1 Good Construction, Functionality, and Aesthetic Appeal

From Vitruvius to the Eighteenth Century

1 Vitruvius

Marcus Vitruvius Pollio (ca. 70–20 BCE) apparently drew on a rich legacy of Greek texts on building, all now lost. His own *Ten Books on Architecture*[1] begins with the recommendation that architects be well-educated in mathematics, including music, and philosophy, including natural science. But most of it is devoted to matters such as the proper choice and preparation of building materials, siting, and proper design for infrastructure, such as ports, markets, and fortifications, for public buildings such as temples, and for private homes – in other words, to his categories of good construction and functionality. What is necessary for aesthetic appeal receives only a brief explicit description in Book I of *De architectura*. Brief as it is, his words are pregnant with possibilities for future thought about architecture. But before we turn to Vitruvius's accounts of construction, functionality, and aesthetic appeal, let's look at his general view about the relation between human life and the rest of nature, for that is the foundation for much of the rest.

The importance of this relationship is evident from Book I, chapter i, on the education of the architect. Following his statement of the importance of philosophy

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for the architect and then of music as the science of harmonies, thus including mathematics, Vitruvius next mentions the importance of "medicine," also very broadly understood, "because of the problems posed by the latitude . . . , by the properties of the air, by locations which are healthy or infected, and by water use; for without such knowledge no healthy house can be built." Architects must understand astronomy in order to take account of the directions of wind and light. They "should also know the mandatory legal regulations for the construction of buildings with party walls, for the distribution of eaves and sewers, and of windows and water-pipes around buildings . . . so that, before starting buildings, they can ensure that no legal disputes are left for householders."[2] These statements show that Vitruvius understands architecture as a fundamental medium for the relation of human beings to the rest of nature and to each other in society. The products of architecture are not simply aesthetic objects, in our terminology, intended for pleasurable contemplation, but are also means for the interactions of people with their physical and social environments on which the possibility of human life and flourishing depends. Facilitating human flourishing in its natural and social context is the underlying goal of the architect, whether designing a house, a fort, or a temple, and that is why the architect must be steeped in every form of human knowledge. Of course, if aesthetic satisfaction is part of human flourishing along with the satisfaction of the more practical goal of shelter, then the architect must aim at both aesthetic appeal and functionality as that which is to be achieved through good construction.

Vitruvius's naturalism is the background for his evolutionary account of "The Origin of Buildings" in Book II, chapter i.[3] Vitruvius is famous for the image of the "primitive hut," the idea that early humans sought shelter from the elements under canopies of leaves and boughs, and learned to mimic such rough shelters with a simple structure of four corner-posts supporting beams and rafters that could be covered with roofs and walls of thatch and mud.[4] The idea that all architecture has its origin in the primitive hut persisted into the eighteenth and nineteenth centuries.[5] But Vitruvius actually offered a more sophisticated account of the origin of building types. He supposed that early humans were first drawn to form groups larger than nuclear families by the attraction of fire, invented languages once they had formed into groups "by indicating frequently the things they used,"[6] and then began to create shelters suited to the particular environments in which they found themselves, using the materials they found in those environments to imitate naturally occurring kinds of shelter that they observed.

> It was then that some of them from these first groups began to make shelters of foliage, others to dig caves at the foot of mountains and yet others to build refuges of mud and branches in which to shelter in imitation of the nests of swallows and their way of building. Next, by observing each other's shelters and incorporating the innovation of others in their own thinking about them, they built better kinds of hut day by day.[7]

For example, "in Gaul, Spain, Lusitania and Aquitaine, houses are roofed with oak shingles or thatched" because

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those materials are abundant, but "the Phrygians, who live on the plains, have very little timber," so instead "choose natural mounds, and cutting trenches through the middle and digging out passages, enlarge the interior space as much as the nature of the site allows."[8] Vitruvius thus saw human beings as adapting to their natural environment by both imitation and invention: they imitate what they find in nature but also what they find in each other, and they invent to improve upon both. Human beings exist in complex interaction with each other and with the rest of nature, and architecture is a fundamental medium of such interaction, as, although Vitruvius does not mention this, the equally fundamental human arts of cooking and dressing also are. Those too use materials afforded to us by nature, that is, whatever particular environment some population happens to find itself in, but in ways that can begin with crude imitations of nature – wearing the pelts of animals much as the animals themselves did – and then can be radically transformed by the human capacities for invention (turning flax into linen or cellulose into rayon) and imitation (fashion). One particular form of imitation that Vitruvius subsequently notes is the imitation of features of timber construction in stone: "Starting from . . . components of carpentry, builders adapted them for the relief work of the stone and marble structures of sacred buildings." For example, no doubt following long tradition, he interprets the triglyphs of the Doric temple frieze as imitations of the painted ends of timber joists.[9] But the imitation of wood in stone is hardly the entire origin of architecture; human beings are too adaptive and too inventive for that.

It is against this background of imitative yet inventive adaptation to nature and society that Vitruvius conducts his discussion of good construction and functionality in the form of the description of building materials, construction methods, and building types that occupies most of *De architectura* (until he comes to the discussion of sundials, water clocks, and military machinery such as catapults that occupies the final two of his ten books). His exploration of human adaptation to nature in architecture begins with accounts of the proper siting of individual rooms, whole cities, and types of structures such as temples within cities in Book 1. Even before he introduces his trio of the fundamental goals of architecture he notes that "appropriateness to nature will be observed if the light for bedroom and libraries is derived from the east, for bathrooms and winter apartments from the west, for picture galleries and rooms which require steady light from the north." The last, he explains, is because "that zone of the sky is not dazzled or obscured by the trajectory of the sun, but the light remains constant all day long";[10] in an era before alarm clocks bedrooms should be lit from the east so that the morning light will awaken sleepers, libraries also lit from the east because before gas or electric lighting reading was best done in the morning, and bathrooms and winter apartments should face west because they will be warmest in the afternoon. The orientation of whole houses should also be "correctly planned if ... we take careful notice of the regions and latitudes of the world in which they are to be built," thus "It is clear that houses in the north should be roofed over, as closed as possible and provided with few apertures," while

"houses in southern regions under the impact of the sun should be provided with more apertures and face north and northeast because those regions are oppressed by heat."[11] The agglomerations of houses that form towns and cities should be sited "in a high place, without mists or frost, and exposed to weather conditions that are neither sweltering nor freezing, but temperate"; "proximity to marshy terrain is to be avoided" before modern mosquito control;[12] and "harbours present great advantages if they are naturally well placed and have prominent headlands or projecting promontories" to keep ships and therefore travel and commerce safe from storms.[13] Architects must also understand the directions of the winds in different locations, at different times of day, and in different seasons, in order to maximize healthy breezes and minimize unhealthy or destructive winds.[14] Finally, "the selection of areas in the city with respect to their development for communal use ... for sacred buildings, the forum and other communal spaces" must be based on the "convenience of the citizens."[15] These are all instances of functionality, which must be understood broadly as the facilitation of the adaptation of human beings to nature and to each other for the successful execution of such activities and tasks as sleeping, bathing, reading, trading, and worshiping, which are part although not the whole of human flourishing.

