citing authors and works whose dimensions are smaller than those I propose, I will set equally authoritative [*autentiques*] works and authors against these, whose dimensions are larger. It is for this reason, therefore, in what follows, that I take as a regulatory dimension the mean, more or less equally distanced from the extremes to be found in the authoritative examples to which I refer. Nor do I believe it necessary to give a size in minutes when it is possible to reduce it to an exact proportion in whole numbers.

The preceding table lists the five columns of the five orders. For each order

I have indicated by how many minutes the entablature of each work referred to in my examples exceeds or falls short of the 120 minutes contained in the two diameters, or six small modules, that I assign to all entablatures. For if the table shows that some entablatures are smaller than the one I propose, it also lists others that are larger. For instance, if the entablature of the Temple of the Sibyl falls short of mine by twenty-one minutes, that of Vignola's Composite Order by thirty, and that of Bullant's Ionic Order by thirty-seven, the entablature of the three columns of the Roman Forum exceeds it by thirty-six minutes and that of the Colosseum by twenty-six.

This table also shows that only in the Tuscan Order is the entablature always smaller than the two diameters I assign to it. Now this I find inexplicable, since the Doric entablature is sometimes larger than the Ionic, Scamozzi's Doric entablature exceeding my 120 minutes by as much as twenty-seven, while the largest Ionic entablature, that of the Theater of Marcellus, exceeds these 120 minutes by only twenty-five. And there would be more reason for giving a larger entablature to the Tuscan Order than to the Doric because of the bulk and strength of the Tuscan column, due, as we have said, to its being short in proportion to its thickness.

Chapter V
The Length of Columns

THE REASON architects have varied the lengths of columns in the same order is no easier to divine than their reason for varying the heights of entablatures in different orders. Vitruvius makes the Doric columns of temples shorter than those of porticoes behind theaters with no more justification than to say that the columns of temples should be statelier than anywhere else. Palladio, who appears to have adopted a similar practice in giving greater height to columns with pedestals than to those without them, had even less justification, for it seems pointless to lengthen columns whose pedestals, in a sense, already give them additional length. Serlio, who makes isolated columns shorter than others by a third, takes a license that has no precedent. Even though his reasons for making isolated columns shorter are good, they are exaggerated, since bringing columns closer together will make them stronger. A more compelling reason than this is needed to justify a change in proportion.

Although different authors have prescribed a great diversity of lengths for columns of the same order, columns in different orders nevertheless maintain a constant relationship when compared to one another, so that as the orders become less massive their columns increase in height. This increase, however, is greater in some ordonnances than in others. In antiquity it is only five modules or half-diameters for all five orders, with the shortest, which is the Tuscan, having fifteen modules and the longest, which is the Composite, having twenty. In Vitruvius the increase is also five modules, but it goes from fourteen modules to nineteen. The Moderns made it greater, for in Scamozzi it is five and one-half modules and in Serlio six, as the following table shows. I have itemized the sizes that the various architects have given to columns in order to select one that represents the mean, in keeping with what I have already done for the heights of entablatures.

Thus, assuming that the height of the Tuscan column should be about fifteen modules, I give it fourteen and two thirds, which make twenty-two of my small modules, because this dimension is the mean between the fourteen of Vitruvius's Tuscan and the sixteen of Trajan's Column. Similarly, I assume that the Doric column should be sixteen modules, which make twenty-four of my small modules, because this dimension is the mean between the fourteen of Vitruvius and the nineteen of the Colosseum. I also give the Ionic column seventeen and one-third modules, which make twenty-six small modules, because this dimension is the mean between Serlio's sixteen and the nineteen modules, two minutes of the Colosseum. Thus, the Corinthian column has eighteen and two-thirds modules, which make twenty-eight small modules, because this height is the mean between the sixteen modules, sixteen minutes of the Temple of the Sibyl and the twenty modules, six minutes of the three columns of the Roman Forum. The same procedure gives the Composite column twenty conventional modules, which make thirty small modules, because this size is the mean between the twenty modules of the Arch of Titus and the nineteen and one-half modules of the Temple of Bacchus.

It may be pointed out that in antiquity and with some modern architects, there is no evidence of a progressive height increase in the Composite Order, as there is in the other orders, and that Composite and Corinthian columns are sometimes the same height, as the examples in the table show. If any such objections are raised, I will say that since the distinction between the orders depends chiefly on the proportion between column length and thickness, the Composite must have a distinctive proportion if we wish to make it an order distinct from the Corinthian. This is what made Vitruvius say that the columns of his day whose capitals were composed of ornaments taken from the other orders did not constitute an order distinct from the Corinthian, because these columns were not longer than Corinthian columns. One might also object that this progressive increment is contrary to the rules of Vitruvius, who makes the shafts of Ionic and Corinthian columns the same height, rather than

TABLE OF COLUMN LENGTHS

			Mean Height	
	Mean Modules		Mean Modules	Small Modules
Tuscan	Vitruvius	14	14⅔	22
	Trajan's Column	16		
	Palladio	14		
	Scamozzi	15		
	Serlio	12		
	Vignola	14		
Doric	Vitruvius in Temples	14	16	24
	Vitruvius in Temple Porticoes	15		
	Colosseum	19		
	Theater of Marcellus	15⅔		
	Scamozzi	17		
	Vignola	16		
Ionic	Colosseum	19–2	17⅓	26
	Theater of Marcellus	17⅔		
	Palladio	18		
	Serlio	16		
	Vitruvius	17		
Corinthian	Portico of the Pantheon	19–16	18⅔	28
	Temple of Vesta	19–9		
	Temple of the Sibyl	16–16		
	Temple of Peace	19–2		
	Three Columns of the Campo Vaccino	20–6		
	Temple of Faustina	19		
	Basilica of Antoninus	20		
	Portico of Septimius	19–8		
	Arch of Constantine	17–7		
	Colosseum	17–17		
	Vitruvius	19		
	Serlio	18		
Composite	Arch of Titus	20	20	30
	Temple of Bacchus	19½		
	Scamozzi	19½		
	Arch of Septimius	19–9		

making the Corinthian column shaft shorter as we do. But the truth is that the authors of ancient buildings changed the proportion of this, just as they changed the proportion of many other things in ancient architecture,[27] and all Moderns have adopted this change, except Scamozzi, who makes the shaft of the Corinthian column more or less equal to that of the Ionic.

Now since it is reasonable for the progressive increment of columns to be constant from one order to the next, I first compile the sum of all four increments from the Tuscan to the Composite, which I make five mean modules, ten minutes, a dimension midway between the five modules of the Ancients and the five and one-half modules of the Moderns. I then divide this sum of 160 minutes into four equal parts, giving forty minutes to the increment of each order. Thus, having made the Tuscan column fourteen mean modules, twenty minutes; I make the Doric sixteen modules; the Ionic seventeen modules, ten minutes; the Corinthian eighteen modules, twenty minutes; and the Composite twenty modules. But because the fractional quantities involved in using mean modules are difficult to retain, I use my small modules, each of which has twenty minutes, and give the Tuscan column twenty-two modules, the Doric twenty-four, the Ionic twenty-six, the Corinthian twenty-eight, and the Composite thirty: an increment of two modules, or forty minutes, in all cases.

Chapter VI
The Height of Entire Pedestals

ALTHOUGH PEDESTALS, which the Ancients called stylobates, are not an essential part of the entire column like the base, capital, architrave, frieze, and cornice, the Moderns have nevertheless added them to its other constituent elements and have given them proportions.

We find nothing in Vitruvius regarding stylobates, other than the fact that there were two kinds: one that is continuous and one that is cut back, as it were,[28] to form as many parts as there are columns placed above it. This is what Vitruvius calls a stylobate made like little stools,[29] since when parts of a continuous stylobate make a projection in line with each column, they are like stools on which the columns are placed. But he says nothing about the proportions of either kind of stylobate.

In antiquity, we see continuous pedestals on the Temple of Vesta at Tivoli, on the Temple of Fortuna Virilis, and on the arch called the Arch of the Goldsmiths. Cut-back pedestals appear at the Theater of Marcellus; on the altars of the Pantheon;

at the Colosseum; and on the Arches of Titus, Septimius, and Constantine. The proportions of these pedestals, which exist only for the Ionic, Corinthian, and Composite Orders, are usually quite different in each order, but they nevertheless do have some relation to one another in that these pedestals, like the columns, have an almost identical progressive increment. This increment is about one module, since the average height of the Ionic pedestal is five modules, of the Corinthian six, and of the Composite seven and one half.

The Moderns have established the rule for the heights of the entire pedestals of all five orders, and most increase their height by a constant progression from one order to the next, as in antiquity. Vignola and Serlio have made pedestals the same height in different orders. The sum of increments from the Tuscan to the Composite varies among modern authors just as in antiquity it varies from the Ionic to the Composite. In all the examples listed in the following table, this sum goes from two modules to four.

In order to reduce all these variations to a mean between the extremes that they manifest and in accordance with the method proposed in chapter 3, I give four half-diameters or modules, which is six of my small ones, to the whole Tuscan pedestal. This height is the mean between extremes, that is, between the largest and smallest dimensions that authors have given to pedestals of this order. I also give six and one-half half-diameters, or ten of my modules, to the Composite pedestal, which again is the mean between the extremes in height that have been given to it. It follows, therefore, that the sum of increments is two and two-thirds half-diameters. If this is divided by four, each increment is two thirds of a module, or half-diameter, which makes one small module. As a result, the Tuscan pedestal is six small modules, the Doric seven, the Ionic eight, the Corinthian nine, and the Composite ten. The progression is by one small module, as shown in the table, where the highest Tuscan pedestal, which is five modules in Vignola, added to the smallest, which is three in Palladio, makes eight modules. Half of this is the four modules, or six small modules, that I take for my mean. In the Doric Order, the greatest height of six modules in Serlio added to the smallest of four modules, five minutes in Palladio, makes ten modules,[30] five minutes; and half of this is four modules, twenty minutes, or seven small modules. In the Ionic, the greatest height, which is seven modules, twelve minutes in the Temple of Fortuna Virilis, added to the smallest, which is three modules, eight minutes in the Theater of Marcellus, makes ten modules, twenty minutes. Half of this is five modules, ten minutes, or eight small modules. In the Corinthian, the greatest height, which is seven modules, twenty-eight minutes in the altars of the Pantheon, added to the smallest, which is four modules, two minutes in the Colosseum, makes twelve modules. Half of this is six modules, or nine small modules.

TABLE OF PEDESTAL HEIGHTS

				Mean Height	
		Modules	Minutes	Mean Module	Small Module
Tuscan	Palladio	3	0	4	6
	Scamozzi	3	12		
	Vignola	5	0		
	Serlio	4	15		
Doric	Palladio	4	5	4–20 minutes	7
	Scamozzi	4	8		
	Vignola	5	4		
	Serlio	6	0		
Ionic	Temple of Fortuna Virilis	7	12	5–10	8
	Theater of Marcellus	3	8		
	Colosseum	4	22		
	Palladio	5	4		
	Scamozzi	5	0		
	Vignola	6	0		
	Serlio	6	0		
Corinthian	Altars of the Pantheon	7	28	6	9
	Colosseum	4	2		
	Palladio	5	1		
	Scamozzi	6	11		
	Vignola	7	0		
	Serlio	6	15		
Composite	Arch of the Goldsmiths	7	8	6–20	10
	Palladio	6	7		
	Scamozzi	6	2		
	Vignola	7	0		
	Serlio	7	4		

In the Composite, the greatest height of seven modules, eight minutes in the Arch of the Goldsmiths added to the smallest of six modules, two minutes in Scamozzi makes thirteen modules, ten minutes. Half of this is six modules, twenty minutes, or ten small modules.

Chapter VII
The Proportions of the Parts of Pedestals

THE PEDESTAL is composed of the base, the dado or drum, and the cornice; the proportions of these parts vary a great deal in the works of the Ancients, as they do in those of the Moderns. The proportion generally observed in antiquity is to have the base larger than the cornice and, of the two parts that make up the base, to make the plinth always larger than the moldings, which together form the rest of the base. Serlio and Vignola, among the Moderns, did not observe these proportions, since they make the plinth smaller than the moldings. In so doing, it would appear that they wished to imitate the bases of columns, where the plinth is only one quarter or one third of the base.

Palladio and Scamozzi have generally followed the proportions of antiquity, but their practice of always making the base twice the height of the cornice is more consistent than the ancient one. In the Composite, Ionic, and Doric, Scamozzi makes the plinth twice the height of the moldings.

It is only necessary to change the proportions of these three parts slightly to give them all a consistent proportion, such as the one I assign to them. Simply make the base in all the orders one quarter of the whole pedestal, the cornice one eighth, and the plinth two thirds of the base. The following table shows how little is needed to make the proportions of ancient and modern works correspond to those I propose. It should also be noted that in the examples I put forward, the proportion of pedestals relative to the orders is not in question, only the proportions of parts of the pedestal to the pedestal as a whole. The size of pedestals relative to the orders is established in the preceding chapter.

Hence, I divide all the pedestals of each order into 120 small divisions [*particules*], which I do not call minutes, because, as we have said, by minute I understand the sixtieth part of a column diameter, which is a fixed dimension. The small division concerned here is the 120th part of every pedestal, no matter what the size of that pedestal may be. In this case, I give the entire base of the pedestal thirty of these divisions, which is one quarter of the whole pedestal, and twenty to the plinth, which is two thirds of the whole base, leaving the ten remaining divisions for the moldings of the base. I give fifteen of these divisions to the cornice and the remainder of seventy-five to the dado. All this conforms to the mean dimensions taken from the ancient examples listed in the following table, which gives the number of divisions for each part of the pedestal in every order. Thus, to obtain the height of the plinth,

TABLE OF HEIGHTS FOR THE PARTS OF PEDESTALS

		Plinth	Moldings of the Base	Dado	Cornice
		Divisions	Divisions	Divisions	Divisions
Doric	Palladio	25	6	68	18
	Scamozzi	27	14	60	21
Ionic	Temple of Fortuna Virilis	30	12	66	19
	Colosseum	28	8	73	11
	Palladio	22	11	70	17
	Scamozzi	25	12	65	18
Corinthian	Arch of Constantine	10	14	79	17
	Colosseum	24	11	73	12
	Palladio	19	12	73	15
	Scamozzi	18	11	77	14
Composite	Arch of Titus	26	14	67	13
	Arch of the Goldsmiths	19	9	84	11
	Palladio	21	10	74	15
	Scamozzi	21	10	74	15
	Arch of Septimius	15	14	76	14
	Mean dimensions	20	10	75	15

I add the greatest height of thirty in the Temple of Fortuna Virilis to the smallest of ten in the Arch of Constantine to obtain forty. Half of this is the twenty that I give to the plinth. By the same procedure, I arrive at the ten divisions that constitute the height of the moldings of the base, and to the greatest height of nineteen divisions in the Temple of Fortuna Virilis, I add its smallest, which is eleven in the Colosseum, to obtain thirty. Half of this is the fifteen I give to it.[31] Finally, by the same procedure, I arrive at the seventy-five subdivisions that constitute the height of the dado. To the greatest height of eighty-four in the Arch of the Goldsmiths, I add the smallest of sixty-six in the Temple of Fortuna Virilis to obtain 150. Half of this is seventy-five.

A constant width for the dado is also common to all the orders in that it always lines up with the projection of column bases. This projection is the same for all the orders, as was established in the third chapter and as will be further explained in what follows.

Chapter VIII
The Diminution and Enlargement of Columns

THE TWO most important requirements in architecture are durability and the appearance of durability, which, as we have already said, produce one of the principal constituents of beauty in buildings. All architects have made columns more slender at the top than at the bottom, and this is what we call diminution. Some have made them a little thicker near the middle than at the bottom, and this is what is called enlargement [*enflement*].[32]

Vitruvius would have the diminution of columns vary according to their height in feet and not according to their height in modules. Accordingly, a column of fifteen feet must be diminished by the sixth part of the diameter at its base and one of fifty feet by only one eighth. For other columns of medium height, he makes the diminution proportional. But we find that these rules have not been observed at all in antiquity. The diminution of the columns of the Temple of Peace and of the portico of the Pantheon, of the Roman Forum, called the Campo Vaccino, and of the Basilica of Antoninus does not differ at all from the diminution of the columns of the Temple of Bacchus, which are only one quarter the height of the others. There are even some very large ones, such as those of the Temple of Faustina, of the Portico of Septimius, of the Temple of Concord, and of the Baths of Diocletian, whose diminution is greater than that of others that are half their size, such as those of the Arches of Titus, Septimius, and Constantine. In fact, these small columns, which are less than fifteen feet high, have a smaller diminution than the sixth part that Vitruvius gives them, since they diminish by only about a seventh part and one half. Furthermore, even in the largest, although they exceed the fifty feet of Vitruvius, we find a greater diminution than that prescribed for them, for they also diminish by as much as a seventh part and one half, instead of by only one eighth, as they should according to Vitruvius's rule.

Nor are the differences between the orders what determine variations in diminution, since both small and large diminutions are present in various works of all the orders. The Tuscan column must be excepted, however, since Vitruvius gives it a diminution as large as a fourth part. Nevertheless, some Moderns have not followed Vitruvius in this, and Vignola gives it a diminution of only one fifth. In Trajan's Column, the only Tuscan work remaining from antiquity, the diminution, being only a ninth part, is much smaller still. Therefore, in order to maintain a mean between these extremes, I give the Tuscan column a diminution of a sixth part, rather than only a seventh part and one half, which the columns of the other four orders have. It would appear reasonable, were diminution to be altered according to the orders, to make diminution less rather than more in orders where columns are shortest in proportion to their thickness, because it is in these that diminution is most apparent. Nevertheless, since the diminution that Vitruvius gives the Tuscan column has been followed by most architects, I believe that deference to custom,[33] which is one of the chief laws of architecture, demands that this diminution be somewhat increased in the Tuscan Order.

I have put in the following table the different dimensions of the various orders, together with their diminutions, in order to show by these examples that the Ancients varied diminution neither according to the different orders nor according to different column heights. Diminutions vary within the same order and for the same column height and, moreover, are the same in different orders and for different column heights. One may see in the table, for example, that the Doric column of the Theater of Marcellus and the Doric column of the Colosseum, which are about the same height, have very different diminutions, one being twelve minutes, the other four, and that the Ionic column of the Temple of Fortuna Virilis and that of the Colosseum, which are also the same height, have divergent diminutions of seven and ten minutes respectively. On the other hand, in the column of the Temple of Fortuna Virilis and in that of the Portico of Septimius the diminution is the same, although the former, which is Ionic, measures only twenty-two feet and the latter, which is Corinthian, measures as much as thirty-seven feet.

Now of all the diminutions that have been given to all columns, examples of which are listed in the table, I have taken the mean, adding the size of the smallest diminution to the size of the largest and taking half of their sum, which comes to about eight minutes. If we add the size of the smallest diminution, which is that of the Doric column of the Colosseum at only four and one-half minutes, to the size of the largest, which is that of the Doric of the Theater of Marcellus at as much as twelve, half of these sizes, which together make sixteen and one half, is eight and one quarter. Similarly, if we add the size of the smallest diminution of the columns that remain, which is six and one eighth in the column of the Basilica of Antoninus, to the largest of ten and one half in the column of the Temple of Concord, half of these two sizes, which together make sixteen and five eighths, is eight and five sixteenths. Now this dimension of eight minutes, which makes almost exactly a seventh part and one half of the diameter, is one fifth of my small module, or four minutes, taken from either side of the column. I have not listed the diminutions of the Moderns because they are the same as those of antiquity, which vary from author to author and from order to order.

TABLE OF THE DIMINUTION OF COLUMNS

		Height of Shaft		Diameter		Diminution
		feet	inches	feet	inches	minutes
Doric	Theater of Marcellus	21	0-0	3	0-0	12-0
	Colosseum	22	10-½	2	8-¼	4-½
Ionic	Temple of Concord	36	0-0	4	2-½	10-½
	Temple of Fortuna Virilis	22	10-0	2	11-0	7-½
	Colosseum	23	0-0	2	8-¾	10-0
Corinthian	Temple of Peace	49	3-0	5	8-0	6-½
	Portico of the Pantheon	36	7-0	4	6-0	6-⅛
	Altars of the Pantheon	10	10-0	1	4-½	8-0
	Temple of Vesta	27	5-0	2	11-0	6-½
	Temple of the Sibyl	19	0-0	2	4-0	8-0
	Temple of Faustina	36	0-0	4	6-0	8-0
	Columns of the Campo Vaccino	37	6-0	4	6-½	6-½
	Basilica of Antoninus	37	0-0	4	5-½	6-⅛
	Arch of Constantine	21	8-0	2	8-⅔	7-0
	Interior of the Pantheon	27	6-0	3	5-0	8-0
	Portico of Septimius	37	0-0	3	4-0	7-⅓
Composite	Baths of Diocletian	35	0-0	4	4-0	11-⅓
	Temple of Bacchus	10	8-0	1	4-¼	6-½
	Arch of Titus	16	0-0	1	11-⅔	7-0
	Arch of Septimius	21	8-0	2	8-½	7-0

The diminution of columns is carried out in three ways. The first and most usual way is to begin diminution at the bottom of the column and to carry it up from there to the top. The second, which is also practiced in antiquity, is to begin diminution about one third of the way up the column from the column base. The third way, for which there is no precedent in antiquity, is to make the column thicker near the middle and to diminish it toward the two ends, that is to say, toward the base and the capital. This practice, which gives the column something like a belly, is called enlargement.

Some Moderns have given this enlargement to columns on the basis of a passage in Vitruvius where the author promises to provide rules for carrying this out but never fulfills his promise. Vignola has invented an ingenious method for regulating this enlargement: he traces the line of its profile in such a way that the two lines that define the profile of the column bend toward the two ends by the same proportion, bending twice as far inward at the top than at the bottom, the upper part being twice as long as the lower part. Monsieur Blondel, in his treatise on the four main problems of architecture, has shown how this line may be drawn in a single stroke with the instrument that Nicomedes discovered for line tracing,[34] which is called the first conchoid of the Ancients. This procedure can only be used for a line of diminution that does not bend back in toward the bottom but falls perpendicularly. To avoid making the column smaller at the bottom, begin to taper it only above the bottom third, which should have straight, parallel sides; for one should not diminish the column at the bottom, since neither the Ancients nor even most Moderns ever did so.

Chapter IX
The Projection of the Base of Columns

THE PROJECTION of column bases is another one of those dimensions that I believe were originally identical in all of the ancient orders, for it so happens that in antiquity, as in the works of modern authors, the projections are either equal or, indiscriminately, sometimes larger and sometimes smaller in the same order. For example, the base projection of the Doric at the Colosseum is the same as that of the Ionic at the Temple of Concord and as that of the Corinthian also at the Colosseum. Serlio's Tuscan has a larger base projection than his Composite; while, on the other hand, Scamozzi's Composite has a larger one than his Tuscan.

The rules Vitruvius gives for this dimension are quite confused. When he speaks about the projection of bases in general, he gives them as much as one-quarter diameter on each side, which greatly exceeds the largest projection found anywhere in antiquity. Yet when he speaks of the Ionic base, which he does not make any different from the Corinthian, he makes it only slightly larger than the smallest ancient ones.

Now the width I give to the bases of all the orders is eighty-four minutes, which makes forty-two on either side of the center line, because of the twelve minutes that I add to the thirty of the half-diameter. Twelve minutes makes three of the five parts of four minutes each, into which, as discussed in chapter 3, I divide my small module of twenty minutes. These twelve minutes hardly diverge at all from the mean

TABLE OF PROJECTIONS FOR THE BASES OF COLUMNS

	Tuscan	Doric	Ionic	Corinthian	Composite
Portico of the Pantheon				41	
Columns of the Campo Vaccino				42	
Pilasters of the Pantheon Portico				43	
Baths of Diocletian				42	43
Trajan's Column	40				
Palladio	40	40	41	42	42
Scamozzi	40	42	41	40	41
Vignola	41	41	42	42	42
Serlio	42	44	41	40	41
Temple of Fortuna Virilis			43		
Colosseum		40	40	40	
Temple of Bacchus					41
Arch of Titus					44
Arch of Septimius					41

dimension found in antiquity and in the Moderns, as may be verified in the following table. From it we may determine this mean dimension in the same way that we determined the diminution of columns in the preceding chapter. If we add the size of the smallest projection[35] of forty minutes in the Corinthian of the Colosseum to the size of the largest of forty-four in the Arch of Titus, we will obtain eighty-four minutes. Half of this is the forty-two minutes in question. And again, if we add the size of the smallest projection taken from the examples remaining in the table, which is forty-one in the portico of the Pantheon, to the largest, which is forty-three in the Temple of Fortuna Virilis, we will once more obtain the same result of eighty-four minutes.

Chapter X
The Projection of the Base and Cornice of Pedestals

As PEDESTALS were not used as commonly by the Ancients as they have been since, the Moderns have made no great effort to follow the proportions of those pedestals that have come down to us from antiquity.

More than anything else, they have rejected the large projections that antiquity gives to pedestal bases, which usually exceed those of modern authors by a third or more. What we may gather from the general rules adopted by the Ancients is that they made this projection proportional to the height of the pedestal. This is a practice that the Moderns have not observed, since they make it almost always equal in all the orders, even though the height of pedestals varies greatly from order to order, and I believe that they are wrong in this. For if the projection of column bases is constant in all the orders, notwithstanding variations in column height, it is because the bases always have the same height in all the orders, except the Tuscan, where it is a little shorter than the others, because the base of the column includes the lip of the base of the column shaft. Now the same reasoning requires the projections of pedestal bases to vary in size, since the height of these bases varies in proportion to the height of the whole pedestal, which is different for every order.

In order to diverge as little as possible from the rules of our masters, we will adhere to a middle ground, whereby we imitate the Ancients in maintaining the proportional relationship that they establish between the projection of the pedestal base and its height and follow the Moderns in cutting back the excessively large projection that the Ancients generally gave to these bases. It is clear that the Moderns reduced this large projection because of the rule of the appearance of durability, which has already been discussed. For just as footings that widen out too abruptly are not solid, so will bases not appear solid and capable of supporting the drum of the pedestal if their projection is too large. Such footings are weak because as they are made of stones placed directly above one another, those at the bottom outside edge are out of plumb with the wall above and support only the outer parts of the footing itself. Consequently, we should make the offsets from one masonry course to the next very small if we want the footing to be solid.

Therefore, in all the orders, I give the bases of pedestals a projection equal to their height without the plinth; and thus, as the height of the base is different for the pedestals of each order, so is the projection of the base different for each order.

As for the projection of the cornice of pedestals, the Ancients and most of the Moderns concur, usually making it either equal to or a little larger than that of the base. This is reasonable, for if a cornice is meant to cover something, it should extend beyond what it covers. Nevertheless, Delorme says that the base should always have more of a projection than the cornice, even though his figures show the opposite.

The following table shows the proportions of these projections in ancient and modern works, which I compare to the proportions that I give them. The number of minutes is the projection of the base and cornice beyond the outer surface [*nû*] of the dado. The overall heights of the pedestal are measured in mean modules.

TABLE OF THE PROJECTION OF PEDESTAL BASES AND CORNICES

		Projection of the Base	Projection of the Cornice	Overall Height of the Pedestal	
		minutes	minutes	mean modules	minutes
Doric	Palladio	16	16	4	20
	Vignola	11	11	5	10
	Our dimension	12	14	4	20
Ionic	Temple of Fortuna Virilis	26¼	13	7	4
	Palladio	14	14	5	5
	Vignola	14	16	6	
	Our dimension	14	17	5	⅓
Corinthian	Temple of Vesta at Tivoli	24½	24	6	7
	Palladio	16	16	5	
	Vignola	13	13	6	6
	Our dimension	15	19	6	
Composite	Arch of Titus	28	27	8	15
	Arch of Septimius	24⅔	25⅓	6	
	Palladio	14	14	6	⅓
	Vignola	13	13	7	
	Our dimension	16	22	6	⅔

The mean dimensions for the projections of pedestal bases and cornices are not precisely at the midpoint between the extremes that are shown in the table. It is enough, however, that they be average, in that the examples give instances of both larger and smaller ones. For example, the mean dimension of twelve minutes I give to the projection of the base of the Doric pedestal is larger than Vignola's, which is only eleven, and smaller than Palladio's, which is sixteen; and similarly for the others.

Chapter XI
The Projection of the Cornice of Entablatures

VITRUVIUS gives a general rule for all the projections of architectural elements: he would have their depth always equal to the height of the projecting element. Clearly, however, this practice should be limited to the projection, relative to its height, of the entire cornice of the entablature, since there are some individual elements in cornices, such as dentils, whose projection is much smaller than their height, and others, such as the corona, where it is always greater. Yet even when it applies to entire cornices, the Ancients have disregarded this rule as often as the Moderns have. In antiquity, the projection of cornices is normally a little less than their height, which is the opposite of what appears in the books of the Moderns, where most cornices have a projection greater than their height.

Most architects believe that the ultimate refinement of architecture consists in knowing how to alter proportions with discretion by being attentive, as they say, to the varying conditions that arise from the diversity of aspects [*Aspects*] and the sizes of buildings.[36] For they claim that some buildings require larger cornice projections than others because of the proximity to or distance from cornices, which changes their aspect, and because of the height above ground or lack of it, which makes projections appear larger or smaller than they are. They say, therefore, that it is necessary to compensate for this drawback by increasing or diminishing the size of projections and would have us believe that this is the reason for the diversity to be found in the projections of ancient works. But it is obvious that this was not the intention of the Ancients, since on buildings where projections should be larger because of an aspect whose magnitude, according to the reasoning of the Moderns, demands a large projection, it so happens that on the contrary the Ancients made it smaller. Such is the case at the Pantheon, where the projection is smaller on the cornice of the portico than on the cornice of the temple interior, where the aspect is incomparably more limited. It would also appear that projections were not changed in keeping with the module that governs the size of the building, because even in the largest buildings the projection is equal to, or even less than, the height of the cornice. In the Temple of Peace, in the Columns of the Campo Vaccino, and in those of the Baths of Diocletian, which are the ancient buildings with the largest module, the cornice projection is smaller than in the smallest orders, such as that of the Temple of Vesta at Tivoli. Furthermore, the following is proof that all this diversity is based on nothing but chance: there are also small buildings where the projection is smaller than on

TABLE OF THE DIFFERENT PROJECTIONS OF ENTABLATURES

Cornices Have Greater Projection than Height	minutes	Size of the Order feet	Cornices Have Greater Height than Projection	minutes	Size of the Order feet
Temple of Vesta at Tivoli	4—0	25—4	Arch of the Goldsmiths	6—0	17—0
			Altars of the Pantheon	7—0	16—0
Ionic of the Colosseum	1—0	25—0	Arch of Titus	0—0	25—0
Doric of the Colosseum	0—¼	31—⅓	Ionic of the Theater of Marcellus	9—0	28—0
Arch of Constantine	0—0	40—⅓			
Portico of Septimius	2—0	40—0	Temple of Bacchus	5—0	28—7
Interior of the Pantheon	0—⅓	47—0	Corinthian of the Colosseum	3—0	30—2
Temple of Concord	16—0	53—7			
Temple of Faustina	0—½		Temple of Fortuna Virilis	12—0	32—0
Ionic of Scamozzi	3—0		Arch of Septimius	13—½	33—0
Corinthian of Palladio	0—½		Portico of the Pantheon	2—0	54—0
Corinthian of Vignola	4—0		The Three Columns	1—½	58—0
Composite of Palladio	1—0		Temple of Peace	7—0	58—0
Composite of Scamozzi	1—¼		Ionic of Palladio	7—0	
			Ionic of Vignola	1—½	

large buildings, as occurs on the altars of the Pantheon, whose cornice projection is smaller than that of the portico, where the order is four times as large. Modification of proportions will be discussed more extensively later on in a separate chapter.

