

RESEARCH ARTICLE

Subjective Proportions: 18th-Century Interpretations of Paestum's 'Disproportion'

Sigrid de Jong*

When 18th-century travellers saw the Doric temples of Paestum in Southern Italy with their own eyes, they observed for the first time true examples of the proportions of archaic Greek architecture. Contrary to the Roman proportional systems, the Greek ones had been largely unavailable to architects until then. With the rediscovery of Paestum, conveniently located south of Naples and not in far away Greece, the secret of Greek proportions was no more. Architects were able to precisely measure the temples and wrote many accounts about their primitive forms and proportions.

But what did architects mean exactly when describing the proportions as primitive? What kinds of reflections did these proportions provoke? This article treats proportions as aesthetics, or as visible proportions, not as a numerical system. The discourse on proportions changed in this period, giving more weight to their cultural and historical meaning. The writings by such architects as Soane, Wilkins, and Labrouste demonstrate how Paestum functioned as a laboratory to unveil the secret of primitive proportions, and how, with the different meanings architects attached to them, it enlarged and renewed the debate on proportions.

Introduction

In 1752 a British traveller, Lascelles Raymond Iremonger, on his grand tour, described the contrast between the startling immensity of the Greek Doric temples at Paestum and the unpleasantness of their architecture and, most of all, the disproportion of their baseless columns:

[A]ll [three temples are] of the Dorick order[;] these antiquities surprise you by their greatness, but give you no great pleasure by their elegance or taste, the Pillars in my opinion being short, out of proportion, & vastly overcharged in their Capitals, & the Entablature & pediments are very heavy.¹

Iremonger was not the only one with such an opinion. In the second half of the 18th century, just after the rediscovery of these temples in southern Italy, many visitors expressed their bewilderment with the unfamiliar proportions of the three buildings (**Fig. 1**). The Baron d'Hancarville wrote about the temples, 'In the midst of [these] ruins stand three Edifices of a sort of architecture whose Members are Dorick, altho' its proportions are not so' (d'Hancarville 1766–67: vol. 1, 96–97).²

Why were these proportions thought to be so strange? The temples, the oldest to be found on Italian soil, were very different from Roman classical architecture and from buildings travellers had seen before in publications and at

other sites. We now know that what the 18th-century visitors called the Temple of Neptune (now named Temple of Hera II and dated c. 460 BC), the Temple of Ceres (Temple of Athena, c. 520 BC), and the Basilica (Temple of Hera I, c. 530 BC) were the creations of Greek colonists who had founded Poseidonia in 600 BC (the city was renamed Paestum after the Roman conquest of 273 BC). Towards the end of the 18th century, in a comparative plate in his publication *Les Ruines de Paestum* (1799), the French architect Claude-Mathieu Delagardette showed how dissimilar the proportions of the Paestum temples were from those of other Greek Doric monuments, notably the Parthenon, the Temple of Theseus, the Propylaea in Athens and the Thorieion temple, and Roman ones that included a Roman Doric order, including the Theatre of Marcellus and the Coliseum in Rome (**Fig. 2**).

Compared to other Greek or Roman buildings Paestum featured exceptionally short and thick baseless columns with a pronounced entasis and flat, unusually wide capitals. The columns were densely placed next to each other, and, in addition, the building material used at Paestum was a rough and porous limestone, rather than a smooth marble. All these elements added to the awkward impression the temples made on their 18th-century visitors.

The temples were measured ever more precisely during the 18th century, and architects constantly discussed, debated, and contested these measurements well into the 19th century.³ But measuring the monuments was only one way of dealing with an unfamiliar architecture. As I demonstrate in my book *Rediscovering Architecture*, there were other ways, such as, for example, invoking the

* Leiden University, Netherlands
s.d.de.jong@hum.leidenuniv.nl



Figure 1: Giovanni Battista Piranesi, The three temples at Paestum, seen from the south. Study drawing for Piranesi (1778), plate I. Paris, Bibliothèque nationale de France, Département des estampes et de la photographie.