Intelligent adaptation to nature is also the underlying theme of Vitruvius's account of solid and durable construction, which takes the form of a description of the proper selection and preparation of building materials and the proper techniques for building with them. This is the

focus of Book II of *De architectura*. Following the historical account of the different types of shelter that emerged in different environments already noted, the next chapter introduces the elements water, fire, air, and earth as the basis for Vitruvius's attempt at a scientific explanation of the properties of various materials, thus of their strengths and weaknesses and therefore best uses.[16] His explanations may seem archaic to us, but his recommendations are obviously rooted in generations of experience and are sound. For example, he describes the best types of clay for making bricks and how long they need to be cured as well as the different shapes of Greek and Roman bricks;[17] the best sands and the preparation of lime for making mortar;[18] the preparation of pozzolana, a type of concrete made from tufa, the lava found around Mounts Vesuvius and Etna, which can harden underwater;[19] and different types of stone, the locations of the quarries where they may be found, and how long they must rest between quarrying and building.[20] He then describes the different ways in which walls should be laid with either brick or stone, and how they should be mortared and filled. His focus is primarily on the strength and endurance of walls, a vital matter at a time in which every city and not merely every military installation was surrounded by walls. But he also touches upon aesthetic issues, observing that *opus reticulatum*, or construction from irregular stones rather than repeated courses of uniform bricks or stones, may be "the more attractive of the two, but it is apt to form cracks because it comprises disconnected bed- and vertical joints in all parts of the wall,"[21] and also on political matters, as when he observes that sometimes even kings who could

afford to build with quarried stone or marble should "not turn up their noses at structures made with brick walls."[22] Although functionality and aesthetic appeal may be separate goals, sometimes they can be achieved together through good construction, and sometimes one may have to be traded off with the other. Then Vitruvius turns to timber. He explains the properties of different woods such as fir, various oaks, alder, ash, and many others, in terms of their proportions of earth, air, fire, and water. His science may be outdated, but his advice on the best ways to harvest timber and the best uses of different types are well-grounded in human experience: such as the use of fir for flooring that will stay straight,[23] alder for foundation piles,[24] and larch, which "is known only in those municipalities along the banks of the river Po and on the shores of the Adriatic," for its resistance to rot, grubs, and fire.[25] "Consequently those who can follow the advice contained in this body of instructions will be better informed and equipped to choose how to use the particular types for construction."[26] Throughout, Vitruvius's aim has been to explain how human beings can intelligently adapt the materials afforded to them by nature, wherever they may find themselves and whatever that material may be, to achieve both functionality and aesthetic appeal.

Having completed his discussion of the conditions of good construction in Book II, Vitruvius turns to the discussion of different building types, from temples to aqueducts, which occupies Books III through VIII. His emphasis through much of this discussion is on the conditions for maximizing the utility of these different types, such as the

forum, basilica, treasuries, prisons, theaters, harbors, and shipyards (Book V), private homes (Book VI), and even pavements (Book VII). We have already seen how this discussion goes from the preliminary examples of siting and orientation in Book I. But Vitruvius's discussion of building types begins with the temple in Books III and IV, and here not only utility but also beauty are at issue. So at this point a return to Vitruvius's general comments about the sources of aesthetic appeal in Book I is in order.

Although the topic of beauty loomed large in modern aesthetics – one of the definitions of the field offered by its founder, Alexander Gottlieb Baumgarten, was as *ars pulcre cogitandi*, the art of thinking beautifully[27] – and remained central until quite recently, Vitruvius's treatment of the aesthetic aspects of architecture (*venustas*) is brief compared to his treatments of construction and functionality. It might also seem to be confined to a formalistic approach equating aesthetic appeal with the proportions within and among the parts of a building, such as the columns considered both singly and as forming its colonnades and porticoes, indeed with proportions strictly governed by particular mathematical ratios; at least that is how Vitruvius's approach to aesthetic appeal was so understood by successors such as the Renaissance humanist Leon Battista Alberti, the Renaissance architect Andrea Palladio, and perhaps twentieth-century masters such as Le Corbusier and Mies van der Rohe. But Vitruvius's conception of the beauty of buildings is more complex than that. First, although he does speak of proportions in mathematical terms, he also emphasizes that what is crucial to beauty is

how the parts of buildings *appear* to human observers from normal vantage-points, not strict conformity to ideal ratios in themselves. His account of beauty is anthropocentric in a second sense: the most crucial ratios in architecture, for example the ratio between the diameter and the height of columns, are determined by the proportions of the human body, in this case that between the height of a person and the length of a foot. Further, these proportions vary in relation to different types of human bodies, as in Vitruvius's analogy between the proportions of Doric, Ionic, and Corinthian columns and those of the figures of men, matrons, and maidens (for further discussion, see pp. 30–32 below).[28] And these analogies, as well as the use of even more representational elements in architecture, can give buildings meaning and relate them to human emotions. So Vitruvius recognizes *content* as well as *form* as contributing to the aesthetic appeal of architecture. The recognition that buildings may have *meaning* in various ways as well as pleasing by the *forms* of the parts and wholes will be a significant development in the subsequent history of the aesthetics of architecture.

In Book 1, chapter ii, on "The Principles of Architecture," Vitruvius enumerates a series of terms that seem to convey a formalistic conception of beauty, although they also touch upon matters of utility on the one hand and of aspects of meaning on the other. They also reflect Vitruvius's recognition of architecture as an intermediary between human beings and the rest of nature and among human beings in society. How to distinguish the significance of these terms and even how to translate them is not

obvious; Vitruvius himself presents several of them as translations of Greek terms. In the older translation of Morris Hicky Morgan, the principles are Order (*ordinatio*, in Greek *taxis*), Arrangement (*dispositio*, *diathesis*), Eurythmy (*eurythmia*), Symmetry (*symmetria*), Propriety (*decor*), and Economy (*distributio*, *oikonomia*);[29] in the newer and in this case perhaps eccentric translations of Richard Schofield, the six principles are planning, projection, harmony, modularity, appropriateness, and distribution.