The table confirms the examples that have been cited above.

The diverse proportions of all these cornices give grounds for reducing them to a mean, which is to make the projection equal to the height in all the orders except the Doric when it has mutules, because their length obliges us to give the entire cornice more projection than height. If we make this cornice without mutules, as at the Colosseum, the projection may equal the height, as it does on this celebrated building.

Chapter XII
The Proportions of Capitals

ALTHOUGH THE BASES of the different orders vary greatly, some being simpler and others having a greater number of moldings, they nevertheless all have the same height of half the diameter of the base of the column shaft. Only the Tuscan is excepted, where the fillet at the bottom of the column is included in this half-diameter. The same is not true of capitals, for in the five orders they have three different heights. Tuscan and Doric capitals have the same height as their base; the Corinthian and the Composite both measure one and one-sixth diameters, or three and one-half small modules, in height; and lastly, the Ionic has a proportion particular to itself, which is one and one-eighteenth half-diameters from the top of the abacus to the base of the volutes, and from the abacus to the astragal at the top of the column, eleven of these eighteenths, which makes for somewhat involved proportions.

Nevertheless, the simple proportions of the other capitals are to be found neither in all ancient works nor in all modern authors. The capital in the Tuscan of Trajan's Column is smaller by a whole third than the half-diameter of the base of the column shaft; the Doric capital in the Theater of Marcellus is higher by nearly three minutes, and that in the Colosseum by almost eight. In Vitruvius, the Corinthian capital is shorter than one and one-sixth column diameters; and at the Temple of the Sibyl it falls short by thirteen minutes. It is higher by six minutes on the Facade of Nero and by more than seven on the Temple of Vesta in Rome. The Composite of the Temple of Bacchus has it higher by six minutes; that of the Arch of Septimius and that of the Arch of the Goldsmiths have it shorter by a minute and one half.

Consequently, all these conflicting variations give grounds for a probable mean proportion that reduces the height of Tuscan and Doric capitals to half the diameter of the base of the column shaft and that of the Corinthian and Composite capitals to an entire diameter plus one sixth, which makes seventy minutes, or three and one-half small modules.

Chapter XIII

The Proportions of the Astragal and the Lip of the Column Shaft

IN ALL THE ORDERS, columns have elements that terminate their stalk or shaft, and these are usually the same: namely, at the top an astragal with its fillet and at the bottom a fairly large listel, or lip. These parts have no fixed proportion in antiquity, where sometimes we find them large and sometimes small with no apparent reason for such diversity. The usage of the Moderns also varies in this regard, but I believe that we can give the same proportions to these elements in all the orders, for the same reason that determined that the height of entablatures be the same for the different orders. That is, because as the column becomes longer in the delicate orders, these parts, although of the same thickness, become, or at least appear to become, more delicate in proportion to the height of the column.

As for the lip, I give it the twentieth part of the base of the column shaft. At the Pantheon it closely approximates this dimension, one that Vignola, Serlio, and Alberti have adopted. In other ancient buildings, the lip is sometimes higher, as at the Temples of Antoninus and Faustina, at the Temple of Bacchus, at the Arch of Septimius, and at the Baths of Diocletian. Sometimes it is shorter, as at the Temple of Vesta in Rome, at the Temple of Fortuna Virilis, and at the Arch of Titus. I believe, however, that we should prefer higher lips to shorter ones, like that of the Temple of Vesta, which is only one-sixtieth part of a column diameter. For this element, acting as the foundation for the column and supported by the base, calls for strength. Now, were there any reason to vary the height of the lip, it would seem to lie in the diversity of tori on which it is placed, since there appear to be grounds for making the lip wider when tori are largest, as they are on Attic and Ionic bases. But this is not the practice found in ancient works, where the lip is made indifferently, sometimes large and sometimes small, on both Attic and Corinthian columns, although the upper torus of the Corinthian base is less thick than that of the Attic.

It sometimes happens that instead of a lip, there is an astragal with a fillet, as at the Temple of Peace, at the three columns of the Campo Vaccino, at the Basilica of Antoninus, and at the Arch of Constantine: a usage some Moderns, such as Palladio, Scamozzi, Delorme, and Viola,[37] have imitated. Still, I believe that there is greater justification for the use of the lip because of the confusion produced by such a profusion of moldings and because an astragal appears too weak a foundation for the column, a round astragal seeming more likely to let the column tip over than a square lip, which appears to hold it up.

As for the height of the astragal at the top of the column, I make it an eighteenth part of the diameter of the base of the column shaft, which is a sixth of the small module, as it appears on the Facade of Nero, at the Basilica of Antoninus, and at the Temple of the Sibyl at Tivoli. This dimension keeps the middle road between such extremes observed in antiquity as on the Arch of Septimius, the Forum of Nerva, the Temple of Fortuna Virilis, and the Temple of Bacchus, where the astragal is a third or even as much as half again as large, or at the Temple of Vesta in Rome, where it is barely half that size. The excesses into which the Moderns have plunged are just as extreme; there are some, like Serlio, who make it scarcely half of what it is in Palladio and Barbaro.[38]

But what most convinces me regarding this proportion for the astragal at the top of columns is that it is established in the Ionic Order, where it must equal the width of the eye of the volute, as will be explained in due course. And since the proportion is established in the Ionic Order, I see no reason to change it in all the others. The reasoning is the same as for the procedure used to establish the size of the lip at the base of the Tuscan column (dividing the upper half of the base into five parts where one part is a twentieth of the diameter of the base of the column shaft), which gives us the rule governing the size of the lip in all the other orders and allows us to always make it in the same way.

I make the fillet half the size of the astragal, following the practice established at the Temple of Bacchus, the Temple of the Sibyl at Tivoli, the Temple of Concord, the Basilica of Antoninus, and the Arch of Septimius, and also in keeping with what Scamozzi, Palladio, Cataneo,[39] and other Moderns have done. There are examples of opposing extremes that conflict with my dimensions both in modern authors and in the works of antiquity, and it is these that justify my choice of the mean, which I consider the most certain rule for reconciling the diverse precepts and conflicting examples found in architecture. I intend to follow this rule throughout this work.

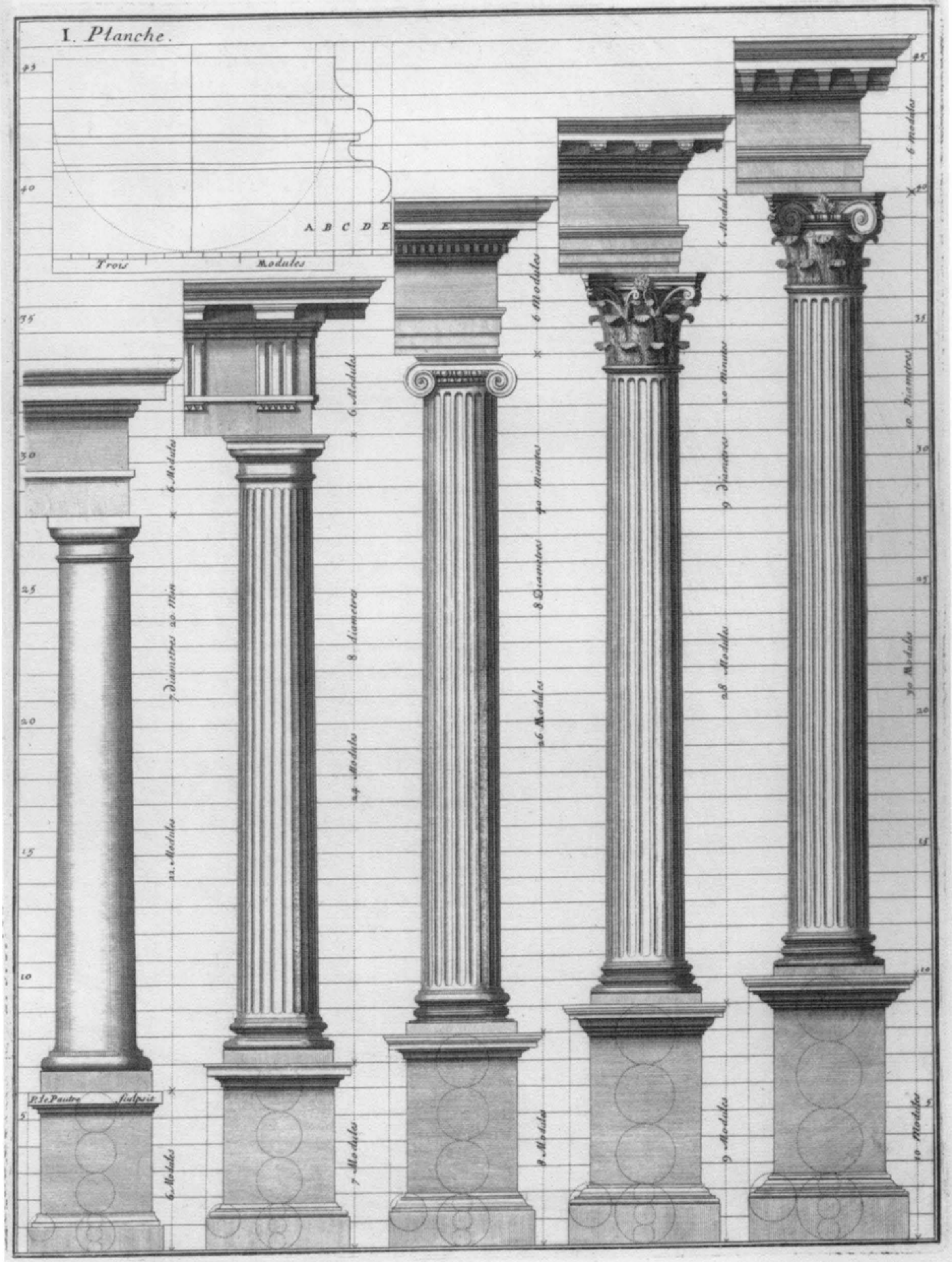
This first part shows the proportions that the principal elements of architecture should have in general by comparing how they relate to one another in the different orders. In the second part, we will establish the detailed proportions of each of these elements by the same method and consider all the particularities of the different characters as they appear in the various works of antiquity and in the modern authors who have written about the architectural orders.

EXPLANATION OF THE FIRST PLATE

This plate contains everything that has been discussed in the first part, which deals with proportions common to all the orders: those relating to heights as well as those relating to widths and projections. Heights are determined by entire modules, and projections by dividing the module into five, taking the module, as we have said, to be a third of the diameter of the base of the column shaft, which I call the small module.

We see in this plate that all the entablatures are six modules in height, which make two diameters of the column at its base. We see that the length of columns increases from one order to the next by a progression equal to two modules, the Tuscan having twenty-two modules, the Doric twenty-four, the Ionic twenty-six, the Corinthian twenty-eight, and the Composite thirty. The height of all pedestals also increases progressively but only by one module: the Tuscan having six, the Doric seven, the Ionic eight, the Corinthian nine, and the Composite ten. Each pedestal is divided into four parts, with one part for its entire base and half of one for its cornice. The entire base is divided into three parts, and we give one to the moldings and the two others to the plinth. Lastly, the projection of the base is equal to the height of its moldings.

This plate also shows that the other projections are determined by fifth parts of the module. The projection that the bottom of the column shaft has beyond its width at the top, which we call diminution, is determined by one of these fifths and is the interval between A *and* B. *The projection of the lip or fillet at the bottom of the column shaft is another fifth, which is the interval between* B *and* C. *The projection of the upper torus and the fillet at the bottom of the scotia is another fifth, which is the interval between* C *and* D, *and the projection of the whole base is the part from* D *to* E. *We take each of these parts to contain four minutes, where the diameter of the column base is sixty, the mean module thirty, and the small module twenty.*


I. Planche.
A B C D E
Trois Modules
P. le Pautre sculpsit
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7 diametres 20 Min
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9 diametres 20 Minutes
28 Modules
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10 Modules

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ORDONNANCE
FOR THE FIVE KINDS
of COLUMNS
AFTER THE METHOD
of THE ANCIENTS

PART TWO
Things Proper to Each Order

Chapter I
The Tuscan Order

THE ORDERS OF ARCHITECTURE invented by the Greeks were only three in number: that is to say, the Doric, the Ionic, and the Corinthian. To these, the Romans added the Tuscan and the Composite, which some have called the Italic. Properly speaking, however, the characters of these two orders do not differ essentially from the characters of the Greek orders, for the characters of the Tuscan are almost the same as those of the Doric and those of the Composite resemble those of the Corinthian very closely. This is not so in the three Greek orders, where the things that distinguish them from one another are very considerable and very obvious, as the first chapter of part one explains in greater detail.

The Tuscan is, in fact, nothing but the Doric strengthened by the shortening of the shaft or stalk of the column and simplified by diminishing the number of moldings that usually ornament the orders and making them more massive, for the base and cornice of its pedestal have few moldings and most of these are very massive. This base and cornice have fewer moldings than do those in the other orders, although their height by proportion is as great. In addition, the base of the column has only a single torus and no scotia; the abacus of the capital has no ogee at the top;

the entablature has no triglyphs or mutules; and the cornice has only a few moldings.

The general proportions of the main parts of this order have been presented and explained in the first part of this work. There we said that the whole order, including the pedestal, the column, and the entablature, has thirty-four small modules, of which the pedestal has six, the column twenty-two, and the entablature six. We also said that the proportions of the three parts of the pedestal are the same in all the orders with the base always a fourth part of the whole pedestal, the cornice an eighth part, and the plinth of the base two thirds of the base itself. It now remains to establish in detail the proportions of each part, together with what defines its particular character.

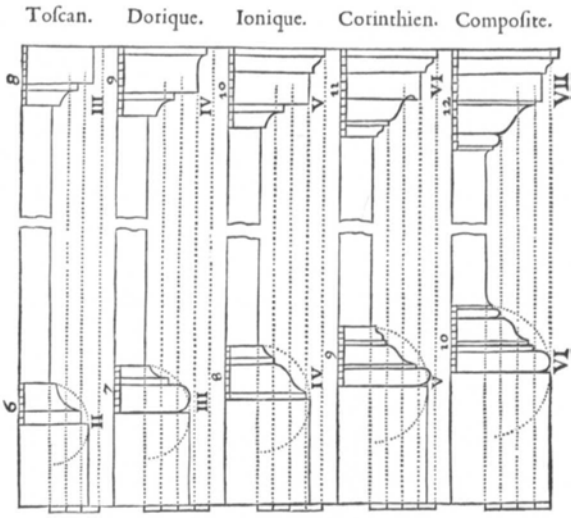
BASE OF THE PEDESTAL

The pedestal, in the Tuscan Order as in all the others, is divided into three parts: the base, the dado, and the cornice. The base is made up of two parts: the plinth and the moldings. Now just as the proportions of the main parts of entire columns, established above, relate to one another in such a way that heights increase as the orders become more delicate, so do the heights of the moldings of the base and the cornice of pedestals. For as the orders become more delicate, the moldings too become less massive due to their increased number, which grows steadily, the base of the Tuscan pedestal having two of them, the Doric three, the Ionic four, the Corinthian five, and the Composite six. Similarly, the cornice of the Tuscan pedestal has three moldings, the Doric four, the Ionic five, the Corinthian six, and the Composite seven.

In order to determine the heights and the projections of these moldings, we divide the height of the cornice and that of the base into a certain number of small divisions [*particules*], which also increase proportionally as the delicacy of the orders increases. The part that determines the size of the moldings has six divisions in the Tuscan base, seven in the Doric, eight in the Ionic, nine in the Corinthian, and ten in the Composite. The height of the cornice of the pedestal is divided into eight in the Tuscan, nine in the Doric, ten in the Ionic, eleven in the Corinthian, and twelve in the Composite. All this is explained by the figure that follows, where the arabic numeral stands for the number of divisions into which the base and the cornice are divided and the roman numeral for the number of moldings that make up each base and each cornice.

CORNICE OF THE PEDESTAL

Having thus divided the part of the base of the Tuscan pedestal that has moldings into six, we give four divisions to the cavetto and two to the fillet that is beneath it, as these are the two elements or moldings contained in this part. The cornice is di-



vided into eight divisions: we give five of these to a platband that acts as the corona and three to the cavetto together with its fillet. The fillet has one of these divisions.

The projections of the elements of the base and cornice of this pedestal, like the projections of all the different elements in every order, are based on fifth parts of the small module, as has already been determined. The diminution of the column, for example, is one of these fifths, the projection of the base of the column is three, etc. Regarding the pedestal, we have said that the projection of the whole base without the plinth is equal to its height and that the projection of the entire cornice is a little greater than that of the base. This holds true for all the orders except the Tuscan, where the projections of the base and the cornice of the pedestal are equal. As for the projection of the elements that make up the parts of the Tuscan pedestal, the cavetto of the cornice is one and one-half fifths of the small module, and the cavetto of the base is two fifths, taken from the surface [*nû*] of the dado.

Now the proportions and characters of this pedestal are midway between the extremes found in both ancient and modern works. In these works, the pedestal is sometimes excessively ornamented, as in Trajan's Column, whose base and cornice have all the moldings of the Corinthian pedestal, or sometimes not ornamented at all, such as in Palladio's Tuscan Order, where it has only a squarish kind of plinth without base or cornice. Scamozzi's Tuscan pedestal is midway between these extremes, as is ours.

BASE OF THE COLUMN

The base of the column, which is a half-diameter, or one and one-half small modules high, and which includes the fillet at the base of the column shaft, is divided into only two parts. One part is for the plinth, and four of the five parts into which the remaining part is subdivided are given to the torus, while the other fifth is given to the fillet or lip, which is part of the column shaft. As we have said, the fifth part of half the base, which is one twentieth of the diameter of the base of the column shaft, determines the size of the lip at the base of all columns in all the orders. This is because nowhere but in the Tuscan Order has the size of this part been fixed, and it also so happens that this proportion has been adopted in some ancient works. In those works that do depart from it, some make it much larger, others much smaller, which gives reason to believe that the mean is the best choice. All the other proportions of this base are also the mean between the varying proportions that the Ancients and the Moderns have established. The plinth, for example, which I make half the height of the whole base, as did Vitruvius, is smaller by one minute in Trajan's Column and larger by three in Scamozzi. Compared to the height of twelve minutes that I give it, the torus in Trajan's Column, in Palladio, and in Vignola measures twelve and one-half minutes and in Serlio only ten. The fillet or lip, which I make three minutes, is three and one-half minutes in Trajan's Column and five in Serlio but only two and one-half minutes in Palladio and Vignola. As we have already said, the projection of the base is three fifths of a module.

What is striking about the character of this base is that Vitruvius gives its plinth an entirely distinctive shape by removing its four corners and making it round. The Moderns did not approve of this practice, and I do not think it should be adopted. The corners of the base relate to those of the capital, and the base would seem mutilated without them, because the proportionality [*analogie*] of bases in the other orders demands that there be some reason for their removal. Were there any reason for doing so, it would be in buildings where columns are placed in a circle, such as in peripteral round temples, where the square corners of the plinths conflict with the curved step or pedestal that supports them. Nevertheless, we never see the Ancients make plinths round in order to alleviate this shortcoming. Rather, they preferred to remove them altogether, as we may see at the Temples of Vesta in Rome and the Sibyl at Tivoli. But even if there are some buildings where these corners should be removed, there is no reason to remove them in the Tuscan Order rather than in the others.

SHAFT OF THE COLUMN

There are two things to be regulated in the shaft of the Tuscan column. The first is the diminution, which was discussed in part 1, where we said that it should be greater than in the other orders. There I put forward my reasons for making it a sixth of the diameter of the base of the column shaft, which is half a small module and makes five minutes on either side, rather than, as in all the other orders, only a seventh part and one half, which is two fifths of the small module and makes one fifth on either side: that is, only four minutes. The second thing to be regulated concerns the lip at the bottom of the column and the astragal at the top. We have said that these elements should have the same proportions in all the orders and that we give the lip a twentieth part of a column diameter, the astragal an eighteenth, and the fillet below the astragal half of that. We have also said that the projection of the astragal, at one fifth of the small module, equals that of the lip, which is four minutes, taken from the surface of the column shaft.

CAPITAL

The capital is the same height as the base, and we divide it into three parts: one for the abacus, another for the echinus or ovolo, and the third for the neck together with the astragal and fillet below the echinus. The character of this capital calls for a simple abacus with no ogee, and under the echinus there are no annulets, as there are in the Doric, but rather an astragal and a fillet. The proportions of these moldings are found by subdividing the third part of the capital into eight, for we give two of these eighths to the astragal and one to the fillet underneath, with the remainder taken for the neck. The overall projection of the capital is equal to that of the lip at the base of the column shaft and is eight and one-half fifths, taken from the center of the column. The projection of the astragal under the echinus, like that of the astragal at the top of the column, is seven fifths.

Vitruvius and most of the Moderns, who make the diminution of the Tuscan column very large, give very little width to its capital, so that it extends outward only as far as the diameter of the base of the column.

Authors agree neither amongst themselves nor with the Ancients as to the character of this capital. We find in Palladio and Serlio, as in Vitruvius and in Trajan's Column, an abacus that is quite simple and without an ogee. Vignola and Scamozzi give it a fillet instead of an ogee. Philander removes the corners and makes it round,[40] perhaps to make it similar to the base whose plinth Vitruvius would have round in this way. Trajan's Column has no neck, so that the astragal of the column shaft merges with that of the capital, and only Vitruvius and Scamozzi put the astragal with its fillet below the echinus. Others, like Philander, Palladio, Serlio, and Vignola, put only a fillet there. Nor are they any more in agreement about proportions, for some, like Philander, include the astragal and the fillet at the top of the column in the third part of the capital, which Vitruvius gives to the neck and astragal under the echinus.

Others, like Serlio and Vignola, give the entire third part to the neck and include the fillet under the echinus in the second part, which in Vitruvius includes only the echinus. Others, like Palladio, give an entire third to the echinus and put only a fillet where Vitruvius puts both an astragal and a fillet. Among all these variations, I have chosen the manner of Vitruvius, which seems to me more agreeable and more in accord with the proportionality and rule common to all capitals: that is, that they be a little more ornamented and less simple than bases, for without the astragal that Vitruvius places under the echinus, the Tuscan capital would differ in no way from the base.

The entablature has six modules, as we have said, and we divide the whole of it into twenty parts, as we do in all the other orders, except the Doric, as already noted. We give six of these parts to the architrave, in which the fillet has one. The frieze also has six parts. Of the eight parts remaining for the cornice, two are given to a large ogee, which is its lowest element; one half to the fillet of this ogee; two and one half to the corona; one to an astragal with its fillet, which is half the height of the astragal; and two to a quarter round that acts as a large cymatium. The projections are determined by the same fifths of the small module that regulate all the other projections. In this way, we give three fifths to the large ogee with its fillet, taken from the surface of the frieze, seven and one half to the corona, nine to the astragal with its fillet, and twelve to the quarter round.

Authors differ greatly as to the proportions and character of the entablature of the Tuscan Order. Regarding the proportions of its three parts, Vitruvius makes the architrave not only larger than the frieze but larger even than the cornice. Palladio also makes the architrave very high and larger than the frieze. Vignola makes it smaller. I have imitated Serlio in making the architrave equal to the frieze.

As for the character of the entablature, Vitruvius and Palladio make the architrave a single square beam; whereas, Scamozzi makes it excessively ornamented, as he does the cornice, where he uses as many ornaments as in the Doric Order. He even puts a kind of triglyph without grooves in the frieze. Serlio's approach is completely the opposite, making his cornice so stark that it has only three elements to Scamozzi's ten. The cornice I propose, which corresponds closely to Vignola's, is midway between the extremes of Scamozzi's delicacy and number of moldings and Serlio's excessive simplicity.

EXPLANATION OF THE SECOND PLATE

A.—*Tuscan base according to the proportions of Vitruvius.*

B.—*Scamozzi's base, where the plinth and the torus are higher than in Vitruvius so that the fillet or lip is not included in the base as in other versions.*

C.—*Serlio's base, where the fillet or lip is much larger.*

K.[41]—*Diminution of the column shaft, which is a sixth part of the diameter at the base of the column.*

D.—*The capital, according to Vitruvius, where the abacus has neither an ogee nor a fillet, where the echinus comprises the entire second part of the capital, and where there is an astragal under the echinus.*

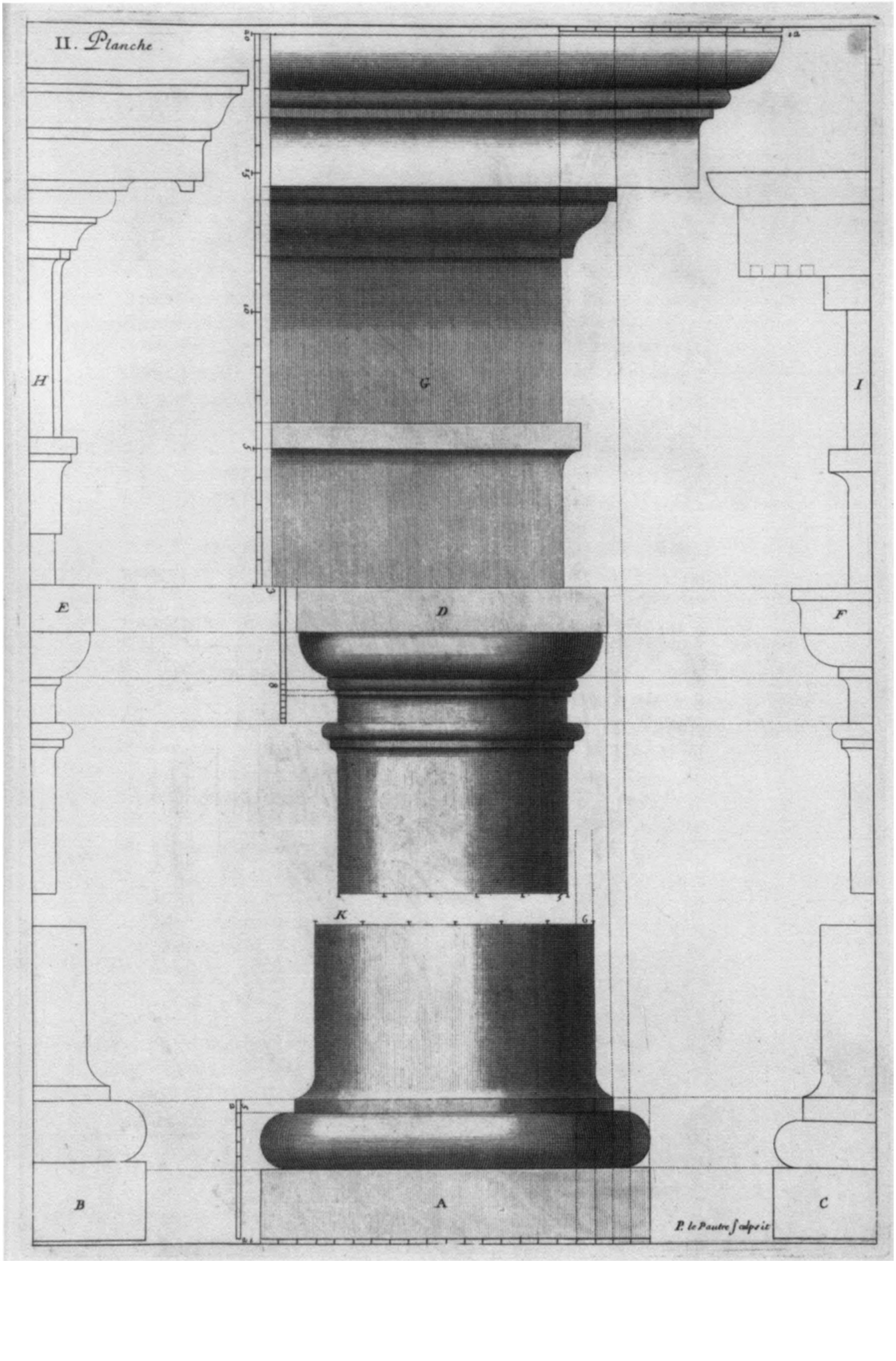
E.—*Scamozzi's capital, without an astragal.*

F.—*Serlio's capital, where the abacus has a fillet; where the echinus does not take up all of the second part of the capital but leaves room for a fillet under the echinus; and where the third part is given over entirely to the neck of the capital.*

G.—*The entablature, where the architrave is equal to the frieze and where the cornice is made up of six moldings.*

H.—*Scamozzi's entablature, where the architrave, which is smaller than the frieze, is made up of two fascia and a fillet under the taenia; where the frieze has a kind of triglyph without grooves; and where the cornice is made up of ten moldings.*

I.—*Serlio's entablature, where the frieze is equal to the architrave, and where the cornice is made up of only three moldings.*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Chapter II
The Doric Order

It WOULD BE MORE NATURAL, in dealing with the orders, to begin with the Doric, since it is the most ancient order and the one on which the Tuscan and the others were modeled. Nevertheless, the custom of dealing with the Tuscan before the Doric is reasonably founded, since the sequence and position of the different orders, when used together in buildings, is to place and build the most massive ones first, as those capable of carrying the others.

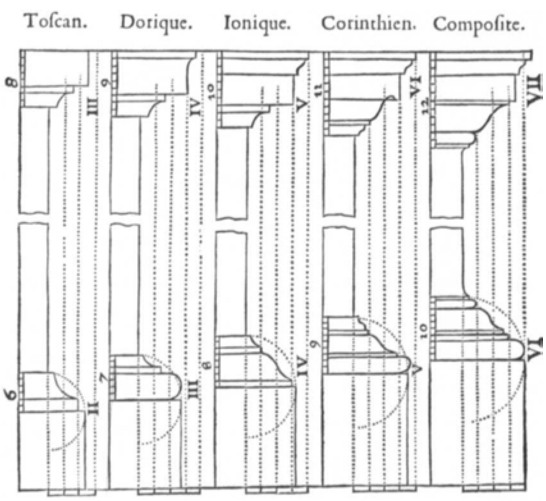
The general proportions of the Doric Order, which make it lighter and less massive than the Tuscan, were established in part 1, where we said that the whole order is thirty-seven small modules, with seven for the pedestal, twenty-four for the column, and six for the entablature. This is in keeping with the progressive increase in height of three modules from one order to the next, which includes an increase of one module in the pedestal and two in the column. For the whole Tuscan Order is only thirty-four modules, with the column twenty-two, the pedestal six, and the entablature, which is always the same in all the orders, also six. The proportions and particular characters of these three parts remain to be determined. The heights of the principal parts of the pedestal have also been established: that is, an eighth part of the whole pedestal for the cornice, a fourth for the base, and a third of the base for its moldings, leaving the other two thirds for the plinth.