concepts of the sublime, the picturesque, theatricality or primitivism (de Jong 2014). While my book shows a kaleidoscope of different reactions to the temples at Paestum and reconstructs their roles in 18th-century architectural debates, this article focuses on one specific aspect of Paestum's peculiarity: the proportions of the temples that visitors viewed as strange. In this article I shall examine visible proportions or, as Matthew Cohen has defined them, proportions-as-beauty – e.g., aesthetics – rather than proportions-as-ratio, which are based on measurements (Cohen 2014). I shall concentrate on the viewers' responses to the aesthetic meaning of proportions rather than studying proportions in the sense of mathematical ratio or systems, and on their perception that the forms of the temples at Paestum appeared strange. What is this 'proportion' when used in this aesthetic sense, and how did this meaning of the term drive the 18th-century reception of the Paestum monuments? In analysing proportion as an aesthetic rather than a numerical phenomenon, I focus on the reactions to unfamiliar proportions, on how viewers subsequently interpreted them, and on what these reactions meant for the ways in which architecture in general was understood.

While Antoine Desgodetz, in his measurements of ancient Roman buildings published in 1682 in *Les édifices de Rome*, was the first to show that the Romans did not use one common proportional system, Claude Perrault

paved the way for the idea of arbitrary proportions. As is well known, in his *Ordonnance des cinq espèces de colonnes* of 1683, Perrault distinguished between 'positive' and 'arbitrary' beauty, differentiating between the general 'positive' beauties that all people would agree upon as symmetry, magnificence or quality of execution, and the 'arbitrary' beauty that was not universal but the result of custom, which was related to proportions. This last, arbitrary, beauty formed taste, and was essential to Perrault, as was the use of proportions. Still, he insists in the preface of the *Ordonnance* that proportions are 'one of the principal foundations of beauty', and that through custom they account for positive qualities of buildings. As Wolfgang Herrmann observes, Perrault presented this connection between custom and the beauty of proportions as 'an indisputable fact' (Herrmann 1973: 63). But the differentiation Perrault made also meant that he opened up architectural discourse, and enabled a shift from an interest in the mathematics of proportions towards a focus on the effects of proportions on the observer of architecture. That Perrault had called proportions arbitrary rather than universal would, in the 18th century, when the observer of buildings took centre stage in architectural theories, lead to the inclusion of proportions in aesthetic discourse. Personal observations became crucial in these debates, and they continued to be when proportions entered historical