Planning or order might seem to concern the proper layout of a building for its intended function, but in this case Vitruvius seems to have a formal foundation for beauty in mind, since he defines this principle as "adapting each individual element of a building to the right dimensions and establishing its overall proportions by reference to modularity," as Schofield translates, or in Morgan's translation giving "due measure to the members of a work considered separately, and symmetrical agreement to the proportions of the whole."[30] Both translators agree that this means selecting a "module" from the elements or members of the building (in the first instance, the radius of its columns at their base) and then designing the whole building through mathematical functions of this module. An obvious illustration of this requirement will be the way in which within each order the radius of a column is related to its overall height and the height of its base and capital, as well as the proper height of the architrave above and the distance between one column and the next (intercolumniation). Although one could also say that the intended size of the building overall will

determine the proper height of its columns and therefore their diameter, as well as the right number of them for the porticoes (four, six, eight) and in turn the right number for the lateral colonnades (seven, eleven, fifteen), all of these values will vary conjointly. Order or arrangement is an interrelation, in which the parts determine the whole but the whole also determines the parts.

Vitruvius's next principle, "arrangement" or "projection," is doubly ambiguous. First, while it seems to continue the previous principle, concerning "the appropriate placement of a building and the elegant completion of the work, based on a combination of the parts appropriate to the characteristics of the work,"[31] or, in Morgan's translation, the "character" of the work, the last term might bring in meaning or content: if it means that the design of a building should be appropriate to its intended function, for example as a temple as opposed to a courthouse, then order or arrangement is more than a purely formal or mathematical consideration. Second, Vitruvius continues in a way that seems to concern *plans* or *drawings* rather than physical buildings: in Schofield's translation, he says that the "types of projection" are "ground-plan" (*ichnographia*), "orthogonal elevation" (*orthographia*), and "perspectival drawing" (*scaenographia*) – this is why Schofield translates *dispositio* as "projection" rather than "arrangement."[32] It seems strange that Vitruvius should switch from talking about properties of buildings to kinds of drawings, but perhaps we could take him to be using the three kinds of drawings to suggest that the architect must be concerned with the proper layout of a building, with the design of its elevations, and in

particular with how those will appear from the perspectives from which the building will actually be viewed, as well as with the overall impression the building will make from the likely points of view on it. He could be talking about buildings themselves by talking about the ways of drawing them.

Vitruvius's third principle explicitly concerns aesthetic appeal. Eurythmy or harmony "consists of a beautiful appearance and harmonious effect deriving from the composition of the separate parts," and is "achieved when the heights of the elements of a building are suitable to their breadth, to their length."[33] This seems to concern the overall dimensions of a building rather than the relation between its parts. But Vitruvius continues that this principle is satisfied "when all the elements match its modular system," which seems much the same as the previous principle of planning or order. And it seems much the same as the fourth principle as well, "the appropriate agreement of the components of the building itself and the correspondence of the separate parts to the form of the whole scheme based on one of those parts selected as the standard unit," for example, the radius of a column that determines so many other dimensions of the building's parts and whole. Schofield translates *symmetria* as "modularity" rather than by its traditional cognate "symmetry" precisely because this requirement does not concern bilateral symmetry, like that of the left and right sides of a human body, but rather concerns the relation between the one canonical dimension or measurement and all the other dimensions of a building. Vitruvius uses the human body as an illustration of his conception of modularity, supposing that there are relations among the

dimensions of members such as fingers, palms, and forearms such that the size of any one determines the proper size of the others, but at this stage he does not suggest that the proper ratios among the dimensions of elements of buildings and of the parts to the whole building have any direct relation to the canonical dimensions of human bodies and their parts. For the moment his conception of the overlapping principles of order, harmony, and modularity seems purely mathematical. He seems to be suggesting that beauty lies in certain mathematical relationships.

Nonmathematical considerations come into play, however, with Vitruvius's remaining categories of *decor*, appropriateness or propriety, and distribution or economy. The former also bears on "perfect appearance," but arises from "following a rule" given by "custom or nature" rather than mathematics. And appropriateness according to custom adds a dimension of content to the thus far formalistic account of architectural beauty: "One follows a rule when roofless buildings open to the sky are built to Jupiter, Creator of Lightning," although apparently this conception of Jupiter as well as the association with this feature of buildings is only a matter of custom; it is also custom that "Doric temples should be dedicated to Minerva, Mars, and Hercules, since it is appropriate to provide buildings without elaborate ornament for these deities because of their warlike character," while "Temples of the Corinthian order built for Venus, Flora, Proserpina, the God of the Springs and of the Nymphs will clearly have the right characteristics, because, given the gentleness of these deities, more graceful and florid buildings decorated with leaves and

volutes will clearly enhance the appearances appropriate to them."[34] Buildings built on the Doric or Corinthian order do not strike us as beautiful just because of their mathematical ratios, although those are part of their beauty, but because, by custom, their appearance seems appropriate to the meaning of a building, as a temple to a particular god or goddess. "Appropriateness in accordance with custom is [also] demonstrated when, for example, suitable and elegant vestibules [match] magnificent interiors," while it is violated when, for example, elegant interiors are found inside shabby exteriors. That would be jarring for almost anyone, although perhaps finding it inappropriate for "dentils to be carved in the cornices of Doric entablatures" depends on expectations based on more specific customs.[35] The aesthetic appeal of buildings depends on aspects of meaning in the broadest sense as well as of form.

Appropriateness with regard to nature rather than custom can also bear on utility rather than beauty, for it is under this heading that Vitruvius states that "very healthy" and well-watered sites should be chosen for sanctuaries and makes his remarks about the proper direction of light for rooms with different functions.[36] Utility is also Vitruvius's first concern with the principle of distribution or economy, which consists in "the appropriate management of resources and the site, and the prudent control of finances during construction thanks to careful calculation."[37] Economy in this sense is obviously the efficient use of time, capital, and labor, to use modern terms, and although an architect or a client may certainly take pleasure in knowing that a project has been completed efficiently, it has nothing

directly to do with the appearance of the finished product. Economy may be a part of functionality that does not bear directly on aesthetic appeal.