BASE OF THE PEDESTAL

To obtain the proportions of the moldings of the base of the pedestal, we divide the third of the base allocated to them into seven parts, as we said in the previous chapter. We give four of these seven parts to the torus, which rests on the plinth, and three to the cavetto together with the fillet below it, these being the three elements that, as we said, make up the moldings. The projection of the torus is equal to that of the whole base, and the projection of the cavetto is two fifths of the small module beyond the surface of the dado. Authors differ as to the character of this base. Palladio gives it a fourth element, which is a fillet located between the torus and the fillet of the cavetto, and Scamozzi locates a cyma recta there. Vignola and Serlio give it greater simplicity, and I have followed them in this, because simplicity is appropriate in an order that is itself simple. Since I gave only two elements to the moldings of the base of the Tuscan pedestal, I give three to the Doric and maintain the same progression in the other orders, increasing the number of elements as the delicacy of the orders increases.

CORNICE OF THE PEDESTAL

The cornice of the pedestal is divided into nine divisions and has a cavetto with a fillet above it, which together support a corona, itself capped only by a fillet. The corona has five of these nine parts; and its fillet, one. The projection of the cavetto with its fillet is one and one-half fifths of a small module beyond the surface of the dado; that of the corona is three fifths and that of its fillet is three and one half. Authors disagree as to the character of this cornice. Palladio and Serlio give it five elements and Scamozzi six. It has more simplicity in Serlio, where it has only four elements, and I have imitated Serlio's practice in this because it is in keeping with the relationship that this order should maintain to the others according to the progressive increase in the number of moldings already described.



BASE OF THE COLUMN

Vitruvius gives no base to the Doric column and says that the primary difference between the Doric and Ionic Orders is that the Ionic column has a base. We find an example of this usage at the Theater of Marcellus, where the Doric column is without a base. At the Colosseum, however, the Doric does have a base, but here it differs from the one most Moderns use for this order, which is the one Vitruvius calls Attic and the one for which he gives proportions. As a result, we find three kinds of bases used for the Doric Order. The first, which Vitruvius calls Attic, has a plinth, a large torus at the bottom, a small one at the top, and a scotia between the two. The second is the base of the Doric Order in the Colosseum, which has neither a small torus nor a scotia but only a kind of abbreviated cyma recta, which projects slightly and is located between the lip at the base of the column shaft and the large torus. The third is simpler yet with nothing more than a large torus and an astragal on its plinth, so that in this base, as in the Tuscan, the lip at the base of the column shaft contributes to the height of the base, which in all the orders should measure half the diameter of the base of the column shaft, excluding the lip.

I have chosen the Attic base of Vitruvius because it is the one most commonly used, and I give its elements the same heights as Vitruvius, whose division is very methodical. We divide the overall height of the base into three, giving one division to the plinth and dividing the remaining two divisions into four. The topmost of these four parts is for the small torus, and the three others are divided in two, with the lower half for the large torus and the upper for the scotia. The scotia is, in turn, divided into six, with one of these sixths given to each of its two fillets. We may determine the heights of these parts in another way, since the sizes of the elements are the same by both methods. This involves dividing the whole base into three, four, and six, giving a third to the plinth, a fourth each to the large torus and the scotia, and a sixth to the small torus.

The proportions of the parts of this base differ both in ancient works and in modern authors. In the Colosseum, the plinth is higher than the ten minutes Vitruvius gives it by one and one-half minutes, in Serlio by one half of a minute, and in Cataneo by one minute. The torus also has varying heights: in the Colosseum it is higher than the seven and one-half minutes of Vitruvius by one half of a minute and in Scamozzi by one minute. In Scamozzi the upper torus is also higher by one minute and in Palladio by one half of a minute. Some, like Barbaro, Cataneo, Viola, and Delorme, make the fillet at the bottom of the scotia larger than the one at the top. Others make them equal, which it seems to me is more correct, since inequality is not as necessary here as it is in the scotias of the bases of the other orders, where one fillet touches the torus, the other an astragal. When they are unequal, they require that the fillets next to them also be unequal, although this is not the case in the Attic base where the two tori differ little in size.

Dividing the module into five parts gives the unit of measurement for determining the projections of the moldings of this base. As we have said, three of the five parts so obtained determine the overall projection of all column bases: the first of these establishes the projection of the fillet or lip at the base of the column shaft, the second determines the projection of the upper torus, and the third that of the lower torus and plinth. To obtain the projections of the scotia, we divide one of these three fifths (the middle one) into three. One of these establishes the projection of the upper fillet, two of them that of the lower one, and three the depth of the recess of the scotia.[42]

Authors generally concur about the character of this base except for the shape some give to the cavity of the scotia, which they hollow out so that it dips below the edge of the lower fillet. This practice appears in some ancient buildings, as in the portico and the interior of the Pantheon, in the three columns of the Campo Vaccino, in the Facade of Nero, and in the Temple of Bacchus. But in a far greater number of highly regarded buildings, the cavity is not hollowed out in this way: for example, in the Theater of Marcellus; in the Temple of Fortuna Virilis, in that of Vesta, of Concord, of Faustina, of Peace; in the Basilica of Antoninus; the Baths of Diocletian; the Colosseum; and in the Arches of Titus, of Septimius, of Constantine, and of the Goldsmiths. Some Moderns, like Vignola, Scamozzi, and Viola, have cut this cavity downward, but most of the others have not. And, in fact, it seems quite lacking in beauty, because it appears to weaken the edge of the lower fillet, making it pointed, so that the cavity gathers water and refuse, which spoil the stone. The plinth of this base has yet another characteristic that Palladio and Scamozzi gave it, with no precedent in antiquity as far as I know. Rather than make the plinth plumb and square, they sweep it outward in the manner of a congé until it lines up with the outer edge of the cornice of the pedestal, thus completely eliminating an essential constituent of the Attic and Corinthian bases. For although it may be true that in certain buildings, such as the Colosseum, the upper part of the cornices of pedestals are swept out in a congé, this congé does not replace the plinth of the column base, which remains unaltered, but rather appears in the cornice of the pedestal.

Vignola objects to the use of this base both in the Doric Order and in the Corinthian, in which he considers it totally inappropriate, although the Ancients used it in the Corinthian Order at least, as we may see in the Temple of Vesta, the Temple of Peace, and that of Faustina; on the Facade of Nero; at the Basilica of Antoninus; the Portico of Septimius; and the Arch of Constantine. The base this author gives to the Doric Order is of the third kind, which has only a torus with an astragal.

SHAFT OF THE COLUMN

The characteristic feature of the shaft of the Doric column is its flutings, which should be only twenty in number and much shallower than in the other orders, where they are hollowed out by a full half-circle, for here they need be only one-fourth or one-sixth part of a circle. Moreover, there are no spaces between these flutings, as the division between them is a sharp angle, or arris, defined by the two curved lines that form the cavity. To trace these flutings, we first divide the circumference of the column into twenty parts, then construct a square using one of these twenty parts as its base. With the center of the square as its center, we trace a curve that forms a quarter-circle from one corner of the square to the other. To make the fluting even shallower, we draw, instead of a square, an equilateral triangle, whose center becomes the center of the curve.[43] The first method, which is that of Vitruvius, is the one most commonly used. Scamozzi would condone neither of these flutings, finding both equally graceless, although they are very widely used and, according to Vitruvius, are particular to the Doric Order. Scamozzi also says that instead of having flutings as such, the twenty planes are sometimes simply left flat, without hollowing them out. There are very few examples of columns with flat planes like these; they cannot have any grace, since the obtuse angles formed when two planes meet, each with only one twentieth of the circumference of a circle, must necessarily have a disagreeable effect, due to the difficulty of making the separation between the two faces sufficiently clear. And this is why I believe one should prefer the fluting whose cavity Vitruvius determines by using the center of a square to that traced from the apex of a triangle. For since Vitruvius's flutings are deeper, the angles between them are sharper, and consequently the flutings are better and more precisely defined.

CAPITAL

The heights of the elements of the capital are determined by dividing it into three parts, as in the Tuscan Order, with the overall height one half of the diameter of the base of the column shaft. We give one of the three parts to the abacus and one to the echinus together with the three fillets or annulets that are below it and that replace the astragal of the Tuscan capital. We leave the whole of the last third to the neck, and in this the Doric differs from the Tuscan, where the echinus takes up an entire third, with the third meant for the neck including the astragal and fillet under the echinus. I have imitated Vitruvius, whom most Moderns have followed, although Palladio, Scamozzi, and Alberti give other proportions. Alberti makes the whole capital nearly half again as high as Vitruvius and also gives the main elements different proportions from his. Palladio and Scamozzi, who do not change the overall height of the capital, increase that of the abacus and reduce that of the neck. All of them have imitated antiquity, for in the Colosseum the whole capital is eight and three-quarters minutes higher than in Vitruvius. In the Theater of Marcellus it is only three minutes higher, but here the proportions of the elements relative to one another diverge more from those of Vitruvius than they do in the Colosseum, since the abacus is proportionally much larger and the echinus much smaller.

The heights of the small moldings are also found by division and subdivision into three; for when the entire abacus is divided into three, we give the upper part to the ogee, and when this in turn is divided into three, we give one part to the fillet and the two others to the ogee. Similarly, when the part between the abacus and the neck is divided into three, we give two parts to the echinus and divide the remaining third again into three parts, giving one to each of the annulets.

As in the Tuscan capital, the projections are determined by fifth parts of the module. The projection of the whole capital has three of them, to be taken from the surface of the top of the column. When the first of these parts has been divided into four, we give a fourth to each of the annulets. The second establishes how far the echinus projects, and after also dividing the third part into four, we give the first fourth to the projection of the platband of the abacus beyond the edge of the echinus and use the three others to regulate the parts of the ogee.

The projection, which I make only three parts, has opposite extremes in the Doric capitals of the Colosseum, where it is five parts, and in Alberti, where it is no more than two.

Authors vary as to the character of this capital. At the Colosseum, there is an ogee instead of annulets or rings, a practice that Scamozzi also adopted. Some, like Palladio, Scamozzi, Vignola, Alberti, and Viola, have put rosettes under the corners of the abacus and in the neck. One may call the overall projection of the capital (in Alberti and Cataneo, unusually small, and in the Colosseum, excessively large) a feature of the character of the order, since narrowing or enlarging this projection will invariably disturb us as soon as we are even a little accustomed to seeing capitals with their usual proportion, which in Vitruvius is thirty-seven and one-half minutes, taken from the center of the column. It is as large as forty-seven and one quarter in the Colosseum and only thirty-two and one half in Alberti and Cataneo. Bullant makes it forty minutes, Palladio thirty-nine, Vignola and Viola thirty-eight, and the Theater of Marcellus, Barbaro, and Serlio have followed Vitruvius, as we have.

In the Doric Order, the entablature is not divided into twenty parts as it is in the other orders but into twenty-four. We give six of these to the architrave, nine to the frieze, and nine to the cornice in which is included the element immediately above the triglyph that Vitruvius calls its capital. All modern architects have followed the proportions that Vitruvius has given for the architrave and the frieze, and these relate to the diameter at the base of the column shaft, with half of this diameter, or one Doric module, being assigned to the architrave and one and one-half Doric modules to the frieze. These proportions were not observed in antiquity, for in the Colosseum the architrave has fifteen minutes more than in Vitruvius, and in the ruins of Albana and the Baths of Diocletian, as recorded by Monsieur de Chambray,[44] the architraves are also larger than in Vitruvius but only by one and two minutes respectively. The cornice is not as high as ours either in Vitruvius or in the Theater of Marcellus, where it is seven and one-half minutes short of the dimension that we give it. In the Colosseum, however, where it is ten minutes more, it is much higher.

ARCHITRAVE

The architrave is divided into seven parts, and we give the uppermost seventh to the listel or taenia. Under the taenia, we put the guttae, as if suspended from a little ruler, or regula. The guttae and regula together take up a sixth of the height of the architrave. This sixth is in turn divided into thirds, with one part given to the regula and the two others to the guttae. The width of the regula and guttae is a module and one half and is divided into eighteen parts. We give three of these eighteenths to each of the guttae, which are six in number, in such a way that the top of one gutta is one of these eighteenths in width, and the bottom a little less than three, due to the small gap required between their bases.

Authors and the works of antiquity vary greatly as to the character of the Doric architrave. The one that we have described is from Vitruvius and from the Theater of Marcellus, which has been imitated by Vignola, Serlio, Barbaro, Cataneo, Bullant, Delorme, and most Moderns. It appears otherwise in the Colosseum, where it is ornamented with all the elements found in the Ionic and Corinthian Orders of this building, since it has three fascia and an ogee at the top but no guttae. At the ruins of Albana and of the Baths of Diocletian, it has only two fascia, but they are separated by moldings as they are in the Corinthian Order, and there are guttae under the uppermost ogee. Palladio, Scamozzi, Alberti, Viola, and several other Moderns have imitated this practice by putting two fascia in the architrave, but they do not separate them with moldings, and the guttae appear beneath a taenia, as in Vitruvius. There is also some variation in the shape of the guttae, which some make round like a truncated cone, but the most common practice is to make them square or pyramidal, with the round ones reserved for the underside of the mutules.

FRIEZE

The frieze comprises nine of the twenty-four parts that make up the whole entablature. This makes one and one half of the modules that I call Doric, or mean, or two and one quarter of our small modules. It is usually ornamented with triglyphs, which are one Doric module in width and are placed in line with the guttae, which are above the columns and in the spaces between them; the spacing of the triglyphs is equal to their height and that of the frieze. The spaces between the triglyphs, called metopes, are therefore square, and they are ornamented with bas-reliefs or trophies, urns, ox skulls, and other things. The triglyphs are cut from top to bottom in two channels or grooves at the center and two half-channels at the edges. The grooves are cut in such a way that they form a right angle. In order to make them, we divide the whole face of the triglyph into twelve parts, giving two to each groove, one to each half-groove, and two to the spaces between them, which Vitruvius calls thighs.[45] The projection of the triglyph beyond the surface of the frieze should be one and one half of these parts. Vignola, who only makes it one part, obviously makes it too small, because as the grooves are two parts wide, their depth must be one part in order to make a right angle. Now since, according to Vignola, the depth of the groove is equal to the projection of the triglyph, the half-groove at the side, whose depth is equal to that of the whole groove, would cut right down to the frieze. This ought not to happen, since the triglyph must retain some thickness beyond the half-groove. The remaining thickness is only one half of a minute in Palladio and one and two-ninths minutes in the Theater of Marcellus, which is a little more than I give it. My mean dimension, which is between those of Palladio and the Theater of Marcellus, comes to about three quarters of a minute.

The part we call the capital of the triglyph is generally considered part of the frieze in the Doric Order, but since it is a molding and moldings do not usually appear in friezes, I think it should be included with the other moldings of the cornice. Although these moldings project over the triglyphs that are part of the frieze, they cannot themselves be considered a part of the frieze any more than the moldings that cap the upper, projecting part of consoles in a frieze are part of it. Instead, these moldings belong to the cornice, since they generally constitute the whole of the part under the corona, which is an essential part of the cornice.

CORNICE

The space left for the cornice, consisting of nine parts, equals that of the frieze in size. The first part is for the capital of the triglyph; the three parts above it contain the ogee and the corona that crown the mutule; and the last three are for the large cymatium and ogee that cap the corona.[46] Further detailing of these moldings entails dividing each of the second and third parts into four to obtain eight small divisions. The five lowest divisions are given to the cavetto, the sixth to its fillet. The fourth part, along with the two divisions remaining from the third part, are for the body of the mutule. The fifth part is likewise divided into four divisions, and we give the lower two to the ogee, which is without a fillet and caps the mutule. The sixth part and the two divisions remaining from the fifth part are for the corona. The seventh part is also divided into four divisions, and we give the three lower ones to the ogee above the corona and to its fillet. Finally, we divide the ninth part into two, giving one part to the fillet of the large cymatium, which itself fills the remaining space down to the ogee above the corona. This division of the Doric cornice, which seems obscure and confused when described, is quite straightforward and easy to retain as drawn in the figure, for all the heights of the moldings are regulated by only two divisions: dividing the whole cornice into nine parts and dividing each part into four.

Under each mutule we cut thirty-six guttae, in six rows of six each. We have said that these guttae on the underside of the cornice should be round and shaped like little cones whose points at the apex are embedded into the underside of the corona. On its front edge only, the mutule is bounded by a hollowed-out fascia like the one we use for the corona of the Ionic cornice.

The character of this cornice can be of three kinds. One of these, such as those of Palladio, Serlio, Barbaro, Cataneo, Bullant, and Delorme, is very simple having neither mutules nor dentils. Another more complex version has dentils but no mutules: this is exemplified in the Theater of Marcellus and in Scamozzi and Vignola. The third kind, also more complex than the first, has mutules but no dentils. I choose this last version because the mutules [are in keeping with the designs proposed by Alberti, Vignola, and Pirro Ligorio,[47] which conform to ancient works whose fragments they have discovered][48] and also because, according to Vitruvius, mutules are an essential part of the Doric Order, whereas dentils are particular to the Ionic. I form the large cymatium as a cyma recta, not as a cavetto, as it is held to have been in the Theater of Marcellus and as Vignola and Viola have made it; a cavetto is not as strong and is more readily broken than the other molding. For it is unreasonable that an order, by nature massive, have weaker elements than the more delicate orders, and in this I have imitated Palladio, Scamozzi, Serlio, Barbaro, Cataneo, Alberti, Bullant, and Delorme. If we want to use a cavetto here, because, in the opinion of some this is the molding that Vitruvius calls the Doric cymatium, we may do so, keeping the same proportions as those given for the large cymatium. Thus we give the fillet at the top of the cavetto no more than one half of one of the nine parts and consign what remains, down to the top of the ogee of the corona, to the curvature of the cavetto. On the capital of the triglyph, where Vitruvius would have us put a Doric cymatium, I put a cavetto or half a scotia, as Palladio, Viola, and Bullant have done, and I do so for the reason just given, namely, that the cavetto is the Doric cymatium. Two other kinds of moldings have been used for this capital: in the Theater of Marcellus it is an ogee, and in Vignola it is a quarter round. What convinces me to use a cavetto here is the authority of Barbaro, who says that the Doric cymatium is a cavetto.

EXPLANATION OF THE THIRD PLATE

A.—*The base Vitruvius calls Attic used for the Doric Order.*

B.—*Base of the Doric Order in the Colosseum.*

C.—*Base of the Doric Order in Vignola.*

D.—*Hollow fluting according to Vitruvius.*

Δ.—*Flat fluting according to Vitruvius.*

E.—*Fluting according to Vignola.*

F.—*Capital according to Vitruvius.*

G.—*Capital of the Doric Order in the Colosseum.*

H.—*Capital according to Alberti.*

I.—*Entablature taken in part from the Theater of Marcellus.*[49]

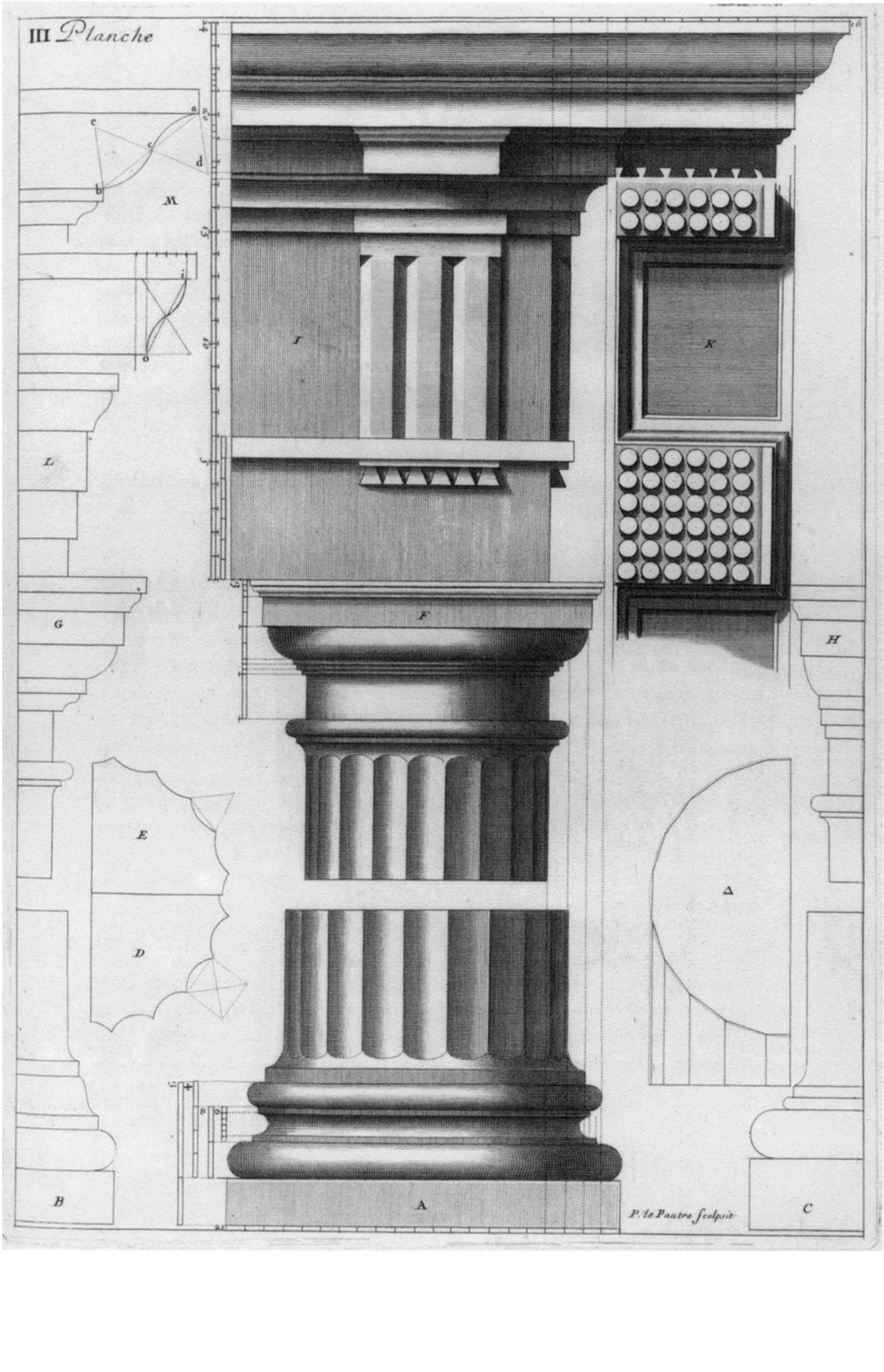
K.—*Soffit of the entablature.*

L.—*Architrave of the Doric Order in the Colosseum.*

M.—*Figure explaining how to trace the cyma recta and the ogee.*

To trace the cyma recta, we draw a straight line from the lower corner of the fillet above it, marked a, *to the upper corner of the fillet above the ogee, marked* b; *bisect this line at the point* c; *and on each half of the line construct an equilateral triangle. The apexes of these triangles, marked* d *and* e, *are the centers of the two arcs, each of which forms half of the cyma recta curve. To make the curves deeper and to give the molding less of a projection, we lengthen the sides of the triangle whose intersection is the center of the arc.*[50]

The contour of the ogee is described in approximately the same way. We divide the projection given to the ogee, with its fillet, into five or six parts, and we take one of these parts for the projection of the ogee beyond the element over which it is placed, unless it is an astragal, since the base of an ogee has no projection over an astragal. Another part is for the projection the fillet has beyond the ogee. We draw a straight line between these two points, o *and* i, *and bisect it, as we did for the cyma recta. We then proceed in the same way, constructing two triangles, tracing the contours of two arcs whose centers are at the apexes of the two triangles. The curvature of this contour is sometimes so great that each curve is almost an entire half-circle, as in the ogee at the top of the architrave of the Arch of Constantine.*



III Planche
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Chapter III
The Ionic Order

THE PROPORTIONS of the Doric Order relate to those of the Ionic Order, and those of the Ionic Order relate to those of the more delicate orders by the same ratio as the proportions of the Tuscan relate to those of the Doric, except that the diminution of the Tuscan column is much larger than in the other orders, where it is always the same. The character of the Ionic Order is much more distinctive since its column, capital, and cornice make it differ more from the other orders than the Doric differs from the Tuscan.

The whole order, as we have already said, is forty small modules high, with the pedestal eight, the column twenty-six, and the entablature six. The parts of the pedestal are generally determined in the way shown in plate 1, with the base a quarter of the overall height of the pedestal, the cornice an eighth, and the moldings of the base one third the height of the whole base.

BASE OF THE PEDESTAL

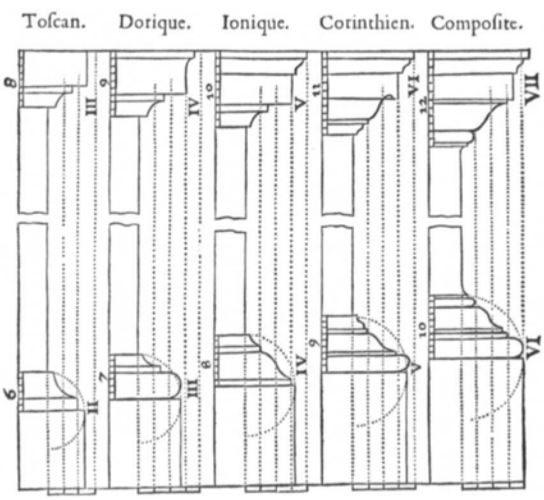
The base moldings of the pedestal, which in the Tuscan Order are two in number and in the Doric three, here number four. They include a cyma recta with its fillet and a cavetto with its fillet under it. To obtain the heights of these moldings, one third of the base, which in the Tuscan is divided into six and in the Doric into seven, is here divided into eight. We give four of these parts to the cyma recta and one to its fillet, two to the cavetto and one to its fillet. The projection of the cavetto is a fifth of a small module taken from the surface of the dado; that of the fillet of the cyma is three fifths.

The character of this base takes the Ionic Order of the Temple of Fortuna Virilis as its model. Ours differs from it only in that there we find a fillet between the top of the cyma and the fillet of the cavetto and in that the fillet of the cyma is unusually thick. Palladio and Scamozzi put an astragal, instead of a small fillet, between the cyma and the cavetto.

CORNICE OF THE PEDESTAL

The elements of the cornice that in the Tuscan are three in number and in the Doric four, here number five. They include a cavetto with its fillet over it and a corona topped by an ogee with its fillet. To obtain the heights of these elements, we divide the height of the whole cornice into ten, just as in the Doric we divide it into nine and in the Tuscan into eight. We give two of these parts to the cavetto and one to its fillet, four to the corona, two to the ogee and one to its fillet. The projection of the cavetto is one and one-half fifths of the small module taken from the surface of the dado, that of the corona three fifths, and that of the ogee with its fillet four fifths. 117

The character of this cornice bears no relationship to anything found in the works of antiquity or of the Moderns. In the Temple of Fortuna Virilis, this cornice has ten elements assembled in a strangely confused way. The cornices of Palladio and Scamozzi are also too complex for the order, since the number of constituent elements in the cornices of their Corinthian and Composite pedestals is no greater than in their Ionic ones.



Most Moderns use the base that Vitruvius describes for Ionic and Corinthian columns only for the Ionic; it does not appear in any of the surviving ancient Ionic works, since the Ancients always used an Attic base for the Ionic column. Some Moderns, such as Alberti and Viola, have used the Corinthian base for the Ionic column and have followed Vitruvius only in that, like him, they give the same base to both the Ionic and the Corinthian.

According to Vitruvius, the proportions of this base are obtained by dividing the overall height of the base into three. We give one of these parts to the plinth, as we do in the Attic base, and divide the remainder into seven parts, giving three to a torus at the top of the base. What remains of these seven parts is in turn divided into two, and each of these two parts is divided into ten others. Two of these we give to the fillet under the torus, five to the scotia, one to the fillet below it, and two to an astragal. This astragal has another identical astragal and another identical scotia immediately below it, and the second scotia is flanked by the same fillets as the first, with the larger of the two fillets resting on the plinth.

Vitruvius has not given projections for this base. I generally obtain them by dividing the small module into five. I give two and one-half fifths to the projection of the torus, two to the astragals, one and one half to the fillet under the torus, one and three quarters to the fillets on either side of the astragals, and two and three quarters to the fillet that rests on the plinth.

The size of the torus at the top and the weakness of the fillet resting on the plinth at the bottom make the character of this base so bizarre that we should not be surprised that the Ancients rejected it, and I only include it here in order to differentiate the orders by every possible distinguishing feature. Delorme proposes another Ionic base, which he claims to have found in ancient buildings. Its character differs from that of Vitruvius in that there are two astragals of different sizes between the plinth and the fillet of the first scotia.

SHAFT OF THE COLUMN

The flutings of the Ionic column shaft distinguish it from the Doric and resemble those of Corinthian and Composite columns. Unlike the Doric column, which has only twenty flutings, the Ionic column, according to Vitruvius and the Moderns, has twenty-four and sometimes thirty-two, although at the Temple of Fortuna Virilis, the only fluted ancient Ionic work in Rome, there are only twenty. Their character is even more distinctive, however, since they are not as shallow as in the Doric Order but usually have the depth of a whole half-circle. There are few columns like those of the interior of the Pantheon, whose flutings are less than a half-circle in depth, or like those of the Temple of Jupiter the Thunderer, where they are more. In some buildings the lower third of the flutings is half-filled as if by a stake or a thick rope, which is why columns that are fluted in this way are called cabled columns. Sometimes, instead of ropes or stakes, the lower part of the flutings is simply filled in almost to the edge of the fillet separating them, as occurs on the columns of the interior of the Pantheon; but because this practice is found in very few works, we may say that it should be implemented only rarely. It would be advisable to use filled-in flutings only when columns are at ground level, not when they are elevated on pedestals or in secondary orders (although in the Arch of Constantine the columns on pedestals are cabled); the flutings are filled in only to strengthen the fillets that separate the channels and to prevent their being broken, since at low levels they are exposed to the danger of collision. The example of the Arch of Constantine cannot carry much authority, since the common view is that this arch was built from the ruins of another building, where it appears that the columns were at ground level. The proportion of the channel of the flutings to the separation between them, which is called a fillet, is not clearly defined, but the average proportion entails making the separation one third of the width of the fluting, which is to say that we must divide each twenty-fourth part of the column circumference into four parts, with three for the fluting and one for the fillet.