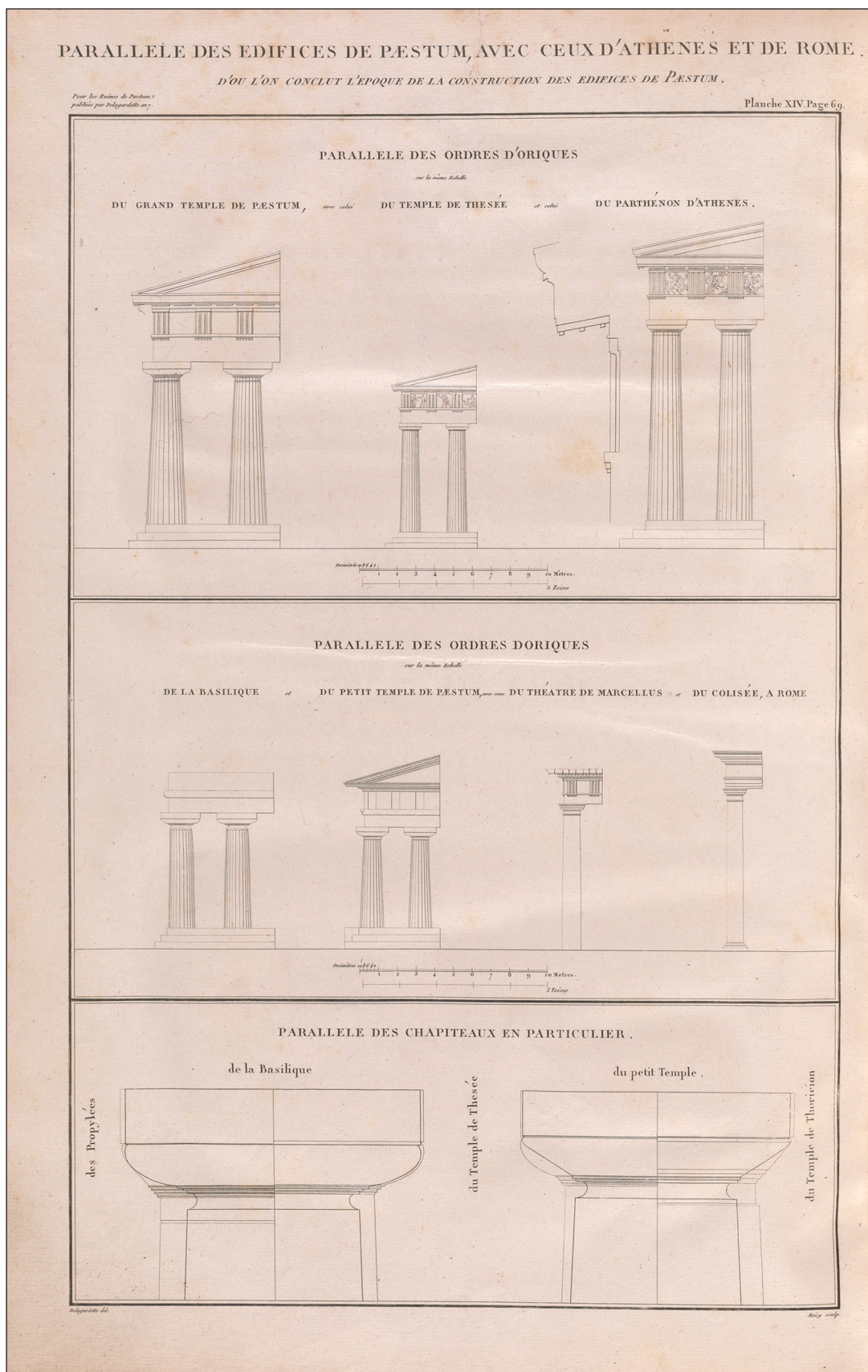


Figure 2: Claude-Mathieu Delagardette, Comparative details of the Doric order of Paestum and of other buildings, from Delagardette ([1799]: plate XIV). *Left to right, top:* Temple of Neptune, Paestum; Temple of Theseus, Athens; Parthenon, Athens. *Middle:* Basilica, Paestum; Temple of Ceres, Paestum; Theatre of Marcellus, Rome; Coliseum, Rome. *Bottom:* Propylaea, Athens; Basilica, Paestum; Temple of Theseus, Athens; Temple of Ceres, Paestum; Thorieion Temple.

discourses in the 19th century. Perrault had made way for subjectivity in the perception and interpretation of proportions.

It was at Paestum that the inevitability of this new manner of looking at buildings became clear. This article will show some of the ways in which the rediscovery of the Paestum temples changed the way architecture was thought about, in focusing on how 18th-century spectators judged proportions as aesthetics, and ultimately applied these judgements to a discourse on the cultural meaning of architecture.

The Beginnings of Building

Travellers explained the strangeness of Paestum's architectural forms and proportions, and the roughness of the building materials, by supposing them to be ancient, or even primitive. The temples were seen as architecture that still had to develop. Delagardette admired the 'primitive purity' of the temples. The French abbé Richard de Saint-Non, comparing the monuments to other examples of classical architecture, put it this way:

[J]udging from the heaviness and solidness of their proportions, it is indubitable that these monuments have been constructed by the Greeks in the origin of Architecture, and that they are of a primary antiquity, being very certain that all that remains in Italy of Temples constructed by the Romans is of a much lighter architecture, and of a very different proportion and form. (de Saint-Non 2000: 124)⁴

The French academician Quatremère de Quincy described how travellers to Paestum,

because of the contrast between the Greek Doric and the modern [version of Doric architecture], & struck by the heaviness, the short proportion, the masculine and massive forms of the ancient Doric, [. . .] viewed it as a precursor of this order, & from the lack of a base, concluded that such a taste must go back to the infancy of art. (Quatremère 1788–1825: vol. 2, 235)

Other writers made connections with the first beginnings of building, with the Temple of Solomon, or with the idea of the primitive hut – first presented as a model in Marc-Antoine Laugier's *Essai sur l'architecture* (1753). The English architect John Soane made a link between Paestum and the primitive hut in his Royal Academy lectures. Soane had travelled to Paestum in 1779 and noted in his diary,

the Architecture of the three Temples is Doric, but exceedingly rude, the Temples at the extremities in particular, they have all the particulars of the Grecian Doric, but not the elegance & taste; they seem all form'd with the same Materials, of Stone formed by Petrification which continues to this day.⁵