Finally, Vitruvius mentions a "second level" of distribution or economy, which consists in planning buildings differently for rich or powerful people, for urban or country estates, and for moneylenders or senators; "in brief, the layouts of buildings must be appropriate to each class of person."[38] This kind of economy is sometimes just a matter of utility, as when a country villa needs wings for storage of grain, animals, and equipment that a townhouse does not, or a politico needs large reception rooms while a financier may need smaller rooms for discreet deal-making. But it might also be a matter of appearance, as when the home of a politician should demonstrate his power while that of a financier should downplay his wealth. This would not be a question of pure form, but more a matter of content, or of perceived congruence between the appearance of a building and its intended function.

The Vitruvian conception of the aesthetic appeal of architecture thus involves more than purely formal beauty grounded in mathematical ratios alone. And even the formal aspect of architectural beauty is, as previously observed, anthropomorphic as well as mathematical. First, the connection between modularity in the human body and in architecture is not just an analogy for Vitruvius – the thought that "if nature has composed the human body so that its individual limbs correspond proportionately to the whole figure," it would also be a good idea that individual components of buildings "should be exactly commensurable with the

configuration of the whole structure"[39] – but is something more direct. It also goes beyond the fact that "the ancients" derived their "system of mensuration . . . from members of the body," that is, derived units such as inches, feet, and cubits from the typical sizes of human fingers, feet, and forearms.[40] Rather, they used the proportions among the parts of the human body to determine the proper proportions among the parts of architectural elements and among the elements in a building. Thus "they fixed six as the perfect number because a man's foot is a sixth of his height,"[41] and then developed the proportions of the Doric column and all the other parts on that ratio: "When they discovered that a man's foot is the sixth of his height, they applied that unit to the column and allocated six times the diameter they had established for the bottom of the shaft to its height, including the capital" (later measurements have shown that the ratio of base diameter to height in Doric columns is typically closer to 1:7). This "is why the Doric column began to exhibit the proportions, strength and grace of the male body in buildings," thus assuring both the adequacy of the columns to bear their heavy loads (functionality) and the "beauty of their appearance" (aesthetic appeal).[42] The proportions of the other two main orders of columns, the Ionic and the Corinthian, were then developed on the basis of the more graceful proportions of the Greek matron and the downright willowy figure of maidens, "who are endowed with more graceful limbs because of their tender age."[43] Even more direct mimesis of the human body is supposed to explain the volutes of the Ionic capital "like graceful curls hanging down from the hair" and the "flutes down the whole trunk

[of the column] like the folds in the robes traditionally worn by married women,"[44] while the Corinthian capital is explained as a representation of acanthus leaves springing up from the grave of a young girl through a basket that her nurse had left above it, a legend no doubt already old in Vitruvius's day.[45]

The second aspect of anthropomorphism that modifies any initial suggestion that the proper form of architectural elements and edifices as wholes is determined by mathematical ratios alone is Vitruvius's recognition that such forms must be modified to take account of conditions under which the buildings are actually observed. These conditions include the angles and distances from which those things are actually seen, as well as atmospheric effects. For example, "the upper diameters" of columns "should be enlarged to compensate for the increasing distances for the glance of the eye as it looks up,"[46] "corner columns should be made thicker than the rest by a fiftieth of their own diameter, because they are strongly silhouetted against the air and appear more slender to observers,"[47] the "level of the stylobate [platform for columns] must be adjusted so that it curves upward . . . for if it is laid absolutely horizontally, it will look concave to the eye,"[48] and

> the further up the gaze of the eye has to climb, the less easily can it penetrate the density of the air; and so it falters when the height is great, and . . . transmits to the senses an unreliable estimate of the dimensions of the modules. For this reason, one must always incorporate in the calculations an increase in the size of the components worked out according to the modular system.[49]

As Vitruvius sums up, "our sight searches for beauty, and if we do not satisfy its desire for gratification by increasing proportions with additions derived from modules in order to correct false impressions with appropriate adjustments, the building will present an awkward and clumsy sight to onlookers."[50] The modular system is not governed by mathematics alone, but by the conjunction of mathematics with the facts of human perception – another way in which architecture mediates between human beings and nature. This is an insight that had to be recovered long after the text of Vitruvius had itself been rediscovered.

A final point about anthropomorphism concerns a direct use of the human figure in architectural design, namely the Caryatids, that is, statues of female figures used as columns in the Erechtheum at the Acropolis, the treasuries at Delphi, and other sites.[51] Vitruvius's story is that these were representations of women taken as slaves after the defeat of the Peloponnesian city of Caria, which had allied itself with the Persians, and that the victorious Greeks led by Athens subsequently "devised images of them placed in load-bearing positions in public buildings so that the punishment of the crime of the Carians would be known to posterity and remain in history."[52] Such a story is why the architect has to know history. In a case like this we can regard the building or its part as having a literal meaning, the assertion "You will regret making war on us." This may not be a beautiful message, but in such cases it may be presented in a manner that contributes to the overall aesthetic impact of the work, an element of content that clearly goes beyond pure form. But such a message should also be

considered a special case: even if some buildings do, it would be a mistake to assume that every building must present a message or content that can be grasped in concepts and translated into words.

The three Vitruvian ideals of good construction, functionality, and aesthetic appeal were highly general and interpreted flexibly by their original author. Let us look now at how these concepts were interpreted in the Renaissance and beyond.

2 Alberti and Palladio

Leon Battista Alberti (1404–72) could stand for the entire Italian Renaissance as much as any other single figure.[53] Born in Genoa as the son of an exiled Florentine merchant, he studied letters and law at Padua and Bologna, then took holy orders and spent much of his life in the employ of the Vatican but was also welcome at the humanist courts of Ferrara and Urbino. He had vast humanistic learning but was also a productive mathematician and even a cryptographer. He began his treatise *Della pittura* (On painting), chiefly on optics and perspective, in 1435, and then turned his attention to architecture. His treatise on architecture, *De re aedificatoria* (On building), was circulating in Latin by 1450, published in Italian as early as 1456, and finally posthumously printed in Latin in 1486. But Alberti was also a practicing and consulting architect: he restored a Roman aqueduct for Pope Nicolas V, and planned the ideal Renaissance city of Pienza for the humanist Pope Pius II, Aeneas Silvius Piccolomini. His own architectural

works included a facade for the Palazzo Rucellai in Florence and the transformation of the partially completed Gothic facade of Santa Maria Novella into a Renaissance masterpiece; the transformation of the Gothic Tempio Malatestiano in Rimini into another Renaissance monument; and above all the Basilica of Sant'Andrea in Mantua, the facade of which is a triumphal arch that ties the Renaissance back to the glory of the Roman Empire. In all these cases Alberti apparently confined himself to the design of the work and left details and supervision of its construction to others, although *De re aedificatoria* demonstrates extensive knowledge of construction materials and techniques, or at least extensive knowledge of the literature on the subject including Vitruvius but also Theophrastus, Pliny, and others.