The character of these flutings varies in the way that they terminate at the congés of the tops and bases of column shafts. The usual way is to make them round, like the top of a niche; sometimes they are cut square, as we see on the Temple of Vesta at Tivoli; and sometimes their form is exactly the reverse of the nichelike form that we have described, with the flat of the column surface making reentrant semicircles at the ends of the flutings, as appeared on the Pillars of Tutelle at Bordeaux.[51]

CAPITAL

The Ionic capital is made up of three parts: namely, an abacus that consists only of an ogee with its fillet, a barklike covering that generates the volutes, and an echinus or ovolo. The astragal under the ovolo belongs to the shaft of the column. Some people call the central part of the capital a bark, because it is like a thick piece of tree bark that when placed on the top of a vase whose rim is represented by the ovolo, seems to have curled under while drying out. Vitruvius says that the scrolls that the volutes form on either side of the capital represent the curls of hair on either side of a woman's face.

To obtain the height of this capital, which measures from the top of the abacus to the astragal, we divide the small module into twelve parts and give eleven of these to the whole capital. The abacus has three of them, with two for its ogee and one for its fillet; the bark has four, one of which is for its border; and the ovolo also has four. From the top of the abacus to the bottom of the volute there are nineteen of these twelfths of the small module.

To trace the contour of the volutes, we begin with the astragal at the top of the column shaft, which should be two twelfths of a module thick and extend on either side to the width of the diameter of the base of the column shaft. Once the astragal is outlined on the face where we wish to trace the volute, we draw a straight line horizontally through the middle of the astragal and extend it beyond its ends. Then we drop a perpendicular from the abacus to this line so that it bisects the circle, half of whose circumference circumscribes the outer edge of the astragal. Vitruvius calls this circle, whose diameter is two twelfths, the eye of the volute, and it is within this circle that we must locate the twelve points that serve as the centers for the four quarters of each of the three revolutions that make up the volute. To locate these twelve points, we inscribe a square in the eye, orienting it in such a way that its diagonals are horizontal and vertical and intersect at the center of the eye. From the midpoints of the sides of this square, we draw two lines that divide the square into four, and when we have divided each of these two lines into six equal parts, we will have obtained the twelve points in question. To draw the volute, we place the fixed foot of the compass at the first point, which is located at the midpoint of the interior upper side of the square, and the other foot of the compass on the point where the perpendicular intersects the line of the base of the abacus, and then we trace a quarter-circle outside and downward, as far as the horizontal line that bisects the abacus. From here, after placing the fixed foot at the second point, at the midpoint of the exterior upper side of the square inside the eye, we trace the second quarter of the circle, turning downward as far as the perpendicular. From there, with the fixed foot at the third point, at the midpoint of the lower exterior side of the square in the eye, we trace the third quarter of a circle, turning upward and inward to the horizontal. Then, with the fixed foot at the fourth point, which is at the midpoint of the lower interior side of the square in the eye, we trace the fourth quarter of the circle, turning upward and outward to the perpendicular. From there, with the fixed foot at the fifth point, located below the first, moving toward the center, we trace the fifth quarter of the circle and similarly the sixth from the sixth point below the second, the seventh from the seventh point below the third; and thus by moving from point to point in the same sequence, we trace the twelve quarters that constitute the spiral circumvolution of the volute.

The thickness of the border on the face of the volute, as we have said, measures one twelfth of a small module when it is below the abacus, and it should gradually and steadily decrease in width as far as the eye at the center. This border projects beyond the face of the volute by one twelfth the width of the bark. Now, since this bark becomes steadily narrower and since its border diminishes proportionally, the projection of the border should also diminish. This diminution is regulated by the width of the bark, since the projection is always a twelfth part of that width. We trace the border by means of a second line, in the same way that we traced the first line, by placing the fixed foot of the compass at twelve other points, very close to the first, located closer to the center and below the first points by a fifth of the distance between them. To obtain the projection of the abacus, we must project the ogee and its fillet outward beyond the perpendicular line by a distance equal to their height, which is two twelfths of a module.

The projection of the echinus is equal to its height, which is four twelfths. This element is carved with an ornament commonly called an ovolo, because it consists of ovals. The Greeks called them echini because they found that these ovals resembled chestnuts partially contained by their shells, which are covered with spines like those of a sea urchin, called *echinos* in Greek. Five of these ovolos are carved on each face of the capital, but only three are completely visible, since the two closest to the volutes are covered by three little pods that emerge from a fleuron, whose stalk rests on the first circumvolution of the volute.

The volutes just described appear on the front and rear faces of the capital. The side faces are made differently. Vitruvius calls this part the cushion. The Moderns call it a baluster because it resembles the cup or calyx of the wild pomegranate flower, which the Greeks call *balaustion*. This baluster is double-ended with a boss in the middle. Its borders on either side are two twelfths of a module according to Vitruvius, which is to say, equal to the width of the eye. Vitruvius calls the contour of the boss in profile a belt or baldrick, but the semicircular profile he gives it does not correspond to the one it has been given in ancient works, where its shape is irregular and cannot be described by a geometrical figure. The baluster is carved with large leaves, and the boss is covered in a similar manner with small bay leaves arranged in a scale pattern.

The proportions of this capital, which are those of Vitruvius, but explained in a simpler, more systematic way, do not correspond entirely to those of ancient and modern examples. The height, which I make eighteen minutes, as it is on the Colosseum, and which is close to that of Vitruvius, is twenty-one and two-thirds minutes at the Theater of Marcellus and twenty-one and one-half at the Temple of Fortuna Virilis. The echinus, which I make the same height as the bark, is larger than the entire rest of the capital at the Temple of Fortuna Virilis and smaller than the bark at the Theater of Marcellus. The volute, which I make twenty-six and one-half minutes high, is only twenty-three and one-quarter at the Fortuna Virilis, twenty-four and one-half at the Colosseum, and twenty-six and one-quarter at the Theater of Marcellus. The width of the volute, which I make twenty-three and one-third minutes, as at the Colosseum, is twenty-five and one-quarter at the Fortuna Virilis and twenty-four at the Theater of Marcellus. The same divergence in proportions may be found in modern authors, with the echinus larger than the bark in Palladio, Vignola, Barbaro, Bullant, and Delorme but the same size as the bark in Alberti and Scamozzi.

There are several differences in character. First, the Ancients and a few Moderns, like Vignola, Serlio, and Barbaro, do not relate the eye of the volute to the astragal at the top of the column, as most Moderns do. The latter follow Vitruvius, who says that from the center of the eye to the bottom of the volute there are three and one-half parts, and he adds that there are three parts below the astragal for the descent of the volute. From this it follows that the eye of the volute and the astragal are in the same place, because if the size of the eye is one part, then from the center to the bottom of the eye is one-half a part, making the space from the astragal to the base of the volute less than the space from the center of the eye to the base of the volute.

In the second place, the face of the volutes, which is usually a flat plane, is somewhat bowed and convex in the Temple of Fortuna Virilis, because the circumvolutions increasingly project as they become smaller, as they do on the Composite Orders of the Arches of Titus and Septimius and of the Temple of Bacchus as well.

In the third place, at the Temple of Fortuna Virilis, the border of this volute is not the usual simple congé but rather is accompanied by a fillet. In the fourth place, the leaves that cover the baluster are sometimes long and thin, or in the form of reeds, like at the Theater of Marcellus, or split up very finely, as in Palladio and Vignola. Sometimes they are broad and made like the olive leaves of the Corinthian capital, as they are on the Temple of Fortuna Virilis. In the fifth place, on the corner column of the Temple of Fortuna Virilis, the two faces of the volutes are joined at the outside corner, and two balusters are also joined at the inside corner. This was done to avoid having to give the capitals of columns at the sides of the temple faces that differ from those of the columns on the front and back, namely, to avoid having the capitals at the ends with volutes and those at the sides with balusters, for by this means all four sides have volutes.

The dissimilarity between the faces of the Ionic capital makes it awkward to use. This obliged the Moderns, taking Scamozzi as an example, to make all four faces the same by doing away with the baluster and bending all the faces of the volutes inward, as in the Composite Order. There are, nevertheless, two things that may be criticized in Scamozzi's capital. One is that the thickness of his volute is uniform, whereas on the Ionic of the Fortuna Virilis and on all the Composite capitals that are the sources for Scamozzi's volute, it broadens out toward the bottom with a great deal of grace. The other thing is that he makes the volute emerge from the echinus as if from a vase in the manner of the Composite capital of the Moderns, who introduced this change contrary to most Composite works of antiquity, where the bark passes quite straight over the echinus, under the abacus, and curves back only at the terminations that form the volute. If we omit this section of bark, the abacus of the Ionic capital appears to be too thin an element, since it consists only of an ogee and seems to need the bark to support it, as it does in the ancient Ionic volute. We may also regret the fact that, of the two forms Scamozzi proposes, architects who use this capital have chosen the one that seems less suitable to the Ionic Order. Scamozzi makes the abacus in two ways: one is to curve it like the volute, as in the Composite Order; the other is to leave it straight and square as in the ancient Ionic and on the Temple of Fortuna Virilis. Here the abacus does not extend over the corners of the volutes; rather, emerging from the underside of the corner of the abacus, there is simply a leaf that spills over the volute and descends to the level of its eye. To further distinguish this order from the Composite, there is no fleuron between the volutes.

For some years sculptors have been adding an enrichment to the Ionic capital, which Scamozzi, who gave it its new form, did not include. It involves making festoons that, along with little pods, emerge from the fleuron whose stalk lies on the first circumvolution of the volute. It would appear that they wished to represent the curls of hair hanging on either side of the face, like the curls that Vitruvius claims the volutes resemble, for one might say that the volutes look more like coiled braids and that the festoons more closely resemble hair curled in ringlets.

It should be further noted that some architects claim that the volutes of the Temple of Fortuna Virilis are more oval and wider than usual. This is not true, for although the capitals of this building differ and are for the most part imperfect, it is obvious from the volutes of the finished capitals that far from being horizontal ovals, they tend rather to be longer in the vertical dimension, with twenty-six and one-half minutes in height and twenty-three and one-half minutes in width. At the Theater of Marcellus, on the other hand, they are twenty-six and one-quarter minutes high and twenty-four minutes wide.

The entablature usually has a height of two diameters of the base of the column shaft, or six small modules. We divide it, as we do in all the orders except the Doric, into twenty parts, with six for the architrave and six for the frieze, leaving the eight that remain for the cornice. Authors differ as to the proportions of the three parts that make up the entablature. Vitruvius makes the frieze larger than the architrave, a practice that Palladio, Scamozzi, Serlio, Barbaro, Cataneo, and Viola have imitated. At the Temple of Fortuna Virilis and at the Theater of Marcellus, however, the frieze is smaller than the architrave, and this proportion has been followed by Vignola and Delorme. Alberti, whom I follow in this, adopts the mean and makes the frieze equal to the architrave. He also gives eight parts to the cornice and six each to the frieze and architrave, which are the proportions that I have given to these elements.

ARCHITRAVE

To obtain the heights of the elements of the architrave, we divide it into five parts and give one of them to the cymatium, which is made up of an ogee with its fillet. The rest is divided into twelve parts, of which three are given to the first fascia of the architrave, four to the second, and five to the third. The projections are determined by fifth parts of the small module. Thus, we give one quarter of one of these fifths to the projection of each fascia and an entire fifth to the ogee with its fillet, which makes one and one-half fifths for the overall projection of the architrave.

These proportions are not found in all the works we use as examples. Vitruvius makes the cymatium only one seventh of the architrave, rather than one fifth as I do and as it is at the Theater of Marcellus. I do so because in antiquity it is sometimes much larger, with two ninths at the Colosseum and two fifths at the Temple of Fortuna Virilis. The Moderns also differ from one another: Serlio and Bullant make it smaller than Vitruvius, and others, like Palladio, Vignola, Alberti, and Viola, make it larger.

The character also varies: sometimes, as in Palladio, there are astragals between the fascias. In the Temple of Fortuna Virilis there is only one, and it is not between the fascias but in the middle of the second fascia. Scamozzi puts one under the cymatium, as in the Corinthian Order. I have considered the simplicity that Vitruvius gives this architrave by removing its astragals to be appropriate to the Ionic, which should not have the ornaments characteristic of the more delicate orders. Vitruvius does not, however, state this as a difference between the Ionic and the Corinthian, which he distinguishes from one another only by their capitals [since the Corinthian, depending on its height, sometimes borrows from the entablature of the Ionic Order, sometimes from the Doric].[52] If architects since Vitruvius have added ornaments to the Corinthian Order, it seems to me that they did so with more justification than those who wished to add these same ornaments to the Ionic Order. The fascias sometimes slope backward, making the soffit of their projection not plumb but raised in front,[53] as it appears at the Temple of Fortuna Virilis. It is claimed that this is done to make the horizontal projection and vertical faces of the elements appear other than they are.[54] Vitruvius would have all the fascias of the elements in entablatures slope forward, claiming that this slope makes them appear plumb. Nevertheless, it so happens that in antiquity fascias slope backward more often than forward. But these matters are all examined in a separate chapter where we discuss the alteration of proportions. Suffice it to say that I believe that everything that ought to appear plumb and level should be made plumb and level, and this rule guides me for all of the elements in every order.

FRIEZE

No application of the small rounded frieze Vitruvius describes is to be found in antiquity except at the Baths of Diocletian, and most Moderns have not approved it either.

CORNICE OF THE ENTABLATURE

The eight twentieths of the whole entablature that are given to all cornices except that of the Doric Order determine the height of this one and also determine the height of all its elements, which are ten in number. The first, which is an ogee, has one of these twentieths; the second, which is a dentil, has one and one half of them; the third is a fillet with one quarter of a part; the fourth is an astragal that equals the fillet in size; the fifth is an echinus that has one part; the sixth is the corona with one and one-half. Under the corona there is a gutter that has the depth of a third of a part. The seventh element is an ogee with one half of one part; the eighth is the fillet of the corona with one quarter of a part; the ninth is the cyma recta, which has one and one-quarter parts; the tenth is the lip, or fillet, of the cymatium, which has one half of one part.

The projections are determined by fifths of a small module, with twelve of these for the overall projection of the cornice. The projection of the ogee is one of these fifths, taken from the surface of the frieze, and that of the dentil is three. The projection of the ovolo, or echinus, together with the astragal and the fillet on which it rests, is four and one-half fifths; of the corona, eight and one half; of the ogee with its fillet, nine and one half; and of the cymatium, twelve.

To cut the dentil, we divide the height into three parts, giving two to the width of the dentil and one to the space between them.

These proportions differ from those of ancient and modern times chiefly in the way the dentil is cut. Vitruvius and some Moderns, such as Barbaro and Cataneo, make it very narrow, giving it a width that is only half of its height and making the space between the cuts two thirds of that width; others, like Serlio and Vignola, make it wider. The proportion I give it is the one it has at the Theater of Marcellus, at the Arch of the Goldsmiths, at the Arch of Septimius, at the Temple of Jupiter the Thunderer, and at the three columns of the Campo Vaccino. And just as Vitruvius makes the dentil very narrow, there are some in antiquity who make it very wide, giving it almost as much width as height, as they do at the Temple of Fortuna Virilis, at the Forum of Nerva, at the Arch of Titus, and at the Arch of Constantine.

The character that I have chosen is the one found in the Ionic cornices of Vitruvius and antiquity, and it includes dentils. Most Moderns, including Serlio, Vignola, Barbaro, Cataneo, Bullant, Delorme, and Alberti, have adopted this cornice. Those, like Palladio, Scamozzi, and Viola, who put modillions in the cornice, have used the cornice of the Temple of Concord as their model. That is an irregular Ionic in every respect, however, particularly in its cornice, since the character of Corinthian and Composite cornices gives it its modillions, the Doric its mutules, and the Ionic its dentils. We ought not to approve of the manner in which architects have imitated the cornice of the Temple of Concord, commending Scamozzi as we do for having modeled his Ionic capital on that of this ancient building. I have not cut an ovolo in the echinus that appears over the dentils nor any other sculptures in the ogees

126 of the architrave and the cornice, because I find this makes the cornice, in which Vitruvius allows nothing more elaborate than dentils, too ornate for the order. In the large cymatiums of cornices with no pediment over them, Vitruvius puts lions' heads at regular intervals over the column spaces and in line with the columns themselves. He would have the ones over the columns pierced, so as to eject the water that falls on the cornice and on the roof. At the Temple of Fortuna Virilis, the lions' heads relate neither to the columns nor to the spaces between them.

EXPLANATION OF THE FOURTH PLATE

A.—*Base that Vitruvius gives to all the orders that have them and that the Moderns adopt only for the Ionic Order. The piece of the column shaft attached to it is fluted with what are called cabled flutings.*

B.C.D.—*Plan of this base. C. Plan of cabled flutings. D. Plan of the kind of flutings used on the columns inside the Pantheon.*

E.—*Face of the ancient Ionic capital.*

F.—*Side of the same capital.*

G.—*Side of the modern Ionic capital as redesigned by Scamozzi and following the form that I believe it should have, which involves passing its bark over the top of the vase without going inside. It should be noted that the piece of the column shaft, which is attached to it, has flutings terminating in the way they did on the Pillars of Tutelle at Bordeaux.*[55]

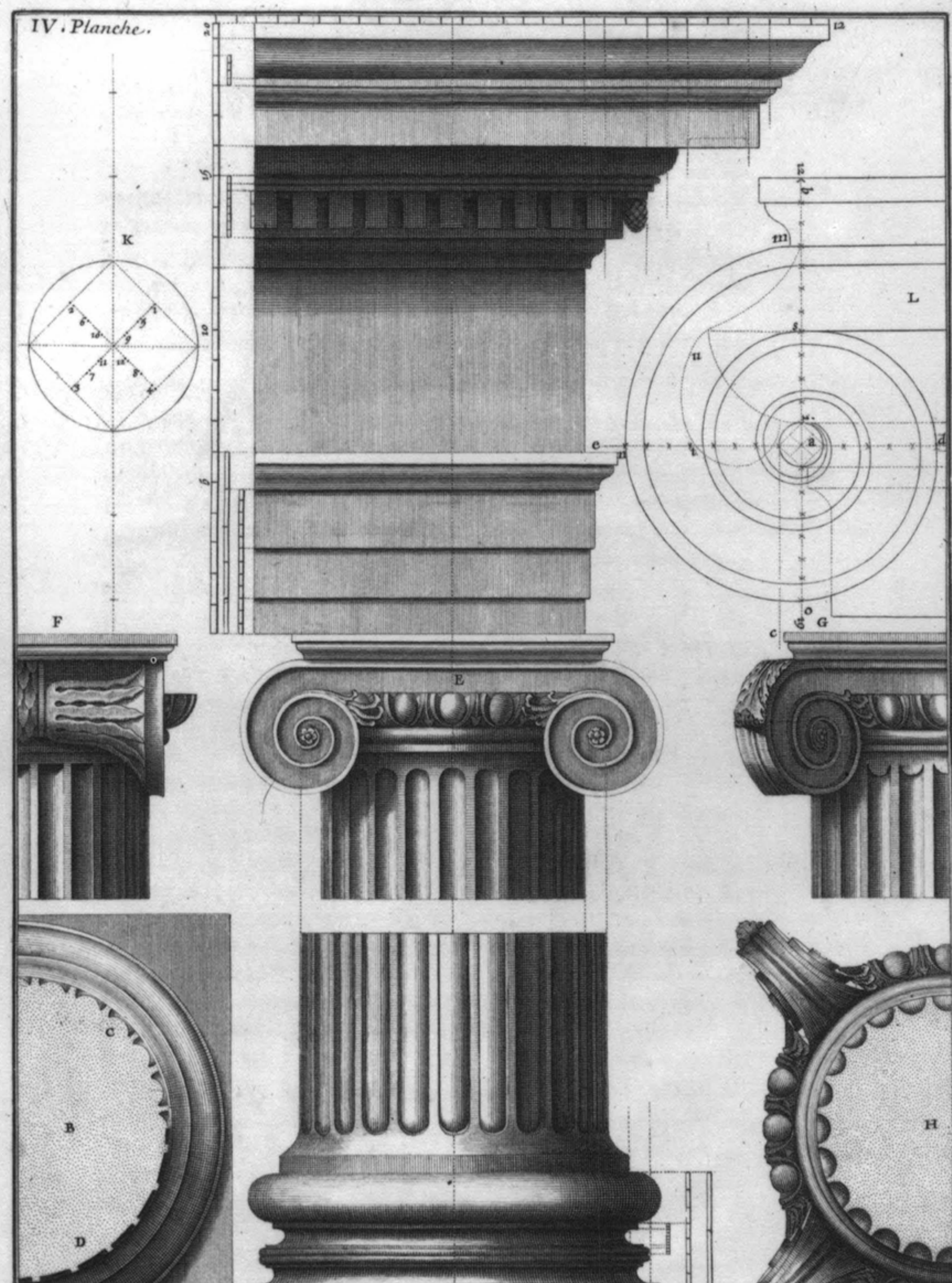
H.—*Plan of the redesigned modern capital.*[56]

L.—*Description of the ancient Ionic volute. K. Large-scale representation of the eye of the volute, which is marked* a, *in the volute* L. *From* a *to* b *is the size of the small module divided into twelve, of which eleven parts, from* i *to* b, *determine the height of the capital, and the nineteen to be taken from* b *to the bottom determine how far the volute should descend. The horizontal line* d, e *passes through the center of the eye.*

To trace the contour of the volute, we put the fixed foot of the compass on the first point marked 1 *in the eye* K *and the other foot at the point marked* m *in the volute* L. *We then trace outward the quarter-circle* m, n. *From this location, having placed the fixed foot on the second point marked* 2 *in the eye* K, *we trace the second quarter of the circle marked* n, o*; and from there, placing the fixed foot on point* 3, *we trace the third quarter of the circle marked* o, d. *From there, placing the fixed foot on point* 4, *we trace the fourth quarter of the circle marked* d, s*; and from there again, placing the fixed foot on point* 5, *we trace the fifth quarter of the circle marked* s, t. *Moving the center from point to point, we trace all three contours in the same way.*

Line c *corresponds to the surface of the base of the column shaft. The line marked* m, n, t *delineates the contour of the boss of the baluster, which Vitruvius calls a belt or baldrick.*

IV. Planche.



de Chastillon sculp.

Chapter IV
The Corinthian Order

VITRUVIUS distinguished the Ionic and Corinthian Orders only by their capitals, whose proportion and character have nothing in common. We find other differences, besides those between their capitals, in the buildings built since Vitruvius; the shaft of the Corinthian column is shorter than the Ionic, and the base is completely different. The Corinthian architrave has two astragals and an ogee, in addition to the three fascia and the cymatium. Its cornice has an ovolo and dentils,[57] which are not present in the Ionic Order of Vitruvius.

BASE OF THE PEDESTAL

In the first part of this treatise, where we established proportions in general, we gave the whole order forty-three small modules, with nine of them for the pedestal, twenty-eight for the column, and six for the entablature. The proportions of the pedestal were also established, giving the entire base one quarter of the height of the pedestal and its cornice one eighth. The plinth of the base is two thirds of the whole base, and the other third is divided into nine. We use these nine parts to obtain the heights of the five elements that make up this part: a torus, a cyma recta with its fillet, and an ogee with its fillet under it. The torus has two and one half of the nine parts; the cyma recta three and one half, the half being for the fillet; the ogee has two and one-half parts and its fillet one half of a part. The projection of the torus equals that of the whole base; the projection of the cyma recta is two and three-quarters fifths of a small module, and that of the ogee with its fillet is one fifth.

The character of this base is taken from Palladio, who imitated the one on the Arch of Constantine, which differs from Palladio's only in having an astragal with a cavetto above it, instead of an ogee, which is the uppermost element in Palladio's base. At the altars of the Pantheon it is also nearly the same, the only difference being that the ogee has an astragal instead of a fillet.

CORNICE OF THE PEDESTAL

The six elements that make up the cornice include an ogee with its fillet above it and a cyma recta that comes up under the corona, hollowing it out to form a drip, a corona, and an ogee with its fillet over it. The whole cornice is divided into eleven parts. Of these we give one and one half to the ogee, one half to its fillet, three to the cyma recta, three to the corona, two to the ogee that caps it, and one to its fillet.

130 The lower ogee with its fillet has a projection of one fifth of the small module, taken from the surface of the dado. From the cyma recta to the edge of the drip is two and one-sixth fifths; the projection of the corona is three fifths, and the upper ogee with its fillet project beyond the corona by one fifth of a small module.

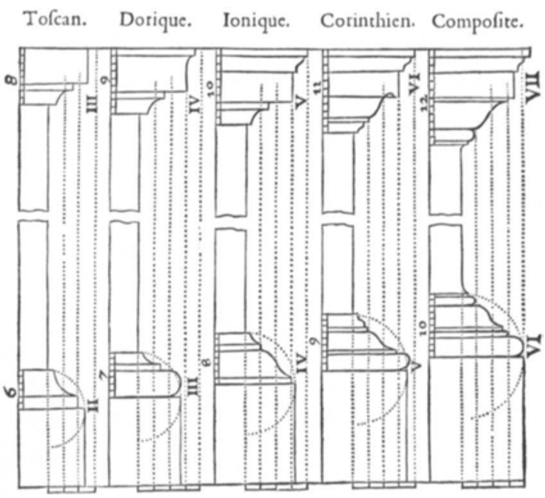
The character of this cornice, also taken from Palladio, differs from that of the altars of the Pantheon, where an upper ogee is used instead of a cyma recta. At the Arch of Constantine this cornice is very irregular and does not relate to the base in the usual way, since unlike the cornices of most pedestals, it does not contain more elements than the base. This cornice is so simple that instead of the six elements I give it, it has only four: a fillet, an astragal, and a cyma recta with its fillet. In addition, its elements are very disproportionate, with the fillet under the astragal excessively small and the astragal and the cyma recta excessively large. At the Temple of Vesta at Tivoli we see a similar disproportion, not in the cornice but in the base, where nothing but a large ogee and fillet act as both base and plinth in the pedestal.

BASE OF THE COLUMN

The ancient architects who immediately followed Vitruvius invented a base for the Corinthian column that seems to be made up of both the Attic and Ionic bases, for it has two tori, like the Attic, and two astragals and two scotias, like the Ionic. In the face of the diversity of proportions to be found in ancient and modern examples of this base, I adopt my usual stance in favor of the mean[58] and find that the heights of all the elements can be established by division and subdivision into four just as in the Doric capital heights are established by division and subdivision into three. One quarter of the half-column diameter that determines the overall height of the base gives us the height of the plinth. One quarter of the remaining three quarters is the height of the lower torus; one quarter of what is left is the height of the upper torus; one quarter of what is left after that is for the astragals at the middle of the base, and each of these astragals measures one half of this quarter. One quarter of the space between each torus and astragal is for the large fillet of the scotia next to each torus. One quarter of the remaining space is for the small fillet next to the astragal, and the rest is for the scotia.

The projections are usually regulated by fifths of the small module. The large torus, like the plinth, projects three fifths beyond the surface of the column shaft; the astragals and the large fillet of the lower scotia, two fifths; the upper torus and the small fillets of the scotias, one and three-quarters fifths; and the large fillet of the upper scotia, one and one-half fifths.

There is almost nothing in antiquity at variance with the proportions and character that I give this base. Whereas I make the proportions of the two scotias the same, in antiquity they are almost always different, with the upper one smaller than the lower. All the Moderns make them equal, however, and therefore, I thought that I could not go wrong in following these great masters.



SHAFT OF THE COLUMN

What is noteworthy about the shaft of the Corinthian column is its height, which, as we have said, is less than that of the Ionic column, because its capital is much higher. If we had increased the height of the shaft proportionally, as we did in the other orders, the overall increase in column height would have been too great. As for the flutings, everything that might pertain to them was said in the previous chapter, since there is no difference between the flutings of these two orders, either in shape or in number. In antiquity, it does sometimes happen that the Ionic has fewer flutings than the Corinthian. At the Temple of Fortuna Virilis, for instance, there are only twenty of them. But there are also Corinthian columns, such as those of the Temple of Vesta at Tivoli, that have no more.

CAPITAL

The Corinthian capital differs even more from the three others than the Ionic does from the Doric and the Tuscan, for it has neither the abacus nor the ovolo that are essential features common to the Tuscan, the Doric, and the Ionic. It does have an abacus, in fact, but it is completely different from the others, with its four faces curving inward to a rosette at the center of each face. Instead of ovolos and annulets, it has only a rim, like the lip of a vase. The part that takes the place of the neck is very elongated and ornamented with a double row of eight leaves that curve outward. From their midst spring the little stalks that generate the volutes, and these bear no resemblance to those of the Ionic capital. Instead of being four, as in the Ionic, here they are sixteen in number, with four on each face.

To obtain the height of this capital, we add one sixth of a column diameter to the whole diameter of the base of the column shaft, which makes three and one-half small modules. After dividing this height into seven parts, we give the four lowest to the leaves: that is, two parts to the first row of leaves and two to the second. The height of each leaf is divided into three, and the top third determines how far the curvature of the leaf descends. At the top of the capital, the three parts remaining of the seven are for the little stalks, the volutes, and the abacus. We divide this space into seven parts, giving the two top ones to the abacus, the three below them to the volutes, and the lowest two to the little stalks or caulicoles. One of these two lowest parts is for the descent of the curvature of the leaves of the caulicoles. These leaves come together and join in pairs at the four corners and the four centers of the capital, which is where the volutes join together. Under the corners of the abacus, where the volutes come together, there is a little acanthus leaf that turns up toward the corner of the abacus to ornament the void between the descending volute and the corner of the abacus, which remains straight.

Each of the leaves is split to create three tiers of smaller leaves on either side of the central leaf that curls outward. The smaller leaves are split again. When they are split into five, as is usual, they are called olive leaves; when split into three, bay leaves. The outward-curling part of the central leaf is split into eleven leaves that have convex surfaces; the surfaces of the other leaves are concave. Above the central leaves is a fleuron that emerges between the little stalks or caulicoles and the central volutes, as does the stalk supporting the rosette at the center of the abacus.

To make the plan of the capital, we draw a square equal to the plinth of the base and construct an equilateral triangle on a base that is one side of this square. The angle opposite this base is the center for the curvature of the abacus. To obtain the cut corners of the abacus, we divide one of the sides of the square into ten parts, one of which is the width of the corner to be cut at the angle of the square.

Both the works of antiquity and the books of architects differ as to the proportions of this capital. In antiquity, the whole capital is sometimes shorter by a seventh part, measuring only one diameter of the base of the column shaft, as it does at the Temple of the Sibyl at Tivoli and as Vitruvius prescribes. Sometimes it is higher, as at the Temple of Vesta in Rome and on the Facade of Nero, where it is nearly two sixths more than the column diameter at the base of the shaft. Sometimes, as at the Portico of Septimius and at the Temple of Jupiter the Thunderer, it has the same height as I give it. Sometimes it is only a little shorter, as it is at the Pantheon, on the three columns, at the Temples of Faustina and of Mars the Avenger, at the Portico of Septimius, and at the Arch of Constantine. Sometimes it is a little higher, as at the Baths of Diocletian. The Moderns are also divided on this issue. Palladio, Scamozzi, Vignola, Viola, and Delorme have made it the same height as I have, while Bullant, Alberti, Cataneo, Barbaro, and Serlio have made it shorter, following Vitruvius. The abacus in Vitruvius, like that of the three columns and at the Temple of Faustina, is a seventh of the whole capital. Sometimes it is smaller, as in the Pantheon, at the Basilica of Antoninus, and at the Forum of Nerva, where it is one eighth the height of the capital; it differs from my own by only one third of a minute. Sometimes it is higher, as much as a fifth or a sixth of the height of the capital, as at the Temple of Vesta in Rome and that of the Temple of Sibyl at Tivoli.

The character of the capital is no less diverse. Vitruvius splits the leaves like an acanthus, which is how they are at the Temple of the Sibyl at Tivoli, but most ancient works have olive leaves split into five. Some split them only into four, as at the Temple of Mars the Avenger; others, into three, as at the Temple of Vesta in Rome. Moderns who have used acanthus leaves include Serlio, Barbaro, and Cataneo. In antiquity, the two rows of leaves are sometimes not equal in height, being higher in the bottom row, as we may see on the portico and in the interior of the Pantheon, at the Temple of Vesta in Rome, at the Temple of the Sibyl at Tivoli, at the Temple of Faustina, at the Forum of Nerva, at the Arch of Constantine, at the Colosseum, and at the Baths of Diocletian. Sometimes they are higher in the second row, as at the Basilica of Antoninus, and sometimes too they are equal in height, as I have made them, and as they are at the three columns of the Campo Vaccino, at the Temple of Jupiter the Thunderer, and at that of Mars the Avenger, on the Facade of Nero, and on the Portico of Septimius. The ribs in the middle of the leaves are most often split into very small leaves on either side of the center line, as they are at the Pantheon, at the Temple of Faustina, at the Temples of Jupiter the Thunderer and of Mars the Avenger, at the Facade of Nero, at the Basilica of Antoninus, at the Portico of Septimius, and at the Baths of Diocletian. Sometimes they remain undivided, as at the Temples of Vesta in Rome and of the Sibyl at Tivoli, at the three columns, at the Forum of Nerva, and at the Arch of Constantine. The first row of leaves usually bellies out at the bottom but more so on some buildings than on others. It is especially noticeable on the Temple of Vesta in Rome. On the capital of a pilaster that remains on the Facade of Nero and on another pilaster at the Baths of Diocletian, there are more leaves than are usually put on pilasters. Rather than each face of the pilaster having only two leaves in the first row and three in the second, these have three in the first row and four in the second. Moreover, on the pilaster of the Facade of Nero, there is yet another leaf between the caulicoles and the central volutes, instead of the little fleuron. We also find this leaf on the capital of the Temple of Vesta in Rome.

The abacus has pointed corners at the Temple of Vesta in Rome, which appears to be according to Vitruvius, who does not mention cutting the corners of the Corinthian abacus, and who, when he speaks of the corners, mentions only four rather than eight, which is how many angles there are when the corners are cut. The rosette at the center of the abacus also varies somewhat. Vitruvius makes it the same width as the abacus, and since then people have made it descend to below the edge of the drum or bell of the capital. It is even much larger still at the Temple of the Sibyl at Tivoli, where it almost covers the central volutes, and its form there is also different. Usually, it is a rosette made up of six leaves, each one split into five like olive leaves, and from their center emerges a fishtail shape, undulating upward. This is how it appears at the Pantheon, at the Temples of Faustina, of Jupiter the Thunderer, and of Mars the Avenger; at the Forum of Nerva; and at the Baths of Diocletian. At the Temple of Vesta, it is shaped like an ear of grain, rather than a fishtail. At the Temple of the Sibyl at Tivoli, the rosette, which is large and made up of leaves that are not split, also has a shape like an ear of grain, twisted like a screw at the center. On the Facade of Nero there is a fleuron. At the Basilica of Antoninus and at the Arch of Constantine, the base of the rosette is turned upward, and it has an ear of grain in the middle. At the three columns, the rosette, which is made up of acanthus leaves, hangs very much downward, and in its center a pomegranate also turns downward. At the Portico of Septimius, instead of a rosette, there is an eagle holding a thunderbolt. The rosette, or whatever is put in the middle of the abacus in place of the rosette, has varying projections. Sometimes it projects beyond the line that connects one corner of the abacus to the other, as it does on the three columns, on the altars of the Pantheon, at the Temple of the Sibyl, and at the Basilica of Antoninus. Sometimes it is a little inside that line, as at the Temples of Jupiter the Thunderer and of Mars the Avenger and at the Baths of Diocletian; and sometimes it just reaches the line, as at the Pantheon and the Temple of Faustina.

The volutes are sometimes connected to one another, as in the portico and in the interior of the Pantheon, at the Temples of Jupiter the Thunderer and of Mars the Avenger, etc. Sometimes they are completely separate, as at the Temple of Vesta, at the Facade of Nero, at the Basilica of Antoninus, etc. In antiquity, the helixes of the volutes are normally handled in two ways. Some helixes twist in the same direction right to the very end, like a snail's shell, others turn back on themselves at the center, making a little S-shape. We see those of the first kind in the interior of the Pantheon, at the Temple of Vesta, at that in Tivoli, and at the Baths of Diocletian. The other kind, not used by the Moderns but more common in antiquity, appears in the portico of the Pantheon, in the Portico of Septimius, in the three columns, at the Temples of Jupiter the Thunderer, of Mars the Avenger, and of Faustina, in the Facade of Nero, at the Basilica of Antoninus, at the Forum of Nerva, and at the Arch of Constantine. The volutes of the three columns, however, are quite unique. Rather than meeting at their edges, as is usual, those in the center of each face intertwine in such a way that one passes over and then under the other.

The entablature, which is six small modules, is usually divided into twenty parts, with six for the architrave, as many for the frieze, and eight for the cornice. These proportions vary as much in antiquity as among modern authors, for the frieze is larger than the architrave at the Temple of Jupiter the Thunderer and at that of the Sibyl, as it is in Serlio and Bullant. It is smaller in the portico of the Pantheon, at the Temple of Peace, at the Basilica of Antoninus, at the Portico of Septimius, at the Arch of Constantine, and in Palladio, Scamozzi, Barbaro, Cataneo, and Viola. In the interior of the Pantheon, however, the frieze is equal to the architrave.

ARCHITRAVE

To obtain the heights of the elements of the architrave, we divide each of its six parts into three, making eighteen in all. We give three parts to the ogee at the top, and of these, one and one quarter to its fillet. The large astragal under the ogee has one; we give five to the upper fascia, one and one half to the small ogee under it, four to the middle fascia, one half to the small astragal under it, and three to the lower fascia. For the projections, we give two fifths of the small module to the overall projection of the architrave, one fifth to the upper fascia, half of one fifth to the middle one, and line up the lower fascia with the surface of the top of the column.

These proportions are the mean between the varying extremes of the Ancients and the Moderns. The large ogee, to which I give one sixth of the whole architrave, has more than one fifth in the portico and interior of the Pantheon, at the Temples of Faustina and of Jupiter the Thunderer, at the Forum of Nerva, at the Portico of Septimius, at the Arch of Constantine, at the Colosseum, and at the Baths of Diocletian. Yet it has only one seventh at the three columns and at the Temple of Mars the Avenger. The Moderns also differ in the same way, with Palladio, Vignola, Alberti, and Delorme giving it more than one fifth, and Serlio, Barbaro, Cataneo, and Bullant giving it only one seventh.

Variations in character are also very diverse. There are some Corinthian architraves where a cavetto with an echinus under it replaces the ogee at the top, as occurs at the Temple of Peace, at the Facade of Nero, and at the Basilica of Antoninus. Sometimes, instead of the echinus, there is an ogee under the cavetto, as there is at the Temple of the Sibyl and in Scamozzi. There are also architraves with nothing under the ogee or between the fascias, as at the Colosseum and at the Arch of Constantine, and others where there are only astragals and no small ogee, as at the Temple of the Sibyl and in Scamozzi. There are other architraves where there are only astragals and no small ogee,[59] as at the Temple of Mars the Avenger, and still others that have only two fascias, as at the Facade of Nero and at the Basilica of Antoninus. The middle fascia of others is completely filled with ornaments, as on the three columns of the Campo Vaccino.

FRIEZE

What is noteworthy about this frieze is that in some cases it does not meet the architrave at right angles but joins it in a curve, like a congé. This practice was adopted at the Baths of Diocletian and at the Temple of Jupiter the Thunderer. Palladio and Scamozzi also adopted it, although it is rare in antiquity, and we may say that it is somewhat awkward in execution, because whereas the joint appears between the frieze and the architrave when these two parts meet squarely, when we use the congé, it appears in the middle of the frieze and this creates an adverse effect.

CORNICE OF THE ENTABLATURE

To obtain the height of the elements that make up the cornice, we divide the entire cornice into ten parts. The constituent elements are thirteen in number. We give one of the ten parts to an ogee, which is the lowest element, one quarter of a part to its fillet, which is the next, and one and one-half parts to the third, which is the dentil. The fillet and the astragal are above, and we count them as the fourth and fifth elements, each having one quarter of a part; the sixth, which is an echinus, or ovolo, has one part; and the seventh, which is a modillion, has two parts. The eighth, which is the ogee that caps the modillion, is one half of a part; the ninth, which is the corona, has one part; the tenth, which is the small ogee that caps the corona, is one half of a part; the eleventh, which is its fillet, is a one-quarter part of that half; the twelfth, which is the cyma recta or large cymatium, is one and one-quarter parts; and the thirteenth, which is its fillet, is one half of a part.

The projections are determined by fifths of the small module. We give one of these to the large ogee at the bottom, taken from the surface of the frieze, two to the dentil, two and one half to the astragal that caps the dentil, three and one quarter to the ovolo, three and one half to the piece behind the modillion that supports it, nine to the corona, ten to the small ogee with its fillet, and twelve to the large cymatium.

The sizes of the constituent elements of the Corinthian cornice vary so greatly among various works that no two are the same, and I have, therefore, based the proportions that I have established on the cornices of the Pantheon, which is the most widely acclaimed Corinthian work. I have also imitated its character in all respects, with the exception of the small ogee, which, following what appears in all the rest of antiquity, I have placed between the corona and the large cymatium; at the Pantheon, there is only a fillet.

There is great diversity in the character of this cornice, as well as in its proportions. In some instances, such as at the Temple of Peace, at the Colosseum, and at the Arch of the Lions in Verona, where modillions appear immediately beneath the large cymatium, the cornices have no corona at all; whereas in others, such as at the Facade of Nero, there is an immensely large one. There are some cornices that have two ovolos, one under the dentil and another over it, as at the Temple of Peace. There are some, as at the three columns, where there is an ovolo under the dentil and a large ogee above it. Some cornices, like those of the Pantheon, the Temple of Faustina, and the Temple of the Sibyl, have a dentil molding that is not cut into separate dentils. Vitruvius says we should never put dentils with modillions, but since the element out of which dentils are cut is found in most Corinthian cornices of antiquity, I think we should limit the application of Vitruvius's precept to the exclusion of cutout dentils, as those works that are most approved do. This appears to me to be the result of good judgment, as much because separate dentils are an ornament particular to the Ionic Order as because the ovolo and the large ogee, which are the two elements between which this molding appears, are usually ornamented, and too great a profusion of ornament creates a confusion that is disagreeable to the sight. There are Corinthian cornices without modillions, such as at the Temples of the Sibyl and of Faustina and at the Portico of Septimius. There are some that have square modillions with several fascias, such as at the Facade of Nero, and those are the modillions that the Moderns have given the Composite Order. On others, the modillions have no volute but are quite square at the front, as they are at the Temple of Peace. In some, instead of having a leaf covering the console on the underside, there is another kind of ornament consisting of eagles, such as those that appear on the cornice that serves as an impost on the Arch of Constantine. Although usually the leaf that covers the console is split into olive leaves, sometimes, as at the three columns and at the Baths of Diocletian, it is treated as an acanthus leaf. Most often, the placement of modillions is unrelated to the columns, and it is very rare to find them spaced in such a way that there is one above the center of each column, as at the three columns of the Campo Vaccino and at the Arch of Constantine. At the Forum of Nerva and at the Arch of Constantine,[60] where the entablature projects over each column, there are four modillions instead of the usual three above each column, so that as a result none line up with its center.

The final comment to be made about modillions concerns their orientation in pediments. The normal practice in antiquity is to make them perpendicular to the horizon, there being few examples where they are perpendicular to the line of the tympanum, as Serlio made them on the Arch at Verona. Clearly such a universal practice ought to establish a rule, although reason would require the opposite, following the precepts of Vitruvius, who would have the imitation of wood construction constitute the basis for everything pertaining to modillions and dentils in cornices, because they represent the ends of the pieces that make up the structure of the roof. Since modillions, which usually represent the ends of struts, represent the ends of purlins in the gables of pediments, it is reasonable for the position of the modillion in the pediment to be the same as that of the purlin. And, since the purlin is placed perpendicular to the line of the pediment, it should determine the same orientation for the modillion. Vitruvius has not settled anything on this point, because he says that the Greeks did not put modillions in pediments, making the cornices in them very simple, as they are at the Temple of Chisi. The reason he brings to bear is that modillions in pediments could not be in keeping with the imitation of wood construction, since, he says, it is not right to place the representation of the ends of struts in a place where they do not belong, namely in the gable. But supposing we do place modillions in pediments: since the only thing they can represent in this location is ends of purlins, they should not have any position or orientation other than that of purlins. This is why some Moderns place modillions and dentils in pediments with an orientation contrary to the common practice of the Ancients. The late Monsieur Mansart was much approved for doing so in the entrance of the church of Sainte-Marie on the rue Saint-Antoine.[61]

The lions' heads that Vitruvius puts in the large cymatium are not to be found in the works of antiquity. At the three columns, instead of lions' heads, there are heads of Apollo with rays, placed at the middle of a rosette made up of six acanthus leaves.

In the soffit of the cornice, between the modillions, there are square coffers in which rosettes appear. The squares of the coffers are most often oblong and rarely perfectly square as in the Temple of Jupiter the Thunderer and at the Baths of Diocletian; for they are oblong at the portico of the Pantheon, at the three columns, and at the Arch of Constantine. Sometimes the rosettes appear without coffers, as at the Temple of Peace and at the Colosseum. Most often, the rosettes differ from one another and are seldom alike as they are at the Baths of Diocletian. The volute of the modillions sometimes extends outward beyond the ogee that caps it, as it does at the Baths of Diocletian, and sometimes it comes only to the inside edge, as in the portico of the Pantheon, at the Forum of Nerva, and at the Arch of Constantine. Sometimes it projects to the center of the ogee, as in the interior of the Pantheon, at the three columns, and at the Temple of Jupiter the Thunderer. Sometimes, as at the Baths of Diocletian, the leaf that covers the modillion extends outward as far as the volute, and sometimes it comes to the inside edge of the volute, as at the three columns and at the Temple of Jupiter the Thunderer; sometimes it projects as far as the middle of the volute, as it does at the Forum of Nerva, at the Temple of Jupiter the Thunderer,[62] and at the Arch of Constantine.

Among the Moderns, however, there is one cornice that has a completely distinctive character, and that is Scamozzi's. In it there is no dentil, and the modillions are so small and the projection of the cornice so great that it extends beyond the modillion by more than half the length of the modillion, making a very large gutter, like that of the Composite Order. It appears that this projection beyond the modillion imitates the Baths of Diocletian where, however, it is much less. This kind of modillion is convenient in that being smaller and more tightly spaced than usual, it allows us to bring columns closer together,[63] to the point of having the corners of their abaci touch and still have the modillions line up with the centers of the columns, which is impossible with the usual kind of modillion, where it is necessary to leave a considerable interval between the outside edges of the abaci. This interval is about forty-five minutes in Vignola, sixteen in Palladio, and twelve in our method. I believe that the best way is the one that allows columns to be more closely spaced as the need arises, such as when they are paired in porticoes, where the closer they are the better. However, because it cannot have a dentil and because this is an element that usage has made virtually essential to the Corinthian cornice, the character of this cornice is too unconventional, and I, therefore, do not believe that we can use it without taking too much license.

EXPLANATION OF THE FIFTH PLATE

A.—*Base invented by ancient architects who came after Vitruvius for the Corinthian and Composite Orders. The heights of its constituent elements are established by division and subdivision into four and their projections by dividing the small module into five.*

B.—*Corinthian capital different from that of Vitruvius, as much due to its proportion, which gives it greater height, as due to its character, since it has olive leaves instead of the acanthus leaves given to it by Vitruvius.*

C.—*Plan of the capital.*

D.—*Volute or helix of the capital that curves back into an S near the center.*

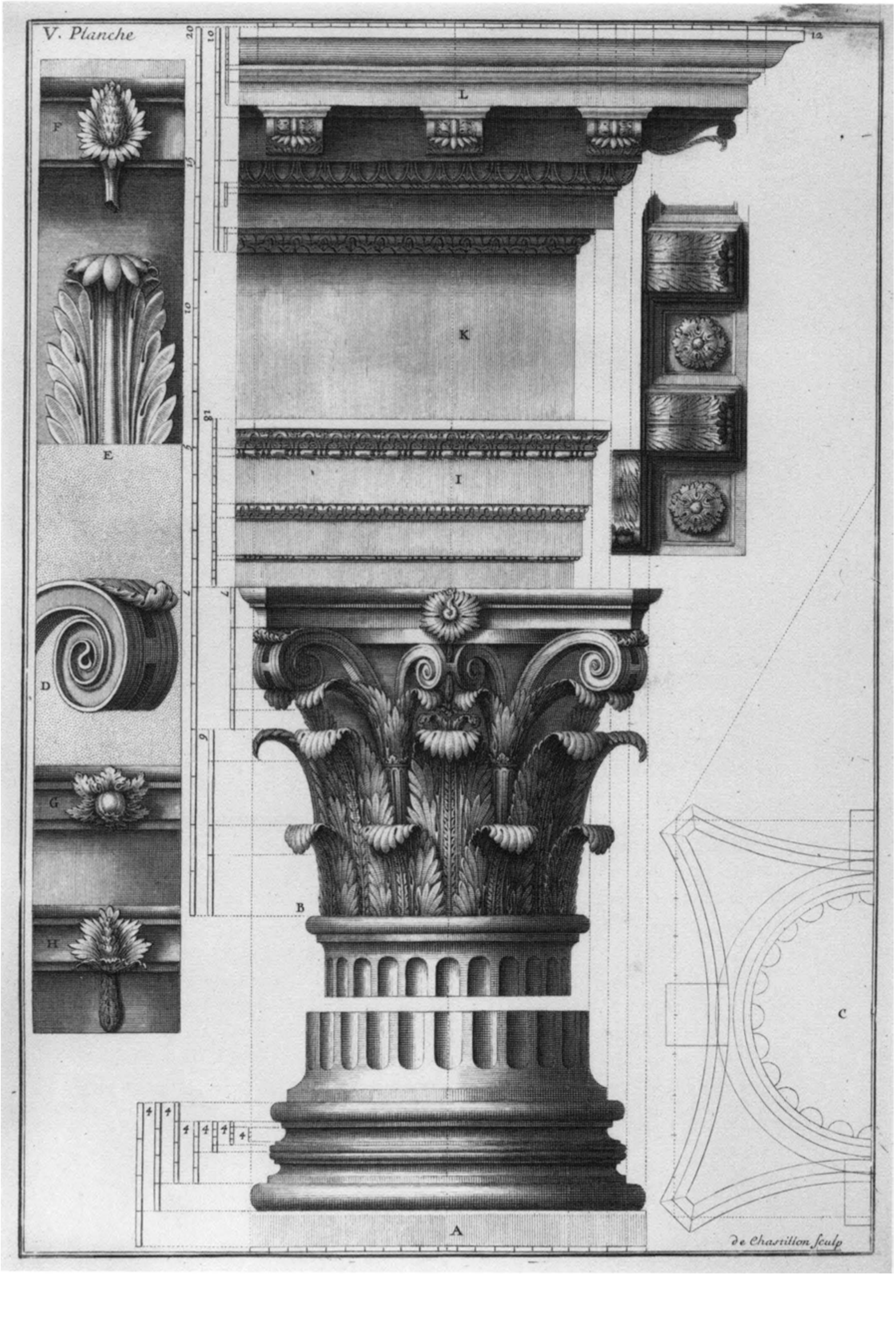
E.—*Bay leaf as it appears on the capital of the Temple of Vesta in Rome.*

F.—*Fleuron of the abacus of the capital at the Temple of Vesta.*

G.—*Rosette of the abacus of the capital at the three columns of the Campo Vaccino.*

H.—*Fleuron of the abacus of the capital at the Basilica of Antoninus.*

I. K. L.—*Entablature showing how the modillions, which are in line with the column, relate to the projections of the base and to the surface of the column shaft at its summit and at its base.*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Chapter V
The Composite Order

THE ORDER commonly called Composite is called Italic by some, because the Romans invented it and because the name *Composite* or *Composed* does not denote anything that distinguishes it from the other orders. Even the Corinthian, according to Vitruvius, is a composite of the Doric and Ionic, and we may even say that the Corinthian Order as it appears in antiquity differs no more from the Corinthian of Vitruvius than the Composite does from the ancient Corinthian, which has modillions and ovolos in the cornice of its entablature, astragals in its architrave, leaves cut like olive leaves in its capital, and two tori in its base. All these are elements of considerable importance, and are not found in Vitruvius's Corinthian, which is the one first invented by Callimachus,[64] and which should be accepted as the authentic one.

Serlio is the first to have added a fifth order to the four described by Vitruvius, and he has devised it out of what remains of this order in the Temple of Bacchus, in the Arches of Titus, of Septimius, and of the Goldsmiths, and at the Baths of Diocletian; but only the capital comes from ancient sources. Palladio and Scamozzi have given the order a distinctive entablature taken from the Facade of Nero, a work that passes as Corinthian due to its capital. Because this entablature has a distinctive character, not to be found in other ancient Corinthian works, and because it is an element of considerable importance, these authors have apparently decided that if they joined it to the capital, the result would distinguish this order well enough from all the others. But the truth is that this entablature is a little massive for an order that should be more delicate than the Corinthian, unless we claim that its heaviness relates to that of the capital, which is, in fact, less delicate than the Corinthian. This is why it is not unreasonable for Scamozzi to place the Composite under the Corinthian, as it appears on the Arch of the Lions in Verona. This Composite cornice is very appropriate in the entablatures of buildings that have neither columns nor pilasters, as was formerly the case on the exterior of the Louvre.

Modern architects have given this order proportions, something Vitruvius did not do, having defined only its character when he said that its capital is made up of several elements taken from the Doric, the Ionic, and the Corinthian. And since he changes nothing in its proportions, neither in its capital nor in the rest of the column, he would not have the Composite constitute an order distinct from the others. Serlio and most of the Moderns, however, do give a different proportion to the

Composite column and make it higher than the Corinthian.

We have said that in keeping with the progressively increasing height given to the orders as they become more delicate, the whole Composite order measures forty-six small modules, of which the pedestal has ten, the column with its base and capital thirty, and the entablature six.

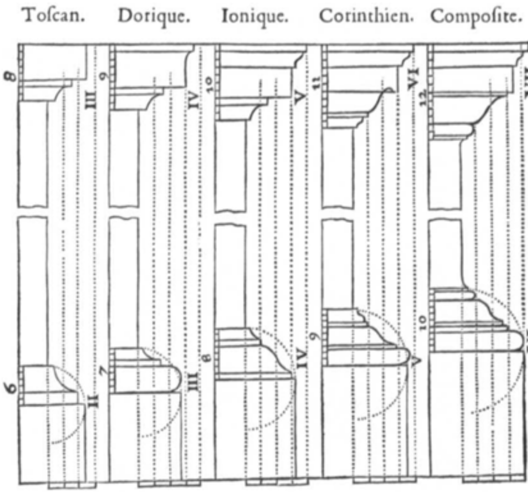
BASE OF THE PEDESTAL

As in all the other orders, the base of the pedestal with the plinth is one quarter of the whole pedestal. The base without the plinth is one third of the overall height of the base and is made up of six elements, just as the Corinthian base is made up of five. These six elements include a torus, a small astragal, a cyma recta with its fillet, a large astragal, and a fillet that makes a congé with the surface of the dado. To obtain the heights of these elements, we divide the part of the base that excludes the plinth into ten parts. We give three of these parts to the torus, one to the small astragal, one half to the fillet of the cyma recta, three and one half to the cyma recta, one and one half to the large astragal, and one half to the fillet that makes the congé. The projections are usually based on fifths of the small module. We give one fifth to the large astragal and two and two thirds to the fillet of the cyma recta. The projection of the torus is equal to that of the whole base, whose projection equals its height.

The Ancients differ as to the proportions and the character of this base, as do modern authors. At the Arch of Titus it is made up of ten elements with a scotia between them. At the Arch of Septimius there are only four, and at the Arch of the Goldsmiths there are five. Scamozzi has given his Corinthian Order the base from the Composite of the Arch of Titus. The one with six elements that I have given to the Composite Order is midway between that of the Arch of Titus and the Arch of Septimius, the one being overloaded with too much ornament, the other, too simple for an order that is a composite of all the others.

CORNICE OF THE PEDESTAL

The cornice of the pedestal, which is usually one eighth of the whole pedestal, is made up of seven elements. These include a fillet with its congé over the dado, a large astragal, a cyma recta with its fillet, a corona, and an ogee with its fillet. The overall height of this cornice is divided into twelve parts. We give one half of a part to the fillet, one and one half to the astragal, three and one half to the cyma recta, one half of a part to its fillet, three to the corona, two to the ogee, and one to its fillet. The lower fillet and the astragal above it have a projection of one fifth of a small module. The projection of the cyma recta with its fillet is three fifths; of the corona, three and one third; and of the ogee with its fillet, four and one half.



The same may be said of the character and the proportion of the parts of this cornice as was said of the base: the number of elements that make it up is excessive in the Composite of the Arch of Titus and inadequate in the Arch of Septimius.

BASE OF THE COLUMN

The base of the column is the same as that of the Corinthian Order, which is how it is on the Arch of Titus. Sometimes it is given an Attic base, as at the Temple of Bacchus, at the Arch of Septimius, at that of Verona, and at the Baths of Diocletian. Vignola gives his Composite column a distinctive base, taken from a base that formerly appeared on a Corinthian Order at the Baths of Diocletian, and which differs from the Corinthian base only insofar as it has only one astragal between two scotias. The other astragal, which has been removed from this location, is placed between the large torus and the first scotia. But apart from the fact that this base is no longer used, the fact that a single astragal between two fillets is a weak element, inadequately supported by the scotias, makes this area of the base too thin and sharp. The character of this base appears to have been taken from that of the bases at the Temple of Concord, where a single fillet takes the place of the two astragals and two fillets between the two scotias. This is even less acceptable than the single astragal of Vignola's base which, at least, is accompanied and supported by two fillets.

SHAFT OF THE COLUMN

The height of the shaft, increased by two small modules in this order, is all that distinguishes the shaft of the Composite column from the Corinthian one.

CAPITAL

It is the capital that chiefly determines the character of this order, since, as we have said, the base is often the same in these two orders, and the entablature is sometimes too, as the Arch of Titus with its entirely Corinthian entablature demonstrates. The overall height of the capital, like that of the Corinthian Order, is established by the diameter at the base of the column, to which we add a sixth part. We give four of these sixths to the leaves and then divide this space into six, giving one of them to the part of the leaves that curl outward.[65] The three other sixths, which remain above the leaves, determine the space for the volutes, the ovolo, the astragal, and the abacus, and this space is divided into eight parts. Of these, we give six and one half to the volute, which rests on the top of the leaves of the second row, two to the abacus, one to the space between the abacus and the ovolo, two to the ovolo, and one to the astragal with its fillet. The fleuron, which is in the middle of the abacus above the ovolo, rises to the top of the abacus. Its width exceeds its height by half of one of the eighths. The projections are determined by fifths of the small module, just as in the Corinthian Order, and the plan of the capital is also made in the same way as in the Corinthian. The leaves are given the shape of acanthus leaves. The fleuron in the middle of the abacus is made up of several leaves; some of these curve inward to join at the center, while others curve outward. Under the corners of the abacus there are leaves that curve upward, as do those in the caulicoles of the Corinthian capital, and still other leaves that curve down to rest on the outer edge of each volute. Instead of the caulicoles of the Corinthian capital, there are small fleurons attached to the bell or drum of the capital, curling toward the center of the face of the capital and terminating in a rosette.

Both the works of antiquity and those of the Moderns differ as to the proportions of the elements of this capital and even as to its overall height. In some buildings, this height is more than the seventy minutes that I give it, as is the case on the Arch of Titus, where it is seventy-four and one quarter, and on the Temple of Bacchus, where it is seventy-six. In others it measures less, as it does at the Arch of Septimius, where it is only sixty-eight and one-half minutes, at the Arch of the Goldsmiths, where it is sixty-eight and three-quarters, and in Serlio, where it is only sixty. The abacus, which I make seven and one-half minutes, is eight and one sixth at the Arch of the Goldsmiths, nine at the Arch of Septimius and at the Baths of Diocletian, ten at the Arch of Titus, and thirteen at the Temple of Bacchus. The volute, which

I make twenty-five minutes, as it is at the Temple of Bacchus, is as much as twenty-eight at the Arch of Titus and only twenty-two at the Baths of Diocletian.

The differences in character are as follows. Usually, the volutes descend to meet the tops of the leaves, but sometimes they are separate from them, as they are at the Baths of Diocletian and at the Arch of Septimius. Some Moderns make the two rows of leaves of equal height, although both in ancient and modern works they are usually unequal with the lower row taller. In the Moderns, the volutes most often emerge from the bell of the capital, as they also do at the Arch of Titus, but sometimes they pass along the base of the abacus between it and the ovolo without entering the bell, as they do at the Arch of the Goldsmiths, at that of Septimius, at the Temple of Bacchus, and at the Baths of Diocletian. The volutes, which are thinner at the middle and thicker at the top and bottom at the Temple of Bacchus, at the Arch of Titus, at that of Septimius, and at the Baths of Diocletian, have parallel sides in Palladio, in Vignola, and in Scamozzi. These volutes are virtually solid in antiquity and in modern authors, but today our sculptors make them in a more open way so that the layers of twisting bark that make them up do not touch each other but appear to show daylight. This, in my opinion, is very well advised, for otherwise the volute is too massive, which is inappropriate in an order that, generally speaking, is the lightest of them all.

As in all the other orders, except the Doric, the entablature is divided into twenty parts, of which we give six to the architrave, six to the frieze, and eight to the cornice. Authors differ as to these proportions, for the frieze is smaller than the architrave in the Temple of Bacchus, at the Arch of Septimius, at the Arch of the Goldsmiths, in Palladio, in Scamozzi, in Serlio, and in Viola, but frieze and architrave are of equal height in the Arch of Titus and in Vignola.