Alberti's work is obviously modeled on and draws from that of Vitruvius. In form, Alberti follows Vitruvius in dividing his work into ten books, and in substance, he reproduces the Vitruvian triad; speaking of the six elements of building, which he classifies as locality, *area* or overall plan and perimeter, compartition or division into rooms, and walls, roofs, and openings, Alberti writes:

> their individual parts should be well suited to the task for which they were designed, and above all, should be very commodious; as regards strength and endurance, they should be sound, firm, and quite permanent; yet in terms of grace and elegance, they should be groomed, ordered, garlanded, as it were in their every part. Now . . . we have set down the roots and foundations of our discussion . . .[54]

Alberti is clearly employing Vitruvius's three categories of good construction, functionality, and aesthetic appeal. In terms of organization, he also follows Vitruvius's pattern of beginning with an account of sound materials and construction techniques, although he amplifies Vitruvius's account with material from other ancient authors, and he similarly follows that with discussions of the various types of building, although he usefully replaces the Roman's discussion of clocks and military machinery with a detailed discussion of machines used in construction itself, such as pulleys, hoists, and cranes (Book VI). However, there are also two important differences between Alberti's approach and that of Vitruvius.

The first and perhaps more obvious is that he largely replaces Vitruvius's empiricist – perhaps Epicurean and Lucretian – approach to the relation between humanity and nature with a more rationalist – Pythagorean and Platonic – conception of the order of nature and its necessary reflection in architectural design. This is evident in both Alberti's general statements and his treatment of particular subjects. In the most general terms, Alberti defines beauty, the third Vitruvian category, as *concinnitas*, the "reasoned harmony of all the parts within a body, so that nothing may be added, taken away, or altered, but for the worse," and he then states that this is an "inherent property, to be found suffused all through the body of that which may be called beautiful," to which ornament is strictly secondary, "a form of auxiliary light and complement" that may highlight the formal beauty of the work but does not make an essential contribution to it.[55] Alberti further insists that *concinnitas*,

his own coinage that there is no point in translating, is not to be "judged by variable and relative criteria,"[56] but is actually a mathematically determinate relationship:

> Beauty is a form of sympathy and consonance of the parts within a body, according to definite number, outline, and position, as dictated by *concinnitas*, the absolute and fundamental rule in Nature. This is the main object of the art of building, and the source of her dignity, charm, authority, and worth.[57]

And because beauty consists in an objective, determinate mathematical relationship, "When you make judgments of beauty, you do not follow mere fancy, but the workings of a reasoning faculty that is inborn in the mind . . . . That is why when the mind is reached by way of sight or sound, or any other means, *concinnitas* is instantly recognized."[58] This is what makes Alberti a rationalist, rather than, like Vitruvius, an empiricist: the basis of beauty is recognized by our reason, not by feeling and certainly not by mere custom, as the older author so often suggested. And what makes Alberti's view Pythagorean and Platonic is that he assumes that the mathematical relationship that constitutes *concinnitas* and beauty is the essence of nature itself: "Neither in the whole body nor in its parts does *concinnitas* flourish as much as it does in nature itself; thus I might call it the spouse of the soul and of reason."[59] Our appreciation of mathematical structure in buildings is appreciation of the order of nature itself. Alberti makes his allegiance to Pythagoras explicit: having described several numerical relationships favored by architects, he continues that

> For us, the outline is a certain correspondence between the lines that define the dimensions, one dimension being length, another breadth, and the third height. The method of defining the outline is best taken from those objects in which Nature offers herself to our inspection and admiration as we view and examine them. I affirm again with Pythagoras: it is absolutely certain that Nature is wholly consistent. That is how things stand.[60]

A preference for certain ratios is not a contingent feature of human psychology; our pleasure in these ratios in architecture is rather a rational response to the essential order of the universe itself. Such a thought is often seen as the core of Renaissance Neo-Platonism, identified with such figures as Marsilio Ficino (1433–99), but Alberti traces it back to Pythagoras – a genealogy to which Plato himself would have had no objection.

We can see Alberti applying his mathematical rationalism to particular cases. As in Vitruvius, an account of the orders of columns is an essential part of Alberti's treatise. And like Vitruvius, he begins with an anthropomorphic account of the origins of the orders:

> The shapes and sizes for the setting out of columns, of which the ancients distinguished three kinds according to the variations of the human body, are well worth understanding. When they considered man's body, they decided to make columns after its image. Having taken the measurements of a man, they discovered that the width, from one side to the other, was a sixth of the height, while the depth, from navel to kidney, was a tenth . . . . The ancients may have built their columns to such dimensions, making some six times their base, others ten times.

Thus originated the heights of the Doric and Corinthian columns. But on Alberti's view the ancient designers of the orders did not long remain content with such obvious anthropomorphism. Rather, they quickly corrected mere imitation with higher mathematics. First, they divided the difference between six and ten, and "made a column eight times the width of the base, and called it Ionic"; then they corrected the dimensions of the Doric column:

> They took the lesser of the two previous terms, which was six, and added the intermediate term of the Ionic, which was eight; the sum of this addition was fourteen. This they divided in half, to produce seven. They used this number for [the correct height of] Doric columns, to make the width of the base of the shaft one seventh of the length. And again they determined the still more slender variety, which was called the Corinthian, by adding the intermediate Ionic number to the uppermost extreme and dividing the sum in half: the Ionic number being eight, and the uppermost extreme ten, the two together came to eighteen, half of which was nine. Thus they made the length of the Corinthian column nine times the diameter at the base of the shaft, the Ionic eight times, and the Doric seven. So much for this.[61]

Alberti does not argue that actual measurements have shown that the ratio of diameter to length in Doric columns is closer to 1:7 than it is to 1:6, or suggest a psychological argument that the more slender column just looks more pleasing to us; rather it is a matter of pure mathematics. Apparently it is just rational to prefer the result of these mathematical calculations to any other basis for establishing

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the proper proportions of columns, because after all such proportions are the order of nature itself.