The Composite architrave differs more from the Corinthian than the Corinthian differs from the Ionic. Unlike the Corinthian, it has only two fascias with a small ogee between them, and in place of the cymatium or large ogee that is at the top with its astragal, there is an ovolo between an astragal and a cavetto. To obtain the heights of these elements, we divide the whole architrave into eighteen parts, as in the Corinthian Order. Five of these we give to the first fascia, one to the small ogee above it, seven to the second fascia, one half of one to the small astragal above it, one and one half to the ovolo supported by the astragal, and three to the cavetto, with one and one quarter of that to its fillet. The projection, like that of the Corinthian architrave, is two fifths of a small module.

The proportions and the character of this architrave are quite similar to what appears in the architrave of the Facade of Nero and of the Temple of Faustina. Palladio and Vignola modeled their architrave for the Composite Order on this one, although the capital in these buildings is Corinthian. The truth is, however, that the ancient Composite Order differs greatly from this one in all respects. At the Temple of Bacchus, the three fascias are very simple, with no astragals separating them; at the Arch of Septimius, there are only two fascias, but the upper cymatium is an ogee with an astragal, as in the Corinthian Order; and at the Arch of Titus, the architrave is identical to the Corinthian in every way.

FRIEZE

The frieze has nothing distinctive about it, except that at the Temple of Bacchus it is rounded, which Palladio imitated, and that at the Arch of Septimius it is joined to the architrave by a large congé. The frieze of the Facade of Nero, which I have imitated, also has a congé but at the top. The congé I have used is much smaller, being intended only to link the surface of the frieze to the first element of the cornice, which is a fillet, and as such usually needs a congé to join it to the moldings or other elements over which it is placed. It would appear that the congé on the frieze of the Facade of Nero was made as large as it is because this frieze is ornamented with sculpture. Since this sculpture is of considerable thickness, the congé prevents the projection of the sculpture from creating an adverse effect, as it does in friezes without one, where the sculpture projects as far as the first elements of the cornice. However, sculptured friezes without congés are, in fact, more common than those where they are present. There is no congé in the sculptured friezes of the Temple of Faustina and of the Temple of Jupiter the Thunderer, of the Forum of Nerva, of the Arch of Titus, and of the Arch of the Goldsmiths; but in the friezes of the Temple of Fortuna Virilis and of the Temple of the Sibyl at Tivoli and of the Facade of Nero, there is one.

CORNICE OF THE ENTABLATURE

The cornice is divided into ten parts, as in the Corinthian Order, and like it the cornice is made up of thirteen elements. It appears heavier, however, because the corona is much more massive, as are the modillions, which are not shaped like consoles or covered with leaves, but square. The first element of this cornice, which is a fillet, is one quarter of one of the ten parts; the second, which is an astragal, is also one quarter. The third is an ogee with one part; the fourth is the first fascia of the modillion with one part; the fifth, which is a small ogee, is one half of a part. The sixth, which is the second fascia of the modillion, is one and one-quarter parts; the seventh, a fillet, is one quarter of a part; the eighth, which is an ovolo, is one half of a part. The ninth, which is the corona, has two parts, and the gutter under it has a depth of one third of a part. The tenth, which is an ogee, is two thirds of a part; the eleventh, which is a fillet, is one third of a part; the twelfth, which is a large cyma recta, is one and one-half parts; the thirteenth, which is a fillet, is one half of a part.

The projections are usually determined by fifths of a small module. We give one third of one of these parts to the first element, which is a small fillet, and another third to the small astragal above it. We give one and one-third parts to the large ogee that appears next, four and two-thirds parts to the first fascia of the modillion, five parts to the second one, five and two-thirds parts to the ovolo above the modillion, eight and one-half parts to the corona, nine and one-half parts to the ogee of the corona, and twelve parts to the large cymatium.

Although the character of this cornice, like the proportions of its moldings, is taken, as the architrave was, from the Facade of Nero, I have more or less followed what Palladio and Scamozzi copied from it. In this way, always adhering to the mean that I have adopted as my rule, I have kept midway between two extremes. For example, the corona in the Facade of Nero at one quarter of the height of the whole cornice is extraordinarily large. It has only one sixth in Palladio and as little as one seventh in Scamozzi. I make it one fifth. The modillion, which is only one quarter of the cornice in the Facade of Nero and in Scamozzi, is one third in Palladio. In this, as in almost everything else I have followed Palladio, whose cornice is closer to that of the Facade of Nero than the one Scamozzi has given us. Scamozzi has taken all the moldings that appear below the modillions from the Corinthian Order, namely, an echinus, or ovolo, a dentil, and a large ogee. The other Moderns have followed neither the Ancients, who use a Corinthian cornice on the Composite Order of the Arches of Titus and of Septimius, nor the model of the Facade of Nero. Vignola gives it a very simple cornice, which is similar to that of the Ionic Order. Serlio and Bullant have made it even more massive than in the Tuscan Order. To enrich this cornice, which is not very appropriate in an order as delicate as the Composite with its highly ornamented capital, sculpture is added to all the elements that can be sculpted, such as the astragal, the ogee under the modillions, the ogees and the ovolo of the modillions themselves, and the ogee under the large cymatium. This would appear to be the reason why this last ogee is enriched with some very beautiful sculpture on the Facade of Nero, even though ornament or sculpture of some kind is not as essential here as it is in other parts of the cornice.

EXPLANATION OF THE SIXTH PLATE

A.—*Base that appears on the Composite Order of the Arch of Titus, which is the same as the one the Ancients have given to the Corinthian Order.*

B.—*Base of the Temple of Concord, which Vignola's base imitates.*

C.—*Base that formerly appeared on the Baths of Diocletian, copied from that of the Temple of Concord, and which Vignola gives to the Composite Order.*

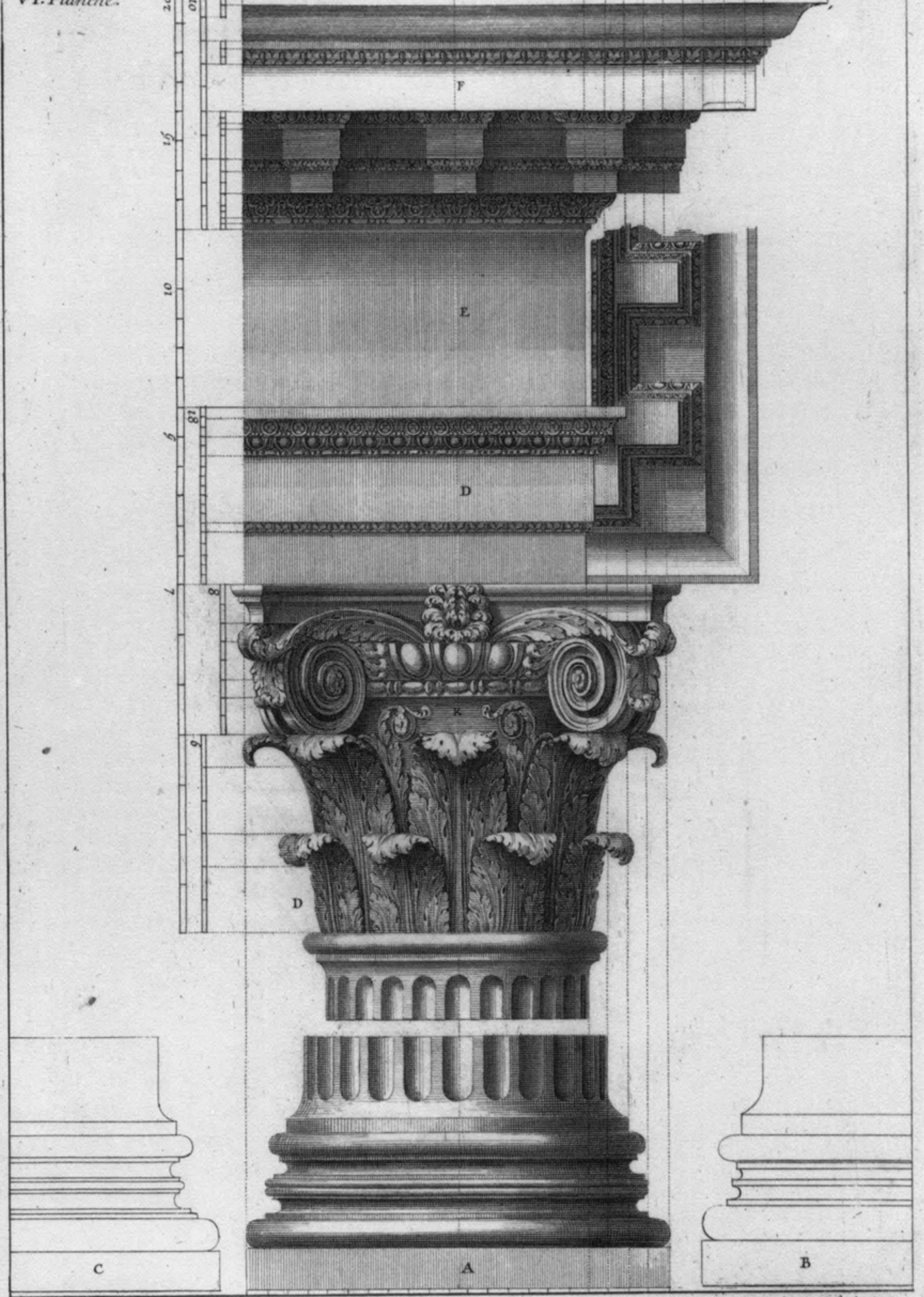
K.[66]—*Capital with the proportions and character that our sculptors have given it of late. Its most noteworthy features are the equality in height of the acanthus leaves and the lightness of the volutes, which are hollowed out with much grace. The circumvolutions of the bark are separated from one another, and the volute is not massive or solid, the way it is in all ancient and modern works.*

D.—*Architrave taken from the Facade of Nero and the Temple of Faustina.*

E.—*Frieze with a congé at the top, as it is on the Facade of Nero, where the congé is much larger, perhaps because there are ornaments carved in the frieze.*

F.—*Cornice also taken from the Facade of Nero.*

VI. Planche.



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Chapter VI
Pilasters

HAVING DISCUSSED COLUMNS, it remains for us to deal with matters pertaining to pilasters, which are square columns. There are several kinds of square columns, and the differences between them arise from the way they are applied to walls, which is also a differentiating factor for columns themselves. Some columns are isolated and completely detached from the wall, others are attached by only a corner and have two faces free, and others are sunk into the wall by one half or only one third of their thickness, with only the front face left entirely free. Similarly, there are also isolated pilasters, pilasters with three, or only two, faces outside the wall, and pilasters where only one face is entirely free.

Isolated square pilasters are rare in antiquity. One example appears at the Temple of Trevi, which Palladio has drawn. They are placed at the outside edges of porticoes in order to strengthen the corners. Those that have three faces free of the wall were called *antae* by the Ancients. Vitruvius calls those that have only two faces free of the wall angular antae, or antae of the walls that enclose the temple, to distinguish them from those that have three faces free and that are placed at the ends of the walls of the porch.[67] Pilasters that have only one face free of the wall are also of two kinds, those that emerge halfway out of the wall and those that emerge only by a sixth or seventh part. The latter, which were rare among the Ancients, are now the most common ones in our architecture.

There are four factors that enter into the regulation of pilasters: their projection from the wall; their diminution; the manner of placing the entablature over them when it also continues over a column; their flutings and their capitals.

The projection of pilasters that have only one face free of the wall should either be by an entire half or by no more than one sixth, as it is at the Facade of Nero, as long as nothing compels us to give it more of a projection. At the portico of the Pantheon, the pilasters on the exterior only project by one-tenth part; and sometimes they only project by one-fourteenth, as at the Forum of Nerva. But when pilasters must receive imposts, which are profiled against their sides, their projection ought to be one quarter of the diameter. This proportion has the added advantage of avoiding having to cut off Composite and Corinthian capitals in an irregular way, since it so happens that when we use a projection of a quarter diameter, we can cut the lower leaf exactly in half, and in the Corinthian Order, we can also cut the caulicoles in half. The symmetry of capitals is also the reason for giving pilasters a projection of more than half their diameter when they meet at reentrant angles, as we will explain in the next chapter.

Usually, we do not diminish pilasters toward the top when they have only one face free of the wall: those on the exterior of the portico of the Pantheon are without diminution. But when pilasters are in line with columns, we ought to make the entablature continuous over both without its breaking forward as the entablature on the sides of the exterior of the portico of the Pantheon does.[68] In order to achieve this continuity, we must give the pilaster the same diminution as the column, but this applies only to its front face, since the sides are left without diminution, as they are on the Temples of Antoninus and Faustina. But when the pilaster has two faces free of the wall at a corner, and one of the faces is opposite a column, this face is diminished in the same way as the column itself, as appears at the Portico of Septimius; whereas, the face that is not opposite the column is not diminished. Nevertheless, there are examples in antiquity where pilasters have no diminution, as in the interior of the Pantheon, or where the very little they do have is less than that of the column, as at the Temple of Mars the Avenger and at the Arch of Constantine. In such cases, sometimes the practice of the Ancients is to bring the architrave in line with the surface of the column shaft, which makes it recede inside the surface of the pilaster, as occurs at the Temple of Mars the Avenger, on the interior of the Pantheon, and at the Portico of Septimius. Sometimes the practice is to divide the discrepancy in half, making the architrave project wrongly beyond the surface of the column by half the discrepancy and bringing it back inside the surface of the pilaster by the other half, as it appears at the Forum of Nerva.

As for flutings, sometimes pilasters have them, even though the columns that accompany them do not, as at the portico of the Pantheon. In this building, however, the columns have no flutings because they are not white marble, for when different kinds of colored marble are used, columns are normally left unfluted. Sometimes there are fluted columns that are accompanied by unfluted pilasters, as at the Temple of Mars the Avenger and at the Portico of Septimius. We do not flute the returning faces at the sides of the pilasters when the pilasters project by less than half a diameter. The number of flutings varies in antiquity. There are only seven at the portico of the Pantheon, at the Arch of Septimius, and the Arch of Constantine. There are nine on those in the interior of the Pantheon, although columns usually have only twenty-four. The number of flutings is always uneven in pilasters, except in the half-pilasters that form reentrant angles, where, when the entire pilaster has seven or nine, we give the half-pilaster four instead of three and one half and five instead of four and one half. This practice ought to be adopted in order to avoid creating an adverse effect by leaving too narrow a space for the capital at the top when it is folded into the angle. In capitals with leaves, such a restricted space would create a confusion that enlarging the width alleviates.

The proportions of capitals are the same as those of the columns, as far as their height is concerned, but the widths are different [since the leaves are much wider due to][69] the perimeter of pilasters being much greater than that of columns. Nevertheless, the capitals have the same number of leaves, which is eight for the whole perimeter, although there are some examples of pilasters with twelve leaves, such as on the Facade of Nero and at the Baths of Diocletian. The usual disposition of leaves on pilasters is such that in the lower row of small ones, there are two on each face and in the upper row, there is one in the middle and a half of one on each side, each of which is half of the large leaves folded over the angle. Also to be noted is that usually the top of the bell is not straight, as it is at the bottom, but is rounded and protrudes slightly at the middle of each face. It does so by an eighth part of the diameter at the base of the column at the Basilica of Antoninus but only by one tenth at the Portico of Septimius and one twelfth at the portico of the Pantheon.

There are also several things concerning pilasters in the following chapters.

Chapter VII
Abuses in the Alteration of Proportions

THERE ARE SOME THINGS so firmly entrenched in everyone's opinion that even the wish to examine them would seem to invite ridicule, although when we look at them closely, they are found to be far from self-evident. One of these things is the alteration in the proportions of architecture and sculpture, which it is claimed ought to be practiced in keeping with differences in aspect.[70] Architects believe that this is what gives them most credit and claim that the highest distinction of their art consists in the exercise of the rules that they have for such alterations.[71] Nevertheless, some hold that these alterations are not what people think they are, that these rules are not actually put into practice, and even that their application in the most highly acclaimed works is the reverse of what the rules stipulate. They hold that the reasons given to justify the renown of such works are accepted by common consent and have been for so long only because people have accepted them without examining them.

Such an examination is what I intend to undertake in this chapter, and thus I conclude this treatise with an unorthodox opinion, just as I began it with another pertaining to the alteration of proportions. For I have tried to show in the Preface that since most proportions in architecture are arbitrary and since there is nothing in these matters that has a positive and natural beauty, there is nothing to prevent us from altering established proportions or to stop us from inventing others that appear to be beautiful. And I claim here that once these proportions have been established, they should no longer be changed or made different in different buildings for optical reasons or because of the different aspects they may have. I anticipate more opposition, however, to the second unorthodox opinion than I do to the first. In the first case, I only have to contend with the opinion of architects who do not consider the idea of the beautiful that guides them as something they themselves have formed through study and by looking at buildings that meet with approval but who rather regard the idea of beauty as a natural principle. People who are not architects, however, who are free of the prejudice created by rules and by custom, and who, for this reason, do not know if an astragal or a torus has too much or too little height or projection, readily conclude with me that if architectural proportions had natural beauty, we would know them naturally without any need to be instructed by practice or by study. Concerning the second unorthodox opinion, however, I am sure that there is no one who does not find alteration of proportions a very reasonable thing and who is not convinced of this by the celebrated story of the two statues of Minerva made to be set in a very high place. It is claimed that one of these statues did not have its intended effect because the sculptor did not change its proportions, and I have no doubt that those who hear the arguments put forward on the subject acquiesce to what is specious in them and have a great deal of trouble giving up an opinion that they believe to be founded on reasons as good as those of optics and sensory deception, which they think very reasonable for art to correct.

Because the images of things represented in the eye are smaller and less distinct when objects are farther away than when they are close and because a direct view makes objects appear differently than an oblique one, people imagined that this had to be compensated for, as though it were a shortcoming that art had to correct. That is why people say that columns, which are, in fact, usually thinner at the top, should have less of a diminution when they are very large than when they are small, because their length already makes them seem thinner at the upper end, just as the far end of a corridor seems narrower. They would also make the entablatures placed above these large columns larger, because the height makes them seem small. They would have the fascias of elements, which are usually plumb when located at an average height, slope forward when these elements are very high, for fear of their appearing too narrow, and would raise the soffits or undersides, which are usually level, at the front when they are low and not much above eye level, for fear of their appearing to project too little. Similarly, in sculpture, they would advocate making works to be placed at a distance from the viewer higher, more massive, and more rugged to avoid having them appear too weak and inconspicuous, and they would also advocate making statues placed in very high niches lean forward, for fear that they might appear to be leaning backward.

I begin my examination of these reasons by examining a point of fact and maintain that there are no examples where these rules for the alteration of proportions have been applied. If there are a few such examples, we should not believe that their proportions were altered for optical reasons but rather that they have occurred by chance, since they have not been applied at all in the most highly acclaimed buildings.

To begin with the upward diminution that we give to columns: it so happens that in antiquity both the largest and the smallest columns have the same diminution and that there are even small ones that have less diminution than large ones. The large columns of the Temple of Peace, those of the portico of the Pantheon, those of the Campo Vaccino and of the Basilica of Antoninus, whose shafts alone measure forty and fifty feet, have no more diminution than those of the Temple of Bacchus, whose shaft measures only ten. But the columns of the Temple of Faustina, of the Portico of Septimius, of the Baths of Diocletian, and of the Temple of Concord, whose shafts are thirty and forty feet high, have even more diminution than the columns of the Arches of Titus, of Septimius, and of Constantine, whose shafts measure only fifteen and twenty feet. Therefore, it is obvious that the diminution of these columns was not varied for optical reasons, and since the large columns have a large diminution and the small ones a small diminution, their proportions should, according to the rules of optics, create an effect opposite to that which the architects intended.

People claim that the fronts of soffits should be raised to make the projection of elements apparent and hold that this is necessary in three main instances: when the aspect is distant, when the element is not situated very high up, and when it is not possible to give it a suitable projection. It so happens, however, that in these very instances the opposite practice was adopted in antiquity. As regards the aspect, at the portico of the Pantheon, where it can be very distant and where, for this reason, the projections ought to appear small, the soffits are not raised, and yet they are raised in the interior of the temple where, because the aspect is necessarily close, the need for raising soffits does not arise. As regards elements situated low down on a building, a practice contrary to the rule is also observed in the most highly acclaimed works, where the soffits of the highest elements are often raised when they have no need of it and are not raised on elements situated below. This appears at the Theater of Marcellus, where the soffits of architraves as well as of imposts are raised on the second order and not on the first. It also appears at the Colosseum, where they are raised in all four orders alike. In the Temple of Vesta at Tivoli and at the Temple of Bacchus, which have the smallest orders and the lowest entablatures of any buildings, the soffits are not raised anywhere. Finally, the small size that must sometimes be given to projections is not a reason for raising soffits, since there are acclaimed buildings with very large projections where the soffits are raised nonetheless. This appears in the architrave of the Temple of Fortuna Virilis, where the soffits of the fascias are raised even though the size of their projection is unusually large.

As for the inclination of fascias, which people believe should slope forward to avoid their appearing narrow due to an oblique aspect, they should, according to the rule, slope forward when too close an aspect forces the viewer to see them obliquely or when a fascia must be made to appear large because, for some reason, it had to be made small. But this does not occur in antiquity. At the portico and on the interior of the Pantheon, where the aspects differ, all the inclinations are backward. They are the same at the Temple of Bacchus and at the Baths of Diocletian, where, as the aspect is necessarily close, they should follow the rule and slope forward. Although many fascias have their proper size, we still almost always see them slope backward, and we even see some that do so although they are smaller than they ought to be. This may be noted at the Temple of Vesta at Tivoli, where the top fascia of the architrave, which is much too small, slopes backward. In fact, it so happens that fascias almost always slope backward, regardless of whether they are situated in very high or in low architectural elements, and there is no knowing why they slope forward at the Temple of Mars the Avenger and at the Forum of Nerva, since these are almost the only ancient buildings where they do so. It is sometimes necessary to slope fascias backward to give a suitable width to the soffits of the elements that make up an impost, a cornice, or an architrave when the large overall projection that would result if the fascias were not sloped backward is undesirable. But it would appear that this is not why the Ancients used this backward slope, since in the architrave of the Temple of Fortuna Virilis where the fascias are sloped backward, the soffits have double the projection they ought to have.

Nor in sculpture did the Ancients make figures in very high places larger, more deeply chiseled, more rugged, and more massive than those closer to the viewer. On Trajan's Column the figures of the bas-reliefs are no larger or more massive at the top than at the bottom. The statue of Trajan that was at the top of the column was less than one sixth of the column height, and it is certain that it was half as small, relative to the column, as the figures Palladio places on columns half the size of Trajan's Column. This architect, like all architects, advocates the alteration of proportion, but like all architects, he abstains from applying it. He makes figures situated in the high places of the ancient temples that he has drawn the same size as those below and quite often makes those below larger than those at the top. Pliny remarks that at the top of the Pantheon there were formerly statues that, although they were among the most beautiful, were not classed as first-rate works because, he says, they were situated too high, which is to say that their distance from the viewer prevented their being seen clearly. Yet the celebrated Athenian Diogenes,[72] who had made them along with all the other figures of this temple, had placed them there, and we have no indication that this illustrious craftsman was unfamiliar with the story of the two Minervas or that he did not take as much pride in the alteration of proportions as everyone else. Like everyone else he applied the alteration of proportion by not applying it at all.

It is true, however, that there are both ancient and modern examples that show clearly that people sometimes did try to change proportions because of the aspect, but these kinds of alterations, besides being rare, undeniably create a very adverse effect. We have examples of this in the courtyard of the Louvre, where the bas-relief sculptures of the Attic story contain figures that are much larger than those at the bottom, thereby disturbing everyone. The same thing occurs on the facade of Saint-Gervais, where the statues were made an enormous size due to their being so very high up. But the most significant example of an alteration made for optical reasons occurs at the Pantheon. The squares of the coffers in the vault recede in steps, like hollow pyramids, and the center of the axes of the pyramids, rather than being near the center of the vault, is located at the center of the temple five feet above the pavement. This results in the axes not being perpendicular to the bases of the pyramids, which would have been necessary in order to maintain symmetry. This alteration makes the view of the hollow pyramids from the lower center of the temple the same as it would be if the viewer were lifted up to the center of the vault, with this the point where all the axes of the coffers converge. However, as soon as one moves away from the center of the pavement, the effect is destroyed, and one becomes aware of the obliqueness of these axes and of the defective symmetry of the pyramids, which is something much more disagreeable to the sight than if the orientation of the receding coffers had been straight, as it ought to be, relative to the vault. The only shortcoming of this straight orientation, which can be called the natural one, is that a part of the tread of the steps on the lower side of each coffer would have been hidden by their depth when we move toward the wall and that we would see more of these treads as we moved away from the center. This, however, is no more of a shortcoming than when the nose hides part of a cheek when a face is viewed in profile. For the architect of the Pantheon has done the same thing as a painter would have if when drawing a face in profile, he had drawn a frontal view of the nose for fear that if it were drawn properly, it would hide part of one of the cheeks. Labacco who,[73] like other architects, commends the alteration of proportions without practicing it, turned the poor results of this alteration in the Pantheon to his own advantage in a design he published for the cupola of Saint Peter's, where he oriented the hollow pyramids of the coffers of the vault toward the center of the vault, as they ought to be. He decided that changing the center could not create a favorable effect, although the much greater height of Saint Peter's relative to that of the Pantheon greatly increases the shortcoming caused by the rise or thickness of the steps, which hide the treads of the steps above them. It would appear, however, that he paid no attention to this, treating it as something that never offends the sight, since nothing is more normal than to see some elements hidden by others, and there is nothing that sight is more accustomed to doing than to adjust the proportions of things as a whole through the judgment it makes of an overall size of which it views only a part.

The ability of sight to make such judgments is the reason why we should not alter proportions, because this judgment never fails to apologize, as it were, and to prevent our being deceived by the distortions and the adverse effects that we imagine can be caused by distance and varying relative position. We have shown that there are no examples of altered proportions in antiquity, and in order to make it understood that there is no reason at all to change proportions, it now remains for us to explain what this faculty of judgment entails.

The judgment with which all the senses are endowed is something that we possess without knowing it and that we exercise without being aware that we do so, as if it were habit or second nature. Habit has made us less disposed to be aware that we engage in this activity than we are of the other activities of judgment, and as a result the judgment of the senses becomes a separate case [*espece*] altogether.[74] For it is unlike those other activities of judgment that, because repeated less often, we cannot engage in without reflecting on them and without knowing it. Habit also makes the judgment of sight and hearing, as the senses we use most often, much more precise than that of the other senses, and habit makes it rare for them to be deceived by situations that might entail deception. As a result, we judge the distance, height, and strength of objects with great certitude through sight and hearing and discern such matters less easily through the other senses. Touch, for example, does not readily distinguish the heat of a large fire that is distant from the heat of a small fire that is nearby. Taste often confuses the weakness of a lesser wine with the weakness of a stronger one that is mixed with water. Smell mistakes the weakness of an odor that is weak by nature for one that is weak because there is little of it. The almost continuous action of sight and hearing has, through long practice, given these senses a facility that the others do not have for want of training. For instance, when we touch the end of a stick with the tips of two crossed fingers, we initially think we are touching two sticks because we are not used to touching it in this way. If we continue touching the stick in this way for a long time, we are no longer deceived and only feel one stick. Similarly, we see double when, with effort, we displace our eyes from their normal position. Cross-eyed people, however, whose eyes are naturally displaced in this way, do not see double because they are used to correcting, through judgment, the error into which the unnatural position of their eyes would lead them.

It is very likely that animals see badly when they are born and that they judge distant objects to be as small as the image of them represented inside their eye makes them appear. By letting them know they were mistaken, experience corrects the error of this first judgment. Subsequently, judgment becomes so apt in the use of all possible means to ward off such deception that finally it achieves the perfection it has when we begin to see properly. This perfection is such that no one believes that a distant tower is smaller than a finger because it can be covered by a finger placed close to the eye, or that a circle viewed obliquely is an oval, or that an oval is a circle, although these are the actual images of things in the eye. It is very important to reflect well on the exactitude of a judgment so precise that it would not be believable if experience did not bear it out: if every day we did not observe a coachman judge at fifty paces the impossibility of making his coach pass between two others although the clearance falls short by no more than two inches; if we did not see a hunter judge the size of a bird in flight; if we did not observe a gardener make no mistake about the size of a piece of fruit at the top of a tree; a carpenter determine the size of a beam placed in the ridge of the roof of a building; and a fountain maker measure by sight the exact height and thickness of a jet of water.

Our conviction that sight does not deceive us to the extent that people claim is not a result of experience alone. Reason too can disclose this, showing us what methods judgment uses to prevent deception and on what basis judgment can acquire such difficult knowledge with so much certainty. In order to understand what this basis is and what these methods are, we must consider the practice painters usually adopt when they try to deceive sight by making things appear near or far away. They base their practice on the fact that the judgment of sight is very exact in its observation and examination, and their method consists chiefly in two things: the modification of shapes and sizes and the modification of colors. They use the modification of shapes and sizes to establish distance when they reduce things in size and locate them properly, by making floors rise and ceilings descend, for example, and by converging the far ends of what is at the sides. They use the modification of color to create the same appearance of distance, by diminishing the colors' intensity, making light areas less brilliant and shaded areas less dark. The practice is such that both kinds of modification always occur together. For we must presume that when the judgment of sight has examined all these things, it concludes that an object whose depiction in the eye is small is, in fact, small and near if it is illumined by very bright light and has very dark shadows. Similarly, it concludes that a floor depicted in the eye as being raised is not so, in fact, but that it is very long when its constituent parts are colored in such a way that as it rises, the lights and darks become progressively less pronounced.

In addition to examining these two modifications with great exactitude, the judgment of sight also takes other circumstances into consideration and uses other methods to know the size and distance of far-off objects. These methods involve comparing known things to unknown ones, so that knowing a distance conveys knowledge of size and knowing a size conveys knowledge of distance. For we judge objects of a known size, such as a man, a sheep, or a horse, to be distant when their depiction in the eye is small, and for the same reason, when the depiction of a tower that we know to be distant is large in the eye, we judge that the tower is in fact large. We must understand that this occurs because, in judgment, we link the method comparing the known to the unknown to the method based on the modification of sizes, shapes, and colors. Since the modification of colors enables us to judge distance, since distance enables us to judge size, and since the modification of size also enables us to judge distance, the mind, which has long been accustomed by nearly infinite practice to examine, link, and compare all these things together, finally acquires an almost infallible facility for discerning the size, distance, shape, and color of distant objects and all other truths concerning them.

But what proves that the judgment of sight is both accurate and infallible and what imparts certain knowledge that this sense is not as susceptible to surprise and deceit as people claim, is the difficulty even the most perfect and ingenious art has in succeeding in the attempt to delude us; for apart from a few birds whose flight is disturbed, we rarely see any animal deceived by perspective. The painter may well have decreased sizes, made lines at the sides oblique, and made lights and shadows less pronounced, keeping, as much as possible, the same levels of intensity as nature gives them at various distances. Since it is impossible for him to do it as precisely as nature does, the eye, which is more accurate and more exact than the hand of the painter, easily perceives the shortcomings of even such supreme precision. And we can find no reason for not being deceived by painting other than the certitude of sight, which is able to discover other imperfections besides those invariably present due to the fault of the craftsman: imperfections necessarily arising from the thing itself. When a mountain is made to appear distant, for example, by weakening its coloration, the eye inevitably perceives in these attenuated lights and shadows the same intensity as the lights and shadows of nearby objects, because the unevenness of the canvas or of the wall that actually is near to us itself has an intensity of light and shadow not present in things that are distant. For the same reason, if we listen closely, the distant voice represented by ventriloquists does not deceive us, because the ear discerns all kinds of other little sounds mingled with the sound of the weakened voice and these have all the strength of a sound emitted nearby. For even though a painting at a distance from the viewer does not make it possible to see the unevenness of its surface very clearly, nevertheless the fidelity and exactitude of sight are such that the imperfect and confused perception we have of it is still enough to prevent its deceiving us.

Since the judgment of sight is so exact and since the certainty of the knowledge it gives us is so precise, the distance of objects can neither surprise nor deceive us. It should not, therefore, be difficult to grasp why proportions cannot be changed without our noticing it and why their alteration is not only useless but should even be considered harmful.[75] The eye of the person who knows, for example, what the proportion of an entablature should be cannot fail to see that it has been made proportionally larger on a large column than on a small one, no matter how high up it is, just as there is no one who cannot judge perfectly well if a man at a high window has a larger head than usual. As a result, if it is true that the usual proportion of an entablature is reasonably founded because the mass of what is carried should have some relationship to the strength of what carries it, then an entablature that is, in fact, larger than it should be relative to the column that supports it will inevitably offend the sight. And the same thing will happen if we make a statue in a niche or a bust on a console lean forward in order to prevent its appearing to lean backward; for if it is made to lean forward, it will inevitably appear to lean forward.

For the same reason, if we make crude and massive the parts of sculptures that are placed high up in order to avoid their appearing indistinct and confused because of their great distance from the viewer, the eye will perceive them as being crude and massive. This is because when the eye compares the distance it knows with the confusion it knows ought to be present in things that are far away, it will be offended if it detects a clarity that it judges should not be there. Similarly, we would be offended to see a painting in which the painter made distant things as forceful and distinct as those that are near. For if we accept that only the ignorant would wish to see every eyelash and the redness of lips clearly depicted in the distant background of a painting, we must also accept that unless a person were someone who knew nothing of what determines the beauty of sculpture, he would not be able to bear for sculptors to shade the eyes of statues, make holes in the curls of their hair, or define their muscles more strongly than necessary, no matter how elevated their placement.

162 For those who have an idea of what constitutes perfection in craftsmanship will always see, at least when comparing one part to another, when proportions have been distorted or spoiled, since it is impossible to make all parts equally forceful and distinct. On sculptures situated at a distance, for instance, it is impossible to make the shadow cast by the head on the neck as dark and distinct as the shadows that appear around the eyes, which have been hollowed and shaded to create the forcefulness people claim is needed.

Suppose that the eye with its judgment were not able to convey knowledge of the size of distant objects very precisely and that a coachman were less certain of the space needed for his coach to pass than if he measured it. Where the knowledge of proportions is concerned, we must bear in mind that this precision is not the only thing required to prevent the eye from being deceived by distance; it is not necessary to know the size of something absolutely but only to know how to compare it to the size of things next to it. The coachman judges the space between two coaches through which he wants to pass as too small because he compares this space to the size of the coaches on either side. Similarly, the eye judges the size of an entablature and knows very well if it is too large, even if it does not judge very precisely what its actual size is; it is enough to compare this size to that of the other parts of the building. Now distance does not prevent making this comparison, because if distance reduces the appearance of the size of the entablature, it also reduces the appearance of the size of the other adjoining parts of the building associated with it; thus, notwithstanding distance, the eye would still notice any increase the architect or sculptor might have made in the size of one part.

Even when the judgment of sight might not be able to prevent the distance and position of objects from deceiving us, the alteration of proportions is still not a good remedy for this supposed defect, because the effect of alteration is favorable only at a given distance and only if the eye does not change position. There are optical figures whose proportions are modified in such a way that their effect is favorable only if they are viewed from a specific location but become immediately misshapen as soon as the eye changes place. If we alter the proportions in a building in order to make them create a favorable effect in an eye situated in a specific location, these proportions, like those of the optical figures, will also appear totally defective as soon as the viewer changes place, because an aspect that is oblique when a person is near becomes progressively less so as he moves away. Thus, enlarging or inclining the fascia of a corona, in order to avoid its appearing too small due to the obliqueness of the aspect, would make it appear too large as soon as a change in aspect obviated this obliqueness.

To conclude in a word, I believe that once people have thought the matter over carefully, they will find no reason at all for distorting or spoiling proportions in order to prevent them from appearing distorted or for making something defective in order to correct it. Since the appearances created by distance and position that people take to be shortcomings and adverse effects are actually the true state and natural form of things, they cannot be changed without making them visibly misshapen. For all we have said, or can say, on this subject is that distance is less likely to distort proportions than is the alteration of those proportions and that there is greater danger in making a proportion appear distorted when, in fact, it is than in having it appear distorted when, in fact, it is not.

Yet what is to become of the unanimous opinion held by all architects, which is based on the authority of Vitruvius whose teaching advocates this alteration of proportion and prescribes rules for its application? Must we believe that in the nearly two thousand years since this precept was established, no one has taken the time to examine it and that the many brilliant minds that appear to have reflected on a question of such importance were unable to discover the truth of the matter? There must be something in this, and my opinion is that just as a person with all the gifts needed to be an architect may feel it a waste of time to toy with matters he believes to be pointlessly subtle, so people with the ability to resolve the most subtle issues may well have neglected this one. Discussion of it appeared pointless since the authority of Vitruvius seemed to have settled the matter and also since there are a few instances where alteration of proportion can be said to exist in some way. But because, as we shall demonstrate in these instances, the alteration of proportion is not at all for optical reasons, the truth regarding proportion still remains absolute: namely, that one must not alter architectural proportions in accordance with varying aspects.

Everyone's eagerness to enhance his professed art is what has led architects to turn anything they cannot find a reason for into a mystery. Exploiting the high regard that people usually have for things from the past, of which almost none are more ancient than the ruins of Greek and Roman buildings, architects tried to establish as fundamentally unshakable the belief that nothing in these admirable ruins was ever done without complete justification. And when people objected by calling attention to the divergent proportions found in works that meet with uniform approval, architects attributed this diversity to their divergent aspects, maintaining that different locations required different proportional rules.

The examples at the beginning of this chapter, taken from the most highly acclaimed buildings of antiquity, demonstrated that this cannot be so, since proportions often vary even when the aspect remains the same and proportions often remain the same even when the aspect varies. It is left for me to show that in cases where alteration of proportions may be permitted, the basis for such alteration is not optical or the effect caused by the distance and position of architectural elements.

The first case where I believe that we may change proportions is when we do not want to give too much projection to a cornice, architrave, or pedestal. In such instances we can slope the fascias backward in order to make their reversed inclination compensate for the width given to the outward projection. Clearly, optics has nothing to do with this, because the projections do, in fact, have their proper width and the intention is not to make them appear other than they are. It should be noted that the use of this inclination is applicable only where surfaces are concave, such as on the interior of domes or lanterns, in the bands around arches, in jambs, and in frames: generally speaking, in those situations where the angle makes it impossible to view the molding in profile, since from the side the inclinations of the fascias create a very adverse effect. There are successful examples of these backward inclinations inside the Pantheon in the bands of the arches over the entrance and over the central chapel. This practice was not observed, however, in the architrave of the attic, where the bands are distinguished only by different colors of marble without being projected beyond one another, and this is one reason for believing that the attic was designed by an architect other than the one who designed the rest of the temple.

The second case occurs when we want to place a colossal figure in a very high place, for then it can be much larger than the other figures at the bottom. Obviously, however, this is not done for optical reasons, since the statue is intended to appear colossal. In this instance, we should note that the statue must be placed on something that relates to its size, since we are not allowed to place it, for example, in a second or third order. Because second and third orders are necessarily smaller than the first, they cannot sustain the presence of statues, unless these are suitably proportioned and made smaller than those of the first order. Therefore, we must make sure that the background of a colossal statue appears to contain several orders or at least an order that is proportional to the colossal statue. This practice was observed in the Arch of Triumph of the faubourg Saint-Antoine,[76] where a colossal statue of the king crowns the entire mass of the structure. Against the arch, all around it, an order reaching to only half the height of this mass has been applied. The whole mass of the arch acts as a pedestal for the great statue, which is much larger than the statues over the order, since these have the same proportion relative to the order as the statue of the king has to the entire mass of the structure.

Thus, statues in high places should not be made larger than statues in low ones when they are of the same kind, which is to say, when each of them is placed in its own story and in its own order. The practice, rather, should be the opposite: the statues should be made progressively smaller, just as the orders necessarily decrease in size from the bottom upward.

The third case occurs when two pilasters form a reentrant angle, for then their width must be a little more than half a diameter to avoid the adverse effect the capital and flutings would inevitably create if the half-pilasters were not enlarged in this way, as we noted in the preceding chapter. It is obvious that optics are not the reason for this alteration. Rather, the reason is to give some parts a little more width than necessary, in order to avoid having to give other parts less width than is needed. This occurs when we use the Corinthian capital in reentrant angles, and we give the two half-leaves of the second row more than half a leaf in width, because if they were precisely half a leaf wide and not enlarged in this way, the fold of the leaf would be too sharp and the volutes at the center too crowded.

The fourth case occurs when, as Scamozzi advocates, we wish to place the Composite Order between the Ionic and the Corinthian, a practice of which I strongly approve, since the Composite capital is more closely related to the Ionic and the ruggedness of its entablature makes it more analogous to the massive orders than to the Corinthian. In this case, it would be necessary to change the proportions and shorten the column shaft by two small modules when we place the Composite column and entablature on the Corinthian pedestal. Similarly, when we place the Corinthian column and entablature on the Composite pedestal, we would need to increase the height of the Corinthian shaft by two modules. There may be other instances where it is permissible to alter proportions, although I do not believe any of them would be for optical reasons. It may be permitted for a sculptor to pose his figures in ways that suit their placement to avoid giving them attitudes that might create adverse effects, as Monsieur Girardon so judiciously undertook to do at Sceaux,[77] where he made a large statue of Minerva sitting on the peak of a pediment. He disposed her limbs in such a way that even though she was seated rather high up, her knees did not hide the rest of her body, as they would have had he raised them more. But the truth is that this alteration was in no way intended to make the thing appear to be other than it is.

To conclude this chapter, it remains for me to say that I find it strange to see proportions left the same in the very cases where they ought to be changed. Vignola, Palladio, and Scamozzi, for example, the three most celebrated authors to have written about architecture, make the height of entablatures in the Ionic, Corinthian, and Composite Orders all the same relative to the length of the column. Vignola gives them a height of about one quarter of the column length; and Palladio, like Scamozzi, makes them all indifferently about one fifth. I think that it would have been more reasonable to put a more massive entablature of one quarter of a column length on a shorter, squatter column, which is how we might describe the Ionic relative to the Composite, and to give a lighter one of one fifth of a column length to the Composite, which is long and slender relative to the Ionic, than to have done the opposite. As a result, I find the variation and alteration of proportions that I have made in my entablatures, adapting them to the differences between the orders, much better founded than the alterations that have been made to adjust to differences in position and aspect.

When I discussed entablatures explicitly in this treatise, in chapter 4 of part 1, I forgot to mention what constitutes the differences between the proportions that I have given them. In that chapter I said that I give the entablature the same height in all the orders. It is this uniformity in height that gives rise to the difference in their proportion relative to the columns. For since the length of the columns constantly increases while the height of the entablatures remains the same, it follows that the shorter columns have proportionally larger entablatures than the larger ones. Thus, since the proportion of the entablature constantly decreases by one third of the overall height of the entablature in each order as it becomes lighter and more delicate, the length of the Tuscan column is three and two-thirds entablatures, that of the Doric is four, that of the Ionic is four and one third, that of the Corinthian is four and two thirds, and that of the Composite is five.

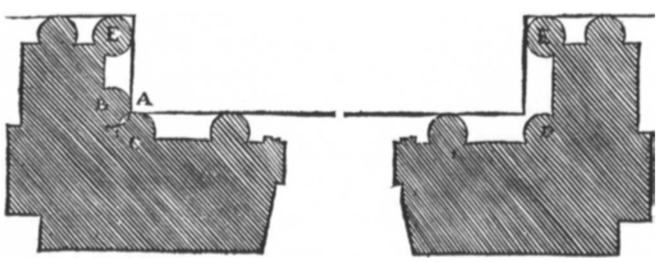
Chapter VIII

Some Other Abuses Introduced into Modern Architecture

AMONG THE WAYS of speaking that are contrary to the rules of grammar, we find many that are authorized by long usage and are so firmly established that it is not even permitted to revise them. Other ungrammatical expressions are less widely accepted and would have been rejected had they been condemned by those who have a reputation for knowing how to speak well. In architecture as in language we may note abuses of two kinds. Some abuses custom has rendered not only acceptable but even necessary; thus, even though they are contrary to reason and the rules of the Ancients, they have themselves become the rules of architecture. These are the abuses we discussed in the preface: the enlargement of columns and the placing of modillions in pediments so that they are perpendicular to the horizon and not to the slope of the tympanum. To these we may add the accepted practice of putting modillions on all four sides of a building and in the cornice under the pediment and of putting them in the first order, rather than reserving them for the last one at the top. Modillions should appear only at the sides where the walls support the rafters and the struts, since they represent the terminations of these members; and they should not appear in the cornice under the pediment but only in the pediment itself, where they represent the ends of purlins. Nothing is more inconsistent with what modillions ought to represent than putting them in places where rafters, struts, and purlins can never appear. The practice of placing triglyphs anywhere but over the columns, where they represent the ends of beams, may also be listed among the liberties authorized by usage.

There are other abuses that the sanction of authority has made only just tolerable, and if we do not wish to condemn them altogether, we can at least avoid them in the interest of attaining greater perfection. Palladio has written a chapter about these, reducing their number to only four.[78] They include using scrolls to support something; breaking pediments and leaving them open at the center; giving cornices large projections; and making columns with bulges, such as bands, on them. To these, I think we can add others, some of which could not yet have been introduced in Palladio's day. In addition to the abuse concerning the alteration of proportions that we discussed in the preceding chapter, I note several others, most of which are actually less harmful than those alleged by Palladio.

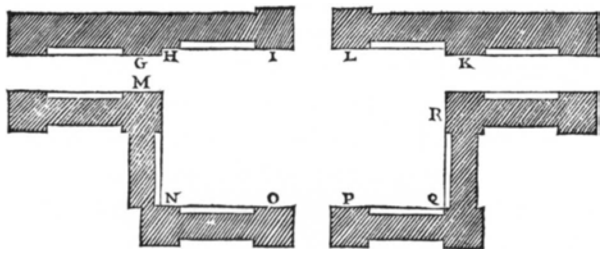
The first of these involves overlapping and interpenetrating columns or pilasters. This interpenetration is less common with columns than with pilasters. One example appears in the courtyard of the Louvre where, in reentrant angles such as *A*, the architect has placed two columns *BC*, rather than using only a single column as in *D*. Column *D* can serve the same purpose as columns *B* and *C* and even more naturally, so to speak, when we consider that just as column *E* supports the two architraves that form the projecting angle, column *D* supports the two architraves that



form the reentrant angle. If a single column can adequately support the projecting angle, there is no reason for it not to be able to support the reentrant one.

Palladio also used these interpenetrating columns, which he calls double columns, in a palace he built for Count Valerio Chiericato in Vicenza.

A similar abuse is more usual in pilasters when, for example, pilaster *G* effects the transition to a projecting wall plane, making the entablature and the pedestal project as well. When this occurs, the practice of the Moderns is to connect *G* to a half-pilaster *H*, which penetrates it and is penetrated by it. Since the purpose of the half-pilaster *H* is to support the entablature that is continuous over pilaster *I*, the



abuse consists in the fact that in addition to the interpenetration of these parts, half-pilaster *H* is out of place and completely ineffectual, since pilasters *K* and *L* are sufficient. The reason for this is as follows. In works where pilasters such as *G*, *H*, *I* appear, with a projection of only one fifth or one sixth of the diameter of the pilaster, and where the transition from one wall plane to another is no greater than this fifth or sixth, *G, H, I* must be considered a bas-relief or reduced representation of the full-scale relief shown as *M, N, O* in the figure. A case like *L, K*, with no half-pilaster, is a bas-relief representation of *P, Q, R*. Now clearly the practice illustrated in *M, N, O* is quite wrong and the placement of pilaster *Q* in the full-scale relief is much better than that of pilaster *N*, which since it is out of line with pilaster *M*, is completely out of place. Clearly too, the representation of something defective would not of itself be entirely wrong, if it were not for the weight of other considerations not entailed by the nature of the matter itself, such as the proliferation of ornament involved in using half-capitals and awkwardly placed half-bases. Thus we may say in general that the use of half-pilasters is inherently an abuse: not only in this specific case where a half-pilaster is joined to an entire one but even when two half-pilasters meet in a reentrant angle. As a result, the little corner of pilaster *Q* is the only thing that can consistently be placed in reentrant angles, and this was the practice adopted inside the large porticoes of the Louvre facade. For although half-pilasters can be found in the reentrant angles of highly acclaimed ancient works, such as the Pantheon, they always entail the interpenetration of two columns. Therefore, it is true to say that they are not in keeping with that exact regularity that we may, nevertheless, sometimes dispense with when there is a reason to do so.

The second abuse is the enlargement of columns, which we discussed in chapter 8 of part 1, where we showed this practice to be both unjustified and without precedent in antiquity.

The third abuse is the pairing of columns, which some cannot approve of since almost no examples of it exist in antiquity. The truth is, however, that if we are permitted to add anything at all to the inventions of the Ancients, this is one innovation that deserves to be accepted into architecture for its considerable beauty and convenience.[79] In terms of beauty, it is entirely in keeping with the taste of the Ancients, who particularly appreciated buildings with closely spaced columns and who found nothing to object to in the usage except the inconvenience caused by such spacing as they practiced it. This inconvenience obliged them to increase the size of intercolumniations at the center and also caused Hermogenes to invent the pseudodipteral in order to enlarge the wings or aisles of the porticoes of temples known as dipteral. The wings of these temples were double, having two rows of columns that, together with the temple wall, formed two corridors on the exterior. Now this skillful architect, one of the first inventors of ancient architecture, took it upon himself to remove the middle row of columns and, out of the two narrow aisles, made a single aisle as wide as both, with a column width added as well. The Moderns introduced this new way of placing columns, after the example of Hermogenes, and found, by pairing them, a way to give more clearance to porticoes and more grace to the orders. For by placing the columns two by two, we can keep the intercolumniations fairly large, so that the windows and doors that overlook the porticoes are not obscured, as they were in ancient works, where the openings were wider than the intercolumniations. In the usual arrangement, columns had to have diameters of three or four feet in order to obtain intercolumniations of eight feet. When columns are paired, however, it is enough for them to be two or two and one-half feet in diameter, and as a result wide intercolumniations do not appear as awkward as they do when columns are arranged singly and seem too weak to support their entablature.

This way of placing columns may be considered a sixth type of spacing, added to the five used by the Ancients. The first of these was called pycnostyle, because the columns were very close together with intercolumniations of only one and one-half column diameters. In the second, called systyle, columns were a little less close with an intercolumniation of two diameters; in the third, called eustyle, they had an average spacing of two and one-quarter diameters. In the fourth, called diastyle, the spacing was a little wider, with three diameters; and in the fifth, called araeostyle, the columns were very widely spaced with intercolumniations of four diameters. We might say that the sixth one we add here consists of the two extremes, namely, of the pycnostyle, where the columns are very closely spaced, and of the araeostyle, where they are very far apart. We might also say that this column placement, which can be classed as an abuse only because the Ancients did not use it, may be considered as one of many similar things authorized by usage, which we discussed at the beginning of this chapter.

The fourth abuse is the enlargement of the metopes of the Doric Order, so as to give the intercolumniations the width they need. If, for example, we wish to pair two columns, we must necessarily space the triglyphs more widely and enlarge the metope, since the space between the middle of one triglyph and the middle of the next is much smaller than that between the middle of one column and the next, no matter how close the columns may be to one another. Now the Ancients would have been very hesitant about making such an enlargement. Vitruvius says that Pythius and Arcesius,[80] two celebrated architects of antiquity, considered this order unsuitable for temples for this very reason. Hermogenes, who in other instances dispensed with ancient rules, could never bring himself to take liberties with the Doric Order. Once, when he had amassed a large quantity of marble to build a temple to Bacchus, he gave up his intention of using the Doric Order and built it in the Ionic.[81] The Moderns are more audacious. In the palace of Count Valerio, which we have already mentioned, Palladio has enlarged the metopes in the central intercolumniation, so as to make it wider than the other intercolumniations, which have two triglyphs. The only reason for his doing so was his reluctance to enlarge his central intercolumniation as much as would have been needed for it to accommodate three triglyphs. Yet this is what he should have done, according to the rules that Vitruvius gives for Doric porticoes, where the central intercolumniations should have three triglyphs even when the other intercolumniations have only one. The skillful architect of the facade of Saint-Gervais, which is one of the most beautiful works to have been built in the last one hundred years, was not reluctant to enlarge the metopes of the first Doric Order so as to be able to pair his columns. In the Doric Order of the Portail des Minimes of the Place Royale, there are still other liberties taken, such as placing half-triglyphs in reentrant angles, as Palladio did in the palace of Count Valerio.

The fifth abuse is the elimination of the lower part of the abacus, which some call the bark, in the modern Ionic capital. This part produces the volute in the ancient Ionic capital and also constitutes the lower part of the abacus in the Composite capital as, I believe, it should also do in the modern Ionic. For when this part is eliminated, only the upper part of the abacus, which is an ogee, remains, so that the abacus becomes as thin as a tile. Because this thin tile rests only on the convex surface of the four volutes, touching it at just four points, its apparent fragility aggrieves the sight and creates a very adverse effect. In the capitals of the Temples of Concord and of Fortuna Virilis, which are the models for the modern Ionic capital, the abacus is indeed made up of only a single ogee. For all its thinness, however, this ogee avoids the appearance of fragility by not resting on the convex surfaces of the volutes, since these volutes do not emerge from the bell but pass straight over it, as in the ancient Ionic. As a result, the abacus, though quite thin, is not offensive at all, since it has uniform support under its entire surface. This does not occur in the capital in question, where there is a large gap between the abacus and the bell of the capital. The best practice, in my opinion, would be to leave the abacus solid, as it is in the Composite capitals of antiquity, where the volutes emerge from the bell and penetrate the lower part of the abacus. This is what Palladio did in the capital that he designed, which he shows as being the same as that of the Temple of Concord.[82] Because the volutes enter into the bell, he made the abacus of this capital solid, like that of the Composite capital of the Arch of Titus, where the volutes also enter the bell. And since the other features of the modern Ionic capital have been modeled on the ancient Composite capital, there is no reason not to have imitated this particular feature and, in fact, the abuse consists in failing to imitate it.

The sixth abuse is the extending of a large order over several stories, instead of giving each story its own order as the Ancients did. It would appear that this irregularity is based on the imitation of the courtyards of ancient houses called *cava aedium*,[83] principally of those called Corinthian courtyards, where the entablature of the surrounding building was supported by columns extending from the bottom to the top over several stories. The only difference between these Corinthian courtyards and our buildings with large orders is that whereas the columns of the Corinthian courtyards stood a little away from the wall to support the projecting entablature that acted as an awning, our large orders are semiengaged in the wall and most often consist of pilasters rather than columns. Now the abuse lies in how a large order is used, since it is not suited to all kinds of buildings. Even though a large order gives stateliness to temples, theaters, porticoes, peristyles, reception rooms, entrance halls, chapels, and other buildings that can sustain, or even require, great height, we may say that the practice of incorporating several stories in a single large order has, quite on the contrary, something mean and paltry about it. It is as if private individuals had wished to take up lodging in a vast, abandoned, half-ruined palace, and finding the great high apartments inconvenient or wishing to save space, they had had a series of mezzanines built.

If this practice is sometimes to be permitted in large palaces, the architect must have the skill to find a pretext for its application. He must appear to have been obliged by symmetry: required, by the necessity of using a large order in some substantial part of the building, to make the large order continuous and governing throughout the rest of it. This has been carried out with much judgment in several buildings but mainly in the palace of the Louvre, which needed a large order so as not to appear insignificant, because its situation on the bank of a large river gives it such a vast and distant aspect.[84] This large order, which extends over two stories, is placed on the lower story, actually the rampart of the castle, which serves as its pedestal. The height of this order has been increased because of the two large, magnificent porticoes that dominate the principal facade at the entrance of the palace, and since these porticoes are like the entrance hall for all the apartments of the first story, the order there needed the size and exceptional height that it has been given. Subsequently, their height needed to be made continuous and dominant all around the remainder of the building. This authorizes, or at least excuses, the impropriety that the architect might be accused of had he done something in itself unreasonable without its being necessary: namely, not giving each story, which strictly speaking is a separate building, its own separate order and using the same column to support two floors, carrying one, so to speak, on its head and the other as if suspended from its belt. For the length of an aspect cannot of itself constitute a sufficient reason for elevating a building that, by nature, should be low, any more than the size of a theater justifies making its tiers, seats, balustrades, and railings higher, as Vitruvius has remarked.

The seventh abuse consists in feeling compelled to give buildings a great height in proportion to their great width. This arises from the misconception that the proportion of height to width should constitute the governing rule, even though it contradicts a precept of Vitruvius that is incomparably more important, namely, that sizes in buildings ought to be regulated by the convenience their use demands. For when the need for a large courtyard compels us to make a building very wide, nothing is less reasonable than to give it double the height it needs by increasing the number and height of its stories and so to make it inconvenient without giving it any beauty at all, since things in which height creates an obvious inconvenience can have no beauty. Therefore, we must concede that large, wide buildings require a great height only when they have the potential for sustaining it and when they demand it, as do temples, theaters, and other buildings of this kind. For although it may be true that loftiness contributes greatly to the stateliness and beauty of architecture, it depends on the architect's discretion to find and select reasonable pretexts for giving this loftiness to buildings such as those meant for habitation, which are inherently unable to sustain it.[85] To this end a way must be found to elevate some large entrance hall or chapel, which, by appearing above the apartments, gives the building loftiness in those parts where it is suitable. This was very well implemented at the Escorial, which consists of several buildings of a vast extent but of limited height, since their use, which does not require height, determined their proportion. At its center, there is a large, high chapel that rises up with much grace, like a head rising up over the shoulders of a great body. For we should not say that the Escorial, consisting as it does of a convent and a palace, cannot serve as an example for palaces alone. There is nothing inappropriate in giving large palaces conspicuous, lofty chapels that, like this one, are separate from the apartments, since this has always very rightly and appropriately been the case in old castles, where the chapel was never situated in a room or in a hall, as has been the recent practice, but was separate, with the proper form of a chapel.[86]

The eighth abuse is the one we discussed in chapter 2 of this second part, which deals with the Doric Order. It is a practice that some Moderns have adopted, and, contrary to the usual practice of the Ancients, consists in joining the plinth of the base of the column to the outer edge of the cornice of the pedestal, in the manner of a congé. This, in effect, eliminates the plinth, which is an essential part of the base, and makes it appear to be part of the cornice of the pedestal rather than part of the base of the column.

The ninth abuse is somewhat related to the first and consists in the interpenetration of two columns or two pilasters; it involves making what is called an architraved cornice by merging the architrave and the frieze with the cornice. This is done when there is not enough room for a complete entablature. The abuse consists in trying to make something that is not an order pass for one, for it would be better not to use an order at all and to eliminate the columns and pilasters. Or, if this entablature, which we are obliged to collapse due to a shortage of space, needs a projection that requires the support of an isolated member, it would be better to use caryatids, herms, or large consoles, rather than columns, since according to the system of rules that we are concerned with here, columns must always be topped by an entablature consisting of three distinct elements.

The tenth abuse is breaking the entablature of an order. It involves making the cornice of the pediment rise from the top of one column, pilaster, or pier and descend to the top of the next, interrupting the entablature between the two columns so that the pediment has no architrave, frieze, or cornice passing across the bottom. This practice is completely at odds with the principles of architecture, which, according to the precepts of Vitruvius and the practice of all true masters, are governed by the imitation of wood construction in all things pertaining to entablatures and pediments. The assumption is that a pediment is like a roof truss made up of three parts, namely, the two diagonal struts, represented by the two cornices of the pediment, which rise and lean on each other, and a cross brace, represented by an entablature, which passes underneath. Just as a roof truss cannot sustain itself if we remove one of these three parts, so must a pediment also appear completely defective if one of them is missing. And if Palladio was right in censuring the practice of cutting off the tops of pediments because by preventing the upper ends of the struts from leaning against each other, it deprives them of their main function, so is it also right to censure architects who break the entablature under the pediment, since by doing so they remove what represents the brace, which reinforces the struts at their lower end and prevents their spreading apart.

There are a few other abuses of less importance: the practice of profiling imposts against columns, for example, or of giving imposts more of a projection than the pilaster against which they are profiled, as occurs at Saint Peter's in Rome. Others include making the cornice at the top of one story serve as a railing for a balcony or as a sill for the windows of the next story above, continuing the fascia of the windowsill all around a building like a belt, and cutting back the corners of architraves to make what look like the orillions of bastions: there are some very disagreeable ones in Scamozzi. Yet, another example is the placing of consoles at the sides and under the cornices of doors and windows in such a way that they do not support the cornices. The proper practice in this case is to project the moldings under the corona so that they line up with the console, for one might say that this abuse is no less reprehensible than the abuse of the scrolls that Palladio censures so much. For consoles, whose purpose is to support something, are just as objectionable when they support nothing as scrolls are when they are made to support something, since scrolls are incapable of supporting anything.

Palladio's drawings of the consoles of the Temple of Fortuna Virilis and of the Temple at Nîmes, called the Maison Carrée, show these consoles as directly supporting the corona. But the way they are made today gives them an elegance that they did not have in antiquity. The consoles of antiquity, for which Vitruvius has given proportions the same as those of the Temple of Fortuna Virilis, are narrow and flat and unlike those of today; their projecting volutes have no spiral circumvolutions similar to those of ancient Composite capitals. Some of these consoles in the ancient manner appear in the beautiful portico that the excellent architect Monsieur Mercier built on the courtyard side of the church of the Sorbonne,[87] and these do not create a favorable effect. This confirms what we already said at the beginning of this chapter, namely, that there are things in architecture that we can call abuses because they do not conform to ancient rules but that, nevertheless, are very good and that we need not hesitate to put into practice.