There are a few places where Alberti acknowledges the kind of adjustments to purely mathematical forms required by the actual conditions of human perception that Vitruvius had emphasized. Alberti acknowledged but at the same time distanced himself from the need for such corrections when he observed that while "Some maintained that the bottom [of a column] should be one and a quarter times as thick as the top," "Others, realizing that objects appear smaller, the further they are from the eye, sensibly decided that with a tall column the top should not be reduced as much as with a short column,"[62] that "columns seem narrower in the open air than in an enclosed space" and should be adjusted accordingly, and that "the number of flutes may increase the apparent thickness of a column."[63] But these are just "certain matters relevant to [the] systems of columns that must not be overlooked," not anything essential to them; and when he comes to the real mathematics of columns in Book IX that we have just described, he makes no mention at all of these departures from his formulas. The essence of beauty lies in mathematics, not in the physiology of perception. This is the triumph of Alberti's rationalism over Vitruvius's empiricism even within his acceptance of the Vitruvian framework of architectural ideals.

Alberti's other main departure from Vitruvius is that his entire discussion of the orders of columns and the systems of design that depend on them takes place after he has announced a turn to the topic of ornament in Book VI.

This might seem like a trivial difference in organization, but it may have had significant implications for the subsequent history of architecture itself. Alberti starts Book VI by saying that he has already dealt with the "lineaments, the materials for construction, the employment of workmen, and anything else that might seem relevant to the construction of buildings" in the first five books, and that everything that comes next deals merely with the appropriate ornament for various building types (even though his discussion of construction machinery actually comes in the present book).[64] But his relegation of the discussion of columns to mere ornament was already evident in his opening statement that the fundamental elements of buildings are location, plan, partition, walls, roofs, and openings (windows and doors) – columns were not on this list. Vitruvius had started his discussion of building types with the temple, and because of this had started his discussion of building elements with columns; but Alberti starts his whole discussion of temples and therefore of columns only in Book VII, thus after his turn to ornament. This could show that the temple is not as central to a modern list of building types as it was to the ancient, and this seems reasonable enough, especially since the western Christian Church seems to have been based more on the ancient model of the basilica, a secular public building type for governmental functions, than on the ancient temple. Alberti's use of the ancient triumphal arch as the form for the facade of his own Sant'Andrea also suggests a connection between the modern church and ancient secular forms rather than the form of the temple. More generally, Alberti's treatment of columns as mere

ornament may open the way to a modern conception of a building as the enclosure of a volume of space by floor, walls, and roof and of access to it by means of doors and windows in place of an ancient conception of a building as a structure of columns supporting beams, as much a sculpture as an enclosure, and just as plausibly open to the sky as roofed over, or, as emerged in Rome, a series of arches and spandrels, again either open (as in a colosseum) or roofed over. On the new conception of buildings, the proportions of the volume and its enclosure would be more significant than the proportions of columns, even rooted as the latter are in pure mathematics.

This would open the way to a greater emphasis on and variety in the overall shapes of buildings that we see over subsequent centuries, in building types with no clear classical antecedents such as the seventeenth-century additions of the Louvre or the variations of configuration illustrated at the turn of the nineteenth century by Jean-Nicolas-Louis Durand (1760–1834)[65] and the varied shapes of contemporary skyscrapers – Chippendale cabinets, lipstick tubes and pickles – and of the Sydney Opera House by Jørn Utzon, the free-form museums of Frank Gehry, and the new Barnes Collection in Philadelphia by Tod Williams and Billie Tsien. At the same time, the relegation of the column to the status of mere ornament opened the way to a use of columns liberated from ancient building types even when they continued to be a prominent element of buildings, as they did not only from the Italian Renaissance through the Greek Revival movement of the first part of the nineteenth century but also into the stripped-down Roman classicism of

both fascist and democratic states in the 1930s. For just one example, while another polymath, the Frenchman Claude Perrault (1613–88), wrote a treatise explicitly entitled *Ordonnance for the Five Kinds of Columns after the Method of the Ancients* (1683) in which he explored the mathematics of the five orders of columns (Doric, Ionic, and Corinthian plus Tuscan and Composite) in even more detail than Alberti had,[66] his own masterwork, the east facade of the Louvre, deployed a two-story high colonnade of paired columns sitting on single pedestals themselves resting on the lower story of the building, which is without ancient precedent. It is a modern, primarily ornamental invention without an indispensable structural function, which, although this may be to compare the sublime to the ridiculous, can be seen as having prepared the way for the purely decorative use of ancient forms or references to them in such 1980s post-modernist buildings as those of Michael Graves. Sometimes the organization of a book means more than first appears.

One final point that might be noticed about Alberti's book is that although he deployed the traditional distinction between form and *matter*, thus between design and construction materials (analogous to his epochal distinction between outline or design [*disegno*] and color in his book on painting),[67] he did not acknowledge even to the extent that Vitruvius did the way buildings may have *content* and that content as well as form may contribute to their aesthetic interest and appeal. The concept of meaning would not become central to architectural aesthetics until the end of the eighteenth century, and would then flower in

the nineteenth. Before we turn to later authors, however, a word about Palladio.

Palladio may have been the single most influential architect who ever lived: his urban style was imitated in Britain by Inigo Jones, his country villas inspired countless houses throughout Britain and North America from the eighteenth century through the first part of the twentieth (and "Palladian" windows still appear in "McMansions" today), and through the brilliant Prussian architect Karl Friedrich Schinkel (1781–1841) his plans even influenced a modern master like Mies van der Rohe. Unlike Alberti, Palladio was not born into a wealthy, educated environment; he started off as a stonemason and builder, but was taken up by a circle of wealthy humanists in Vicenza – even given the name "Palladio" by them, perhaps in honor of Pallas Athena[68] – and acquired his profound knowledge of antique building through visits to Rome funded by his patrons. But this did not lead to a slavish imitation of antique buildings or building types; on the contrary, working in three main building types – his Vicenzan urban palazzi such as the Chiericati (ca. 1550–57) and the Valmarana (1565–71), his numerous suburban and country villas throughout the Veneto, and his two great Venetian churches, San Giorgio Maggiore (1564–80) and Il Redentore (1576–80) – Palladio used the elements of ancient buildings, the columns in their several orders, porticoes and pediments, in entirely original compositions.

But where Palladio did follow precedent was in his adoption of the mathematical rationalism of Alberti. To be sure, Palladio was seriously concerned with functionality,

thus his country villas were designed as both showcase houses for wealthy landowners and the headquarters of working farms,[69] an urban palazzo like the Chiericati carefully integrated public and private spaces, and Il Redentore was precisely designed to accommodate the annual procession celebrating the delivery from a plague that it had been built to commemorate.[70] And Palladio was obviously concerned with solid construction; although built with simple plastered brick, with proper maintenance many of his villas are still in excellent condition, and with more expensive materials his churches are as magnificent today as they must have been when first completed. But above all Palladio achieved beauty through geometry. In the Introduction, we saw how the Villa Rotonda was designed as a circle inscribed in a square inscribed within a larger circle, the perimeter of which passes precisely through the center-point of each of its four porticoes – a geometrical exercise unprecedented in the history of architecture but blessed by Alberti's Pythagoreanism. The Villa Rotonda is a suburban rather than agricultural villa, and thus has no flanking outbuildings, but in many of Palladio's country villas, the outbuildings flanked a perfectly square residential block, which in turn contained a central hall with three rooms on each side, in descending proportions, from front to back, typically 3:2, 2:2, and 2:1. James Ackerman's brilliant descriptions of the parallels between these ratios and musical harmonies as understood in the Renaissance shows how in his practice of aesthetics Palladio followed the ideals of Alberti.[71] But as Ackerman points out, Palladio went even further than Alberti's recommendations, and integrated the ceiling

heights as well as length and breadth of rooms into his geometrical harmonies; in one example he discusses, the Palazzo Iseppo Porto (1552), Palladio designed a central hall on the *piano nobile* (main floor) that was 30 by 40 feet with a ceiling height of 30 feet, flanked by side rooms of 30 by 20 feet with 20 foot high ceilings. For all of Palladio's influence in Britain, as we will shortly see, the analogy between architectural and musical harmony and in particular this incorporation of ceiling heights into the geometrical scheme were criticized on the sort of empirical, physiological grounds that Vitruvius himself had originally noted.

This detail aside, Palladio's architectural principles remained well within the original Vitruvian paradigm of good construction realizing both functionality and aesthetic appeal, the latter in his case itself achieved through geometrical as well as decorative means. Let us now look at two examples of eighteenth-century thought to show how the Vitruvian paradigm was maintained even as Albertian-Palladian rationalism was criticized – there may be an internal debate about how to achieve aesthetic appeal, but not a rejection of it as an ideal.

3 Kames and Laugier

This section will discuss just two mid-eighteenth-century figures, one a philosopher and one an architectural theorist, to illustrate the continuing power of the Vitruvian framework even as its very general terms are variously applied.[72] Neither was anything close to a trained or practicing architect. Henry Home, Lord Kames (1696–1782), was a

prominent Scottish jurist who also wrote voluminously in moral philosophy, history, and aesthetics, and was an intimate of other leading figures of the Scottish Enlightenment such as David Hume and Adam Smith. The architectural theorist is Marc-Antoine Laugier (1713–69), first a Jesuit and then a Benedictine abbé, who published his *Essay on Architecture* in 1753 and then wrote on music and on the history of Venice as well as serving on diplomatic missions. But both had interesting things to say about architecture.

In his three-volume *Elements of Criticism*, first published in 1762 and remaining in use well into the nineteenth century, Kames devoted a chapter to "Gardening and Architecture." In a general work on what we may find pleasing in all the arts but which is primarily concerned with the emotional impact of literature, when he comes to architecture Kames touches upon the requirement of *firmitas*, or good construction, only in passing. But he takes it as given that architecture is concerned with both functionality and aesthetic appeal, or, in his terms, utility and ornament. Buildings and their parts can be divided into "three kinds, namely, what are intended for utility solely, what for ornament solely, and what for both," although most works of architecture fall into the last group and therefore the great challenge for architects, or "difficulty of contrivance, respects buildings that are intended to be useful as well as ornamental."[73] And when it comes to beauty, although Kames does not cite Vitruvius – the only authority he does cite in the chapter is Charles Perrault, the author of the *Parallèle des Anciens et Modernes* (1688) and the brother of Claude, the author of the work on columns[74] – he clearly

aligns himself with Vitruvius's emphasis on the appearance of proportions to actual human observers as the real basis of beauty rather than with the purer rationalism of Alberti and Palladio. This is only to be expected from a writer so closely connected to the empiricist tradition in British philosophy. In fact, Kames emphasizes how things actually appear to us in the case of utility as well as beauty: "With respect to buildings of every sort, one rule, dictated by utility, is that they be firm and stable" (here is his passing reference to *firmitas*). "Another rule, dictated by beauty, is, that they also appear so: for what appears tottering and in hazard of tumbling, produceth in the spectator the painful emotion of fear, instead of the pleasant emotion of beauty; and, accordingly, it is the great care of the artist, that every part of his edifice appear to be well supported."[75] Here, though, Kames could be thinking of a remark by David Hume that "the rules of architecture require, that the top of a pillar shou'd be more slender than its base, and that because such a figure conveys to us the idea of security, which is pleasant; whereas the contrary form gives us the apprehension of danger, which is uneasy."[76] This concerns the effect of architecture upon our emotions more than on the physiology of perception – but then the central subject of Kames's *Elements of Criticism* is the emotional impact of art.

Nevertheless, most of his discussion of architectural beauty concerns what we actually perceive. Kames sees proportions in architecture as determined by both function and beauty. For example, "The proportions of a door are determined by the use to which it is destined. The door of a dwelling-house . . . ought to correspond to the human size,"

while the "proportions proper for the door of a barn or a coach-house, are widely different." Further, "The size of windows ought to be proportioned to that of the room they illuminate," while "The steps of a stair ought to be accommodated to the human figure, without regarding any other proportion: they are accordingly the same in large and in small buildings."[77] But beauty has its own demands, and proportions among the dimensions of rooms, for example, may be governed by the requirements of beauty as well as of utility, or of beauty when they are not governed by utility. "The height of a room exceeding nine or ten feet, has little or no relation to utility; and therefore proportion is the only rule for determining a greater height."[78] Yet in a further comment on ceiling heights, Kames makes clear his view that in matters of proportion beauty lies in how they strike the eye, not pure mathematics. "That we are framed by nature to relish proportion as well as regularity," he says, "is indisputable; but that agreeable proportion should . . . be confined to certain precise measures, is not warranted by experience," for an empiricist the ultimate arbiter of taste. For example, "In a sumptuous edifice, the capital rooms ought to be large . . . . But in things thus related, the mind requires not a precise or single proportion, rejecting all others; on the contrary, many different proportions are made equally welcome." This is especially true "With respect to the height of a room," where "the proportion it ought to bear to the length or the breadth, is arbitrary; and it cannot be otherwise, considering the uncertainty of the eye as to the height of a room, where it exceeds 17 or 18 feet."[79] The room just has to appear suitably high. This is a direct contradiction of Palladio's practice.