I consider the rosettes placed between the modillions in the soffit of the corona of the Corinthian cornice yet another example of this. In antiquity these rosettes usually differ, but I do not think that we should censure the liberty taken by those who make them all alike, after the example of those at the Baths of Diocletian. The reason is that we should make a distinction between the things painting and sculpture represent as ornaments and the things they represent historically as factual truth. The former must always be repeated in the same way and the latter must necessarily be diverse. For example, if we represent a flower bed, we may show it as being planted with different kinds of flowers disposed in different ways because that is, in fact, how it actually appears. But if we wish to ornament an architectural element with foliage or flowers, not only must we always repeat the same leaves and the same flowers but we must also always give them the same size and shape since this process of repetition, where ornament is concerned, is part of symmetry, which constitutes one of the principal beauties of architecture and sculpture. And it need not be said that the rosettes in question are ornaments of a different kind from those we place along a fascia, an ogee, or a cyma recta and that since the rosettes are separate from one another, it is enough for the purposes of symmetry that they all be the same size. There is no more reason to vary these rosettes than there is to vary modillions, which, even if they were all the same size, would be intolerable if they had different shapes. For there is no one who could approve of a series of modillions where some had olive leaves, others acanthus leaves, and others eagles or dolphins instead of leaves, these being the different kinds of ornaments used on various ancient buildings.

Although there are some reflections made in this chapter on the abuses recently introduced into architecture that do not fall precisely within the subject matter of this treatise, which concerns the ordonnance of columns, I nevertheless did not think that I should leave them out. These abuses appear to me to be too important to forgo this opportunity for discussing them, even though they are somewhat incidental. I hope that the liberty I take will be considered like one of the abuses, which, although against the rules, does not lack authority because of its other considerable merits.

To conclude this treatise, I will reiterate the avowals already made in the Preface, namely, that I do not think the unorthodox opinions that I have put forward here should be considered as opinions that I wish to adhere to obstinately, since if I am mistaken, I am ready to give them up as soon as the truth gives me greater enlightenment. Above all, I would like to stress that I do not consider all the reasons that I have used to condemn the practices that I have called abuses to be so compelling as to outweigh the authority of the notable personages who approved and established them. I believe that the veneration and respect I have for these authorities should not prevent me from treating such questions as problems in the hope of obtaining the verdict of knowledgeable people willing to give these problems judicious consideration in good faith and without prejudice.

1. Perrault makes a fundamental distinction between *caractère* and *proportion*, respectively the invisible and visible parts of the orders. Character sometimes refers to the general characteristics of the orders but also often to their ornamental details. Thus we have consistently translated *caractère* as character for the sake of precision.

2. See Antoine Desgodets, *Les edifices antiques de Rome* (Paris: Jean Baptiste Coignard, 1682), 147. The ruins commonly called the Facade of Nero, and which Perrault refers to as the "*frontispiece de Neron*," were located on the Quirinal and had been identified by Palladio as a Temple of Jupiter. See Andrea Palladio, *The Four Books of Architecture*, trans. Isaac Ware (London: R. Ware, 1786), 92.

3. Leon Battista Alberti (1404–1472), Vincenzo Scamozzi (1552–1616), Sebastiano Serlio (1475–1554), Giacomo de Vignola (1507–1573), and Andrea Palladio (1508–1580) were Italian Renaissance architects; Philibert Delorme (1515?–1570) was a French Renaissance architect.

4. *Connoissance* is here translated as "intellectual knowledge" in order to convey the complexity of argument.

5. Symmetry (*symétrie*), in what Perrault is careful to point out is the French sense of the word, signifies bilateral symmetry, not *symmetria* as Vitruvius uses it (bk. 1, chap. 2), which Perrault, in his translation of Vitruvius, translated as "proportion" ("*la proportion*"). This and all other references to Vitruvius are to Perrault's translation of 1684. See Vitruvius, *Les dix livres d'architecture de Vitruve, corrigez et tradvits nouvellement en françois, avec des notes & des figures* (Paris: Jean Baptiste Coignard, 1673; 2nd ed., revised and enlarged, 1684).

6. Perrault clearly understands mimesis as copying. For subsequent generations, representation entailed "resemblance" rather than "recognition" of an invisible, transcendental order (as in pre-Classical Greece); the latter sense has been recovered in contemporary hermeneutics. See, for example, Hans Georg Gadamer, *The Relevance of the Beautiful*, trans. Nicholas Walker, ed. Robert Bernasconi (Cambridge and New York: Cambridge Univ. Press, 1986).

7. "*Qui les premiers ont inventé ces proportions*": to be a *first inventor* is redundant in English, but *inventer* in the old sense intended here means both to create and to discover. In Perrault's time there were other "inventors" of proportion, himself included, who came after the first ones. See below, note 64.

8. "*Solidité*" and "*commodité*": Perrault's terms here refer to Vitruvius's "*firmitas et commoditas*" (bk. 1, chap. 3). Proportion, by implication, becomes *venustas*. See also Vitruvius, 1684 (see note 5), bk. 1, chap. 3, n. 3.

9. All of the references are to women who were considered to be legendary beauties. Helen, daughter of Zeus and Leda, was the wife of Menelaus whose abduction by Paris led to the Trojan War; Andromache, wife of Hector, was the ideal version of mother and wife who became a slave to Neoptolemus after the fall of Troy; Lucretia, wife of Tarquinius Collatinus, committed suicide after being raped by Sextus (son of Tarquin the Proud), which led to the expulsion of the Tarquins from Rome; and Faustina Minor, daughter of the emperor Antoninus Pius, was the wife of the emperor Marcus Aurelius.

10. Juan Bautista Villalpando (active circa late sixteenth century, d. 1608) was a native of Cordova and a Jesuit. He was also the author of a learned commentary on Ezekiel, which was highly esteemed for its description of the city and Temple of Solomon.

11. Perrault's use of the word *sciences* is very probably meant to suggest its modern connotation. Although "scholarship" would have been the seventeenth-century understanding of *sciences*, Perrault wanted scholarship to be reconsidered in the light of the "progressive" natural sciences.

12. *Littérature*, in the old sense, referred to the entire body of human knowledge or to culture in general. It only came to refer specifically to written work in the eighteenth century.

13. Before the advent of modern science and because of the undisputed authority of the Ancients, scholars believed it possible to ascertain empirical truth through careful study of ancient texts, such as Aristotle's *Physics*. Perrault objects to this and implies here that the aim of learned inquiry ought to be scientific verification of what the text of Aristotle states as fact (*"la verité de la chose, dont il s'agit dans ce texte"*) and not the attempt to discover what exactly it was that Aristotle was claiming (*"le vray sens du texte d'Aristote"*).

14. Blaise Pascal (1623–1662) uses *incompréhensible* in this sense in the aphorism *"Incompréhensible que Dieu soit, et incompréhensible qu'il ne soit pas"* ("It is unfathomable that God exists, and unfathomable that he does not exist"). In Pascal, as in Perrault, *incompréhensible* is read as "unfathomable."

15. In the seventeenth century, as Wolfgang Herrmann explains, *paradoxe* "signified opinions that were uncommon and unorthodox, suspect only because of the high value which classical man set on universal assent." See Wolfgang Herrmann, *The Theory of Claude Perrault* (London: A. Zwemmer, 1973), 37. Martin Heidegger's exegesis of the Greek word *doxa* (opinion) suggests, by implication, why in the ancient world orthodoxy, or universal assent, was necessary to preserve the very existence of the world as appearance from collapse. See Martin Heidegger, *An Introduction to Metaphysics* (New Haven: Yale Univ. Press, 1959), 104–105.

16. Hermogenes (circa 200 B.C.), a Greek architect, proclaimed that the Doric Order was unsuitable in sacred buildings, invented a system of ideal proportions for the Ionic Order, and was thought by Vitruvius to have invented the pseudodipteral plan; Callimachus (active circa 450 B.C.), a Greek architect and sculptor, invented the Corinthian Order; Philo (active circa 300 B.C.), an Athenian architect, built the portico of twelve Doric columns to the great temple at Eleusis; Chersiphron (active circa 560 B.C.), an architect in Crete, commenced building the great temple of Artemis at Ephesus; and Metagenes (active circa 500 B.C.), the son of Chersiphron, completed the building of the temple.

17. The text reads *"impossible,"* which the errata changes to *"difficile."* It would appear that Perrault had second thoughts about overstating his case.

18. Theseus, the legendary hero of Attica, was the son of Aegeus, King of Athens; Pericles (circa 495–429 B.C.), the great Athenian statesman, was the son of Xanthippus and Agariste and the building commissioner of the Propylaea, the Pantheon, the Odeon, and numerous other public buildings and temples.

19. Antoine Desgodets (1653–1728) was a French architect, professor, and author. See Desgodets (see note 2).

20. Vitruvius, *Vitruvius, On Architecture*, trans. Frank Granger, 2 vols. (London: W. Heinemann; New York: G. P. Putnam, 1931–1934), bk. 1, chap. 2: "*Ordinatio est modica membrorum operis commoditas separatim universeque proportionis ad symmetriam comparatio*" ("Order is the balanced adjustment of the details of the work separately and, as to the whole, the arrangement of the proportion with a view to a symmetrical result"). Perrault uses *ordonnance* to translate *ordinatio* in his version of Vitruvius and annotates his usage at some length. See Vitruvius, 1684 (see note 5), 9–10.

21. In French philosophical terminology, *réminiscence* is the word used when referring to knowledge in the Platonic sense, as the recall in life of the world of ideas known before birth. *Appréhension* refers to the mental operation whereby simple thought-objects are grasped and is in contrast to *compréhension*, which is the faculty for grasping complex ideas. Perrault's point is that it is easier to recall interrelated ideas than isolated facts.

22. See pages 57, 59, and 60 of the Preface, where Perrault argues that the true originals of architecture are missing and that the ruins of ancient buildings represent faulty copies of those missing originals.

23. Perrault's small module is completely without precedent in the literature on the orders. It is important to note that this innovation is made purely in the interest of systematization and efficiency.

24. "*À prendre du nu du bas de la colonne*": a *nu* is an unornamented, or naked, surface of something, with no hollows or projections. Here the *nu* of the column is the outer surface of the column at its base, not the inside surface of the flutings.

25. Jean Bullant (1520?–1578) was a French architect who worked for Catherine de Médicis.

26. "*Partager le differend par la moitié*": this, essentially, is the rule Perrault adopts to calculate the mean dimension of column parts in the tables that follow. It is worth noting that at a time when French law was undergoing extensive reform through a process of systematization, Perrault adopted a legal formula as the basis for reforming the orders.

27. This refers to Perrault's belief that the true originals of ancient architecture are missing (see pages 57, 59, and 60 of the Preface). See page 62 for the distinction between three kinds of architecture: that prescribed by Vitruvius, that actually built by the Ancients, and that of the Moderns.

28. See bk. 3, chap. 4; bk. 3, chap. 3; and plate XVIII in Vitruvius, 1684 (see note 5).

29. Vitruvius uses the expression "*scamilli impares*."

30. The text reads *six*, but as Wolfgang Herrmann has also remarked, this is obviously a printer's error for *dix*. See Wolfgang Herrmann (see note 15). Appendix VI in the same work, entitled "Perrault's Mistakes in Calculating the Mean" (pp. 209–12), examines in detail the many errors contained in part 1 of the *Ordonnance*. The reader may also note other inconsistencies, such as the fact that in many cases the figures given in the tables do not correspond to those given in the text.

31. This sentence is as unclear in French as it is in English. If one consults the table, however,

one discovers that whereas Perrault is referring to the moldings of the base in the first half of the preceding sentence, in the second half he is calculating the size of the cornice of the pedestal, which he never identifies as such in the text.

32. Perrault refers here to the entasis of the column.

33. The positive value that Perrault assigns to "custom" as a substitute for natural laws is explicit in this sentence. This contrasts sharply with the usual eighteenth-century understanding of custom as a set of subjective opinions that impede perception of the embodiment of natural beauty in art.

34. The treatise Perrault refers to is François Blondel, *Résolution des quatre principaux problèmes d'architecture* (Paris: Imprimerie Royale, 1673). Nicomedes was a Greek mathematician of the early second century B.C. who discovered conchoidal curves, by means of which he solved the problem of trisecting the angle and that of doubling the cube. See N. G. L. Hammond and H. H. Scullard, eds., *Oxford Classical Dictionary*, 2nd ed. (London: Clarendon Press, 1970). See also Vitruvius, 1684 (see note 5), 84, n. B.

35. By "projection" here, Perrault does not mean the size of the projection beyond the outer edge of the base of the column shaft but rather the horizontal dimension taken from the center line of the column to the outermost edge of the base.

36. As intimated in the ensuing discussion, in French, the *aspect* of a building refers both to its appearance and to the angle or point of view from which it is perceived. Perrault's rejection of aspect as a valid reason for altering proportions here and in chapter 7 of part 2 (see pages 153–66 in this volume) severs the intimate connection between "how" and "what" we perceive that is implied by the word *aspect*, which signifies both. In the early stages of the development of Latin grammar, the failure to distinguish between nouns and adjectives as separate parts of speech affirmed the same symbiotic relationship between perception and its object as that which is affirmed by what we might term the "ambiguity" of the word *aspect*.

37. Guiseppe Viola Zanini was the author of *Della architettura* (Padua: Francesco Bolzetta, 1629).

38. Daniele Barbaro (1513–1570), a Venetian man of letters and a patron of the arts, published an important annotated edition of Vitruvius in 1567, which was illustrated by Palladio.

39. Pietro Cataneo, a disciple of Baldassare Peruzzi (1481–1536), wrote *I quattro primi libri di architettura* (Vinegia: Aldo, 1554).

40. Guillaume Philandrier (1505–1563) was a French architect and theoretician who was also known as "Philander." His notes on Vitruvius were published in several sixteenth-century editions of Vitruvius, as well as by themselves (Rome, 1544; Paris, 1545, 1549; Venice, 1557).

41. "K" falls between "C" and "D" in Perrault's original text.

42. Here, as elsewhere, the procedure described is difficult to follow in the text but quite clear if the reader refers to the graphic rendering in the plates. In this case, see plate III.

43. The text reads *centre*, but Perrault says *sommet* on the next page; and in fact, if the curve traced using a triangle is to be shallower than that traced when using a square, the word must be read as *sommet* (apex).

44. Roland Fréart de Chambray (1606–1676) was the author of *Idée de la perfection de la peinture démonstrée par les principes de l'art* (Mans: J. Ysambert, 1662) and *Parallèle de l'architecture antique avec la moderne* (Paris: Edme Martin, 1650).

45. "*Cuisses*": see Vitruvius, bk. 4, chap. 3; *femur*, which is *femora* or *femina* in the plural.

46. "*L'espace qui a esté laissé pour la Corniche, qui est égal à celuy de la Frise estant de neuf parties, la premiere est pour le Chapiteau du Triglyphe; les trois parties d'audessus, sont pour le Larmier & le Talon, qui couronne le mutule: les trois dernieres sont pour la grande Simaise & pour le Talon qui couronne le Larmier.*" Perrault states that the cornice contains nine parts, yet he goes on to account for only seven of them. The Doric Order illustrated in plate III, together with the remainder of this paragraph, clearly indicates that the middle part of the sentence should read "the five [not three] parts above it contain the cavetto, the mutule, the ogee above the mutule, and the corona," thus adding the cavetto and a mutule to Perrault's enumeration. In his translation of 1708 of the *Ordonnance*, John James must have noticed the same error when he rendered this sentence as: "The space left for the Cornice which is equal to that of the Frieze, being nine parts, the first is for the Capital of the Triglyph, the five parts next above, are for the Hollow, Mutule, Ogee and Corona, the last three are for . . . etc." See Claude Perrault, *A Treatise of the Five Orders of Columns in Architecture*, trans. John James (London: J. Sturt, 1708).

47. Pirro Ligorio (1513–1583) was best known as the architect of the Villa d'Este at Tivoli; he wrote the *Libro delle antichità di Roma* (Venice: M. Tramezino, 1553).

48. The bracketed part of the sentence does not appear in the text itself but is an insertion prescribed by errata. It would seem likely, in view of the authority with which he vests them, that Perrault sees the fragments in question as evidence of the missing true originals discussed on pages 57, 59, and 60 of the Preface.

49. A letter "J" does not exist in Perrault's original text.

50. Any attempt to draw the curve in question following Perrault's instructions makes it obvious that the word here should not be *allonge* (lengthens) but *accourcit* (shortens), since making the curves of the cyma recta deeper is only possible if one shortens, not lenghtens, the sides of the triangle whose apex is the center of the curvature. John James, Perrault's first translator, substituted the word *shortens* in his translation.

51. "*Ainsi qu'elles estoient aux tuteles à Bordeaux*": Perrault visited Bordeaux in September of 1669, where he saw the amphitheater and the so-called Pillars of Tutelle, a Gallo-Roman temple that was demolished shortly afterward to make way for fortifications. The sketch he made of the Pillars of Tutelle in 1669 is reproduced as plate 22 in Herrmann (see note 15).

It would appear that the Roman ruins at Bordeaux were the only ancient works of which Perrault had firsthand knowledge. He never visited Rome and, by his own admission, his information regarding the "different proportions of ancient buildings" is from Desgodets (see note 2). See also p. 63 of this volume.

The Pillars of Tutelle must have made a profound impression on Perrault, since he had a plate engraved of them for his translation of *Vitruvius* of 1684 (see Vitruvius, 1684 [see note 5], 219), where he also comments on them in a footnote of well over a thousand words.

52. The bracketed part of the sentence is an insertion prescribed by the errata.

53. "*A plomb*": the term is inaccurate and should be understood as meaning level, since soffits are not plumb, or vertical, but horizontal.

54. "*Afin que les saillies & les hauteurs des membres paroissent autres qu'elles ne sont*": the claim is that such alterations correct distortions and make these elements appear as they should. Perrault is, of course, skeptical about optical corrections. See below, part 2, chapter 7.

55. See note 51, above.

56. The letters "I" and "J" do not appear in this explanation.

57. "*Denticules*": this must be a misprint for modillions, which, unlike dentils, are present in the Corinthian cornice but do not appear in Vitruvius's Ionic Order where dentils, on the other hand, do appear. See Vitruvius, 1684 (see note 5), 66, pl. XI.

58. "*Me reduisant à mon ordonaire à la mediocrité.*"

59. This awkward repetition does in fact appear in the original French text.

60. The repetition of Arch of Constantine here must be an error, since it contradicts the preceding sentence, which is correct in as much as Desgodets in fact emphasizes the relationship between columns and modillions of the arch by drawing a center line through both. See Desgodets (see note 2), 239.

61. François Mansart (1598–1666) was a French architect. The church of Sainte-Marie, one of Mansart's early works, is better known as l'église de la Visitation.

62. There is an obvious contradiction in this statement, which asserts that the leaf that covers the modillion comes to the inside edge of the volute ("*elle laisse la Volute entiere*") on the Temple of Jupiter the Thunderer and that the same leaf extends as far as the middle of the volute ("*elle s'avance jusqu'au milieu de la Volute*"), likewise on the Temple of Jupiter the Thunderer. The latter seems, in fact, to be the case. See Palladio (see note 2), bk. 4, plate L.

63. This would have been a concern for Perrault when he paired the columns of the Louvre colonnade.

64. "*Inventé*": both the French word and its Latin root (*invenio*) connote discovery as much as creation, which tends to be the sole sense of the term *invent* as it is commonly used in English. Perrault's use of *inventé* in this context illustrates the double sense of the word particularly well. According to legend, Callimachus discovered a basket in an acanthus plant on the grave of a freeborn maid of Corinth and thereupon "built some columns after that pattern for the Corinthians." See Vitruvius, 1684 (see note 5), bk. 4, chap. 1. Callimachus's invention of the Corinthian Order entailed the interdependence of two events, one of them passive (discovery), the other active (building).

65. The illustration in plate VI clarifies what is very opaque in the description. The diameter of the column base is divided into six equal parts. An additional part of the same size is added to those six parts to obtain the height of the capital, which is thus seven sixths of a column diameter. "We give four of these sixths to the leaves."

66. Letters appear in this sequence in Perrault's original text.

67. See Vitruvius, 1684 (see note 5), pl. XXVIII.

68. Perrault does not explain himself very well here, but this is the sense of the passage. The pilasters at the sides of the intermediate block of the Pantheon do not diminish toward the top, as indeed normally they should not since they have "only one face free of the wall." The columns of the porch, however, including the outer ones with which the pilasters are in line, do diminish. As a result and in order to maintain a uniform amount of projection beyond both diminished columns and undiminished pilasters alike, there is a check in the entablature which breaks forward over the pilasters. Therefore, in cases such as this one, the pilasters should in fact diminish in order to keep the amount of the projection uniform and the line of the entablature continuous.

69. The phrase in brackets has been added to the text in keeping with the errata.

70. On *aspect*, see note 36 above.

71. Perrault's debate with François Blondel focused on this basic question. This chapter exposes Perrault's "paradoxical" opposition to the traditional optical "adjustment" of the proportions (see note 15).

72. The Diogenes referred to in the text was an Athenian sculptor (first century B.C.). See Pliny the Elder, *Natural History*, XXXVI.13: "The Pantheon was embellished for Agrippa by Diogenes of Athens; and among the supporting members of this temple are Caryatids that are almost in a class of their own, and the same is true of the figures of the pediment, which are, however, not so well known because of their lofty position."

73. Antonio Labacco (circa 1495–1559) was a disciple of Antonio da Sangallo the Younger and worked on the latter's design for Saint Peter's in Rome. He was the author of *Libro Appartenente all'Architettura* (Rome: Antonio Labacco, 1552).

74. In addition to its usual meanings, there is a legal definition for *espèce*, first used in this sense in 1670: "*Situation de fait de droit soumise à une juridiction, point spécial de litige; v. affaire, cause, cas.*" See Paul Robert, *Dictionnaire l'alphabetique & analogique de la langue française* (Paris: Dictionnaires Le Robert, 1990). This is the sense of *espèce* intended here, appearing as it does in the context of a discussion about judgment. *Espèce* as a point of law submitted to judicial examination suggests an added dimension to the meaning of "*cinq espèces de colonnes*" ("the five kinds of columns") in the *Ordonnance* title. See note 26. One might also recall that Pierre Perrault, Claude Perrault's father, had been a lawyer and that Charles, his younger brother, had been trained as one, as had his elder brother Jean.

75. Here, Perrault's Cartesian belief in the ability of the eye to perceive clear and distinct "ideas" (quantitative dimensional relationships, the objectifying vision of modern science) contradicts the arguments he puts forward in the preface in favor of changing proportions "slightly." This fundamental contradiction was often noticed by his successors.

76. The reference is to Perrault's own design of 1668 for an unfinished triumphal arch in the faubourg Saint-Antoine with its colossal statue of Louis XIV. François Blondel, Perrault's most severe

critic, alluded to it as an example of Perrault's failure to practice what he preached. See Herrmann (see note 15), pl. 17 and 86–87. Perrault argues here that the statue's inordinate size had nothing to do with optical adjustment.

77. François Girardon (1628–1715) was sculptor to Louis XIV.

78. See Palladio (see note 2), bk. I, chap. 20.

79. In this section, Perrault defends his controversial use of paired columns in the east facade of the Louvre, which, in fact, became his most well-known contribution to architectural practice. This is the "modern license" criticized by François Blondel from the point of view of a traditional theory respectful of ancient authority. Perrault discusses this and other "abuses" in the light of reason, independently of the veneration of the authorities who "approved and established them."

80. Pythius (active circa 300 B.C.), a Priene architect, designed the temple of Athena Polias at Priene and the Mausoleum at Halicarnassus, both in the Ionic Order; see Vitruvius, 1684 (see note 5), bk. 4, chap. 3. Arcesius, about whom little is known, is mentioned in the same passage in Vitruvius, as well as in the preface to book 7, where Vitruvius lists him among his Greek sources as the author of a book on Corinthian proportions.

81. Vitruvius, 1684 (see note 5), bk. 4, chap. 3.

82. There is some confusion here. Eight lines earlier, Perrault said that at the Temple of Concord and at the Temple of Fortuna Virilis the volutes do not emerge from the bell of the capital "but pass straight over it, as in the ancient Ionic." Here, he says that at the Temple of Concord (?) the volutes *do* enter the bell. Palladio's illustration of the Ionic Order of the Temple of Fortuna Virilis shows that there the volute-generating "bark" does indeed pass over the bell without entering it. See Palladio (see note 2), bk. I, pl. XXVIII.

83. Vitruvius, 1684 (see note 5), bk. 6, chap. 3, pl. LII.

84. The claim that the "vast and distant aspect" of the Louvre's east facade on the right bank of the Seine justifies the size of the order Perrault used there would appear to be in blatant contradiction to his repeated insistence in chapter 7 that "one must not alter architectural proportions in accordance with varying aspects." Notwithstanding Perrault's considerable effort to apply "reasonable" (scientific) criteria to architecture, the traditional point of view, fraught with such ambiguities as "aspect," is still very near the surface.

85. It is important to emphasize that the issue for Perrault is not some sort of "functionalism" but rather the rationalization of "appropriateness," a tendency that would become increasingly more important in eighteenth-century French architectural theory.

86. The Chapelle Royale at Versailles was built very much along these lines in 1698, ten years after Perrault's death. Wolfgang Herrmann has speculated that Perrault's design of 1678 for a reconstruction of Solomon's Temple may well have influenced the design of the Chapelle Royale. See Wolfgang Herrmann, "Unknown Designs for the Temple of Jerusalem by Claude Perrault," in *Essays in the History of Architecture Presented to Rudolf Wittkower*, ed. Douglas Frazer, Howard Hibbard and Milton J. Lewine (London: Phaidon Press, 1967), 143–58 and pls. XVII.3 and XVII.12. Certainly

the relationship of chapel to palace at Versailles is one Perrault would have approved of, and in fact, it strongly recalls the relationship of church to palace at the Escorial that he finds so admirable.

87. "Monsieur Mercier" refers to Jacques Lemercier (1585–1654), architect of the church of the Sorbonne mentioned here. He was also the architect of the Pavillon de l'Horloge at the Louvre and other important Parisian works, including the completion of the church of Val-de-Grâce, begun by François Mansart.

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Note: Italic numerals indicate illustrations.

ORDONNANCE FOR THE FIVE KINDS OF COLUMNS AFTER THE METHOD OF THE ANCIENTS

INTRODUCTION BY ALBERTO PÉREZ-GÓMEZ
TRANSLATION BY INDRA KAGIS MCEWEN

ALBERTO PÉREZ-GÓMEZ

ALBERTO PÉREZ-GÓMEZ was born in Mexico City in 1949. He has taught at universities in Mexico City, Houston, Syracuse, and Toronto, and at the Architectural Association in London; he was director of the Carleton University School of Architecture in Ottawa from 1983 to 1986. Professor Pérez-Gómez obtained his undergraduate degree in architecture and engineering in Mexico City, completed his postgraduate work at Cornell University in New York, and was awarded a master of arts degree and a doctor of philosophy degree by the University of Essex in England. His articles have been published in the *Journal of Architectural Education, AA Files, Arquitecturas Bis, Section A, VIA, Architectural Design,* and other periodicals. His book *Architecture and the Crisis of Modern Science* (Cambridge, Mass.: MIT Press, 1983) won the Alice Davis Hitchcock Award in 1984. He has also published two books of poetry in Spanish. In January 1987 Pérez-Gómez was appointed Saidye Rosner Bronfman professor of the history of architecture at McGill University in Montreal, where he is currently director of the master's program in the history and theory of architecture. Since March 1990 he has also been director of a new research institute that is cosponsored by the Canadian Centre for Architecture, the Université de Montréal, and McGill University. During the last few years, while living in Montreal, he has developed an interest in the relationship between love and architecture, the subject of his most recent book on the *Hypnerotomachia Poliphili* of 1499 (Cambridge, Mass.: MIT Press, 1992).

INDRA KAGIS MCEWEN

INDRA KAGIS MCEWEN lives and works in Montreal. She is the author of a forthcoming book on the origins of Greek architecture.

Designed by Lorraine Wild.
Composed by Wilsted & Taylor, Oakland,
in Century Old Style type (introduction and heads) and
Garamond No. 3 type (translation and heads).
Printed by Gardner Lithograph, Buena Park, California,
on Mohawk Superfine 80 lb., white and off-white.
Bound by Roswell Book Bindery, Phoenix.

TEXTS & DOCUMENTS
Series designed by Laurie Haycock Makela and Lorraine Wild

Library of Congress Cataloging-in-Publication Data

Perrault, Claude, 1613–1688.
Ordonnance des cinq espèces de colonnes selon la méthode
des anciens. English]
Ordonnance for the five kinds of columns after the method of the
ancients / Claude Perrault ; introduction by Alberto Pérez-Gómez ;
translated by Indra Kagis McEwen.
p. cm. — (Texts & documents)
Translation of : Ordonnance des cinq espèces de colonnes . . .
Includes bibliographical references and index.
ISBN 0-89236-232-4 : $34.95. — ISBN 0-89236-233-2 (pbk.) : $19.95
1. Perrault, Claude, 1613–1688. Ordonnance des cinq espèces de
colonnes selon la méthode des anciens. 2. Architecture—Orders.
3. Architecture—Early works to 1800. I. McEwen, Indra Kagis.
II. Title. III. Series.
NA2812.P413 1992
721'.36—dc20 92-4649
CIP

TEXTS & DOCUMENTS

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A PHYSICIAN, PHYSICIST, CARTESIAN, AND "MODERN" in the famous *querelle des Anciens et des Modernes,* Claude Perrault acquired architectural immortality with his design (sometimes challenged) and construction of the east wing of the Louvre, long acknowledged to be one of the paradigms of French classicism. But perhaps a greater achievement was his translation of *The Ten Books of Architecture* by the classical Roman theorist Vitruvius, published in 1673. The Latin author was not only made to "speak French" in a most eloquent fashion, but he was also interpreted. Perrault's scrupulous annotation, which nearly envelops the lone surviving architectural treatise from antiquity, has never been excelled in its scholarship and intellectual stamina. On the basis of this learned second discourse, Claude Perrault began to compose the first post-Renaissance treatise on architecture, one in which the rules of architectural design were now to be determined not by apodictic ancient precedents but by reason and—above all—by a variable national taste. The *Ordonnance for the Five Kinds of Columns after the Method of the Ancients,* 1683, was the culmination of Perrault's efforts. A relative theory of beauty was proposed: a gage of battle and affront to the absolute premise of the newly founded Académie Royale d'Architecture, headed by François Blondel. The latter reacted vociferously and quite bitterly. The "scientist" Perrault died in 1688 of a wound received while dissecting a camel.

IN PRINT

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