Kames similarly insists the pleasing proportions for each of the orders of columns are not precisely determined by mathematics but fall into a range. He adopts Albertian language in making the general claim that "Proportion of parts is not only itself a beauty; but is inseparably connected with a beauty of the highest relish, that of concord or harmony."[80] These terms seem to be Kames's translation of Alberti's term *concinnitas*, but he is returning to Vitruvius and differing from Alberti in insisting that what counts as such must be determined more by the eye than by mathematical reasoning.

Where Kames agrees with both Vitruvius and Alberti is in his emphasis on *decor* or propriety, but he gives this point his own flavor by connecting it to emotion. He calls this "the sense of congruity," and says that "every building [should] have an expression corresponding to its destination." His illustration of this thesis is shot through with terms for emotions:

> A palace ought to be sumptuous and grand; a private dwelling neat and modest; a play-house, gay and splendid; and a monument, gloomy and melancholy. . . . A Christian church is not considered to be a house for the Deity, but merely a place of worship: it ought therefore to be decent and plain, without much ornament: a situation ought to be chosen low and retired; because the congregation, during worship, ought to be humble, and disengaged from the world. Columns, beside their chief service of being supports, may contribute to that peculiar expression which the destination of a building requires: columns of different proportions, serve to express loftiness, lightness, &c. as well as strength.[81]

What Vitruvius had said about the choice of the order of columns being suitable to the deity a temple is intended to house, Kames puts in terms of the particular emotions different buildings are meant to arouse, or, as he terms it, express. His sense of what emotions a "Christian church" ought to express and by what means it should do so might be particularly Protestant or even Presbyterian, but the point is general.

Since Kames started by saying that true works of architecture aim at both functionality and aesthetic appeal, in his terms utility and beauty, his thought can only be that the expression of emotion contributes to the beauty of a building; he is not rejecting the Vitruvian categories, but expanding the meaning of one of them. The general scheme remains in force.

Laugier also demonstrates the continuing validity of the fundamental principles of Vitruvius. Laugier clearly wrote his *Essay on Architecture* under the influence of *The Fine Arts Reduced to a Single Principle*, published by his contemporary Charles Batteux (1713–80) in 1746.[82] Batteux's single principle was that beauty consists in the imitation of nature, although by imitation Batteux actually meant the idealization of nature: art should describe or present, depending on its medium, how nature ought to be rather than how it often actually is. Laugier took the idea of the imitation of nature more literally, and applied it to architecture through the idea of the primitive hut. He took this from Vitruvius but ignored Vitruvius's point that early humans in different environments would have developed different styles of building. Rather, starting from the

premise that the earliest architecture would have consisted of houses built with four corner-posts connected by four crossing beams, on top of which a pitched roof would have been constructed to shed the rain, he inferred that the "general principles" of architecture are the column, the entablature (the horizontal beams resting on the columns), the pediment or gable ends (but only under the ends of the pitched roofs), windows and doors for access, egress, light and air, and in the fullness of time multiple stories.[83] His general principle is then that these structurally and functionally essential parts are "the cause of beauty," and thus that "If each of these parts is suitably placed and suitably formed, nothing else need be added to make the work perfect," while anything "added by caprice causes every fault."[84] His argument is therefore that beauty is essential to architecture, and that beauty lies in the imitation of nature, but that the relevant nature determines useful and possible structure, so that beauty arises from construction and function. Laugier writes in the terms of Batteux – "Let us keep to the simple and natural; it is the only road to beauty"[85] – but he cannot avoid the three general ideals of Vitruvius. His theory is just that beauty arises from useful construction. Laugier particularly objects to any sort of decoration – twisted rather than straight columns, pilasters, columns that do not sit on the ground like the original corner-posts of the hut but stand on their own pedestals, the paired columns in Perrault's facade for the Louvre – that does not serve a direct and original structural function. Laugier thus denies that there might be demands of beauty that are not also demands of utility. But beauty and utility

can still be distinguished as two distinct ideals both to be realized through the third of good construction. His objection is just to attempting to achieve beauty through ornament with no useful or structural function.

Laugier's continuing commitment to the Vitruvian triad is evident in his Chapter III. Here he first takes up the topics of "solidity" and illustrates this with a few remarks about materials and construction;[86] second, "convenience," about which he says that "Buildings are made to be lived in and only as much as they are convenient can they be habitable," to which their "situation, planning, and internal communications" contribute;[87] and third, in the place of aesthetic appeal, what the translators leave untranslated as "*bienséance*." Presumably this could mean something like "good sense," and what is striking is that Laugier does not explicate it in formal terms, thus rejecting the Albertian interpretation of beauty or even the empiricist modification of the rationalist theory of proportion, but rather interprets it chiefly in terms of the category of *decor* or propriety. "*Bienséance* demands that a building is neither more nor less magnificent than is appropriate to its purpose, that is to say that the decoration of buildings should not be arbitrary, but must always be in relation to the rank and quality of those who live in them and conform to the objective envisaged."[88] This principle implies that the owners of private homes should not pretend by their buildings to be of higher rank than they really are, but it applies even to kings and princes, who should not build churches honoring themselves as if they were gods, and who might better use their pretentious churches as mausolea. But what is striking here

is that even though Laugier, perhaps puritanically, militates against both a formalistic conception of beauty and the liberal use of ornament, he does so within the framework of the Vitruvian triad, just adapting the flexible category of aesthetic appeal for his own purposes.

Laugier does not take up Vitruvius's suggestion, in the form of his discussion of the Caryatids, that part of the aesthetic appeal of a building may be a conceptual meaning or a message. Against the more immediate background of thought from the Renaissance and the eighteenth century that we have just been considering, the emphasis on architectural meaning that we will now see to be prominent in the nineteenth and twentieth centuries might seem like a radical departure from the Vitruvian framework. In fact, it can be seen as the development of what was already an aspect of Vitruvius's own general concept of aesthetic appeal.

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