The rude architectural forms of the temples and the porous limestone that was used to build them led Soane to believe that these buildings were constructed in remote times, when building began. Soane deemed the temples so ancient that he connected Paestum directly to the primitive hut, to the origins of architecture. In his Royal Academy lectures Soane explained the concept of the primitive hut. In his first lecture, which he read on 27 March 1809, he showed a sequence of images to illustrate the evolution of the wooden primitive hut into the stone Grecian Doric temple.⁶ In his drawing of a primitive hut (**Fig. 3**) he depicted tribal people wearing animal hides, just as they appeared in the frontispiece for the British edition of Laugier's *Essai* (Laugier 1756).⁷

In Soane's drawing we can see many similarities with the way different artists had depicted the Temple of Neptune at Paestum. Artists and engravers such as Piranesi, Major, Dumont, and Joli had all used this same viewpoint to represent the interior of the temple (de Jong 2014), and images of these perspective views were widely disseminated through publications, examples of which were found in Soane's extensive collection of books and drawings, such as the one by Major (**Fig. 4**) in his *The Ruins of Paestum* (1768).⁸

Soane's image of the primitive hut shows the double storey of columns, just as in the aforementioned image of the Neptune temple, but more importantly, the perspective chosen to depict the primitive hut is the same as the perspective that many artists used to represent the interior of the temple at Paestum. Apart from differences in the scale and plans of these buildings, the parallels in these depictions of the primitive hut and the temple are striking. People appear in the middle of the drawing of the primitive hut as they had in the Paestum depictions, and the wooden beams in the foreground resemble the stone architectural remains represented in the Paestum views. Also, the effect of perspective draws the viewer of these images into the middle of each building. The structure plays the main role in Soane's image, with its four rows of columns, and a second level of columns placed on top of the two central rows.

The similarities between these images demonstrate that the visual precedents of depicting the Neptune temple had an influence on the manner in which Soane illustrated the construction of the first dwelling. He would thus convince his public, whose minds were well stocked with architectural examples, of the correctness of this version of the primitive hut as architecture's predecessor. The more the primitive hut resembled an abstract version of an antique temple, the more plausible it seemed that the primitive hut really had been the model for Greek architecture. In the drawing of the primitive hut for his lecture, Soane mimicked the often-pictured perspective – one of the archetypal compositions – of the interior of Paestum's Neptune temple to compose the image of the primitive hut, and he then used this image to show what Paestum's predecessor had been. Thus, in these depictions, history was reversed: Paestum served as a model for the building that was supposed to have been its model.



Figure 3: John Soane, Drawing of a primitive hut, undated, for Royal Academy lecture 1. London, Sir John Soane's Museum, 27/2/4.

When we study the text of Soane's lecture, his intention to establish a connection between the origins of architecture and Paestum becomes unmistakable. There he formulated a new argument about the structure of the primitive hut to account for the constructional method that was so specific to the Temple of Neptune. As families became larger, Soane said, dwellings had to be enlarged as well:

The horizontal beams, in particular, being of course considerably lengthened, curved downwards and threatened ruin. A row of posts or supports however, placed from front to rear, dividing the entire space into two equal parts, removed the defect and gave security to the inhabitants. This mode of construction probably suggested the idea of that particular manner of using columns to be seen in one of the temples at Paestum. (Soane 1996: 497)

By connecting a private dwelling to a divine temple, Soane claimed that, in this context, the construction method was of importance, rather than the function of the building. Tectonic aspects took precedence over the orders of columns and their roles in architectural design. But compared to Laugier's primitive hut, in its construction method Soane's primitive hut was entirely new. In his choice of Paestum as his model for the primitive hut – and not Laugier's simplified version of the Roman

Maison Carrée at Nîmes – Soane had to clarify the rather complicated double stack of columns of the Neptune temple in the formulation of a new structural argument for his version of the primitive hut. He did so when he explained how a larger dwelling required new design solutions. When the dwelling became much higher, the rafters needed to be longer and therefore required more support:

These supports were placed immediately over the others, under the beams, and probably gave the first indication of pillars placed upon pillars; and in this early work we perceive the reason why the Greeks, faithful to their primitive model, made the upper pillars in the hypaethral temples so very short in proportion to those immediately under them. (Soane 1996: 498)

The unorthodox double-stacked columns at Paestum had thus entered the 18th-century narrative of the primitive hut. Soane, linking Greek construction methods to the primitive hut, and viewing the first wooden dwelling as having served as a model for the Greeks, illustrated this passage with the drawing of the primitive hut based on the depiction of Paestum's Neptune temple. Soane argued how the primitive hut, and consequently architecture, fulfils human beings' basic need of shelter. His depiction of the primitive hut was in line with Vitruvius's ideas of the primitive hut as a construction that served



Figure 4: Thomas Major, Interior of the Temple of Neptune, from Major (1768: plate IX).

a protective function. Laugier had similarly proposed the birth of a primitive hut as shelter, but where he had used a Roman building as a first architectural outcome of his 'cabane', Soane turned to the oldest example of Greek architecture on Italian soil. This shift in focus demonstrates the key role Paestum played around 1800 in the debates about the origins of architecture.

History Writing

Soane explained Paestum's proportions historically, as they demonstrated to him that the temples represented the beginnings of building. While in his view history is seen as the oldest past, it can also be viewed as a development in time. This evolutionary sense of history gained a crucial place in architectural thought towards 1800, and we can trace in this period an increasing urge to put the temples in a chronological sequence, and to compare them to other Greek temples, in Sicily, for example. A clear exponent of this method is the British architect William Wilkins. In his publication on Greek architecture, *The Antiquities of Magna Graecia* (1807), Wilkins compared the Paestum temples to the Sicilian temples, and the temples at Paestum became examples of a type. He also identified what he thought had been Paestum's model: the Temple of Jerusalem (Solomon's Temple). Wilkins' ideas on Solomon's Temple and the Temple of Neptune at Paestum might have influenced Soane, who opened his second Royal Academy lecture in London (1810) with the Temple of Jerusalem, and subsequently treated the evolution of the Greek Doric order, while he showed first an image of the order of the Temple of Neptune at Paestum.⁹

While Soane referred to Solomon's Temple mostly in passing, Wilkins built an entire discourse around a purported connection between Paestum and the Temple of Jerusalem. He argued that the architects of these temples 'were guided by the same general principles, in the distribution and proportion of the more essential parts of their buildings' (Wilkins 1807: vi). He had extensively measured the temples of Paestum during his trip there in 1803, and viewed them as the beginnings of architecture. In his publication Wilkins turned to what he believed to be the earliest example of temple architecture – the Temple of Jerusalem:

The Temple at Jerusalem is the earliest of which we have any written documents. Upon its claims to attention, as it is connected with our holy religion, it were surely needless to expatiate. But, independently of the interest excited by its antiquity and sanctity, we shall find that an enquiry into the arrangement and dimensions of its component parts will be amply repaid by the light which it tends to diffuse upon the history of Architecture in general. (Wilkins 1807: vi)

In writing at length on this temple in his introduction to *Magna Graecia*, Wilkins aimed also to shed light on the history of architecture. Wilkins argued that the Temple of Solomon had been the model of Paestum's Neptune temple, and illustrated this proposed connection in

engravings. He combined a plan of the Neptune temple at Paestum and a plan of the Temple of Jerusalem and represented sections of the Temple of Jerusalem with proportions taken from the Neptune temple at Paestum (**Fig. 5**) (Wilkins 1807: vii). Wilkins thus used Paestum as a model for the proportions of the building that to him represented the beginnings of architecture. He also viewed Solomon's Temple mainly as having been a model for Greek architecture.

In his ideas on a possible relationship between the Temple of Jerusalem and Greek temple architecture, Wilkins claimed to have been influenced by Isaac Newton's *Chronology* (Cambridge 1728) and Juan Bautista Villalpando's descriptions in *Ezechielem explanationes* (1596–1604).¹⁰ Furthermore, he could have derived his ideas about the Temple of Jerusalem as an ancestor of classical architecture from Paolo Paoli's writings on Paestum (Paoli 1783–84; Paoli 1784). Villalpando's reconstructions preceded others by Claude Perrault (1678), Isaac Newton (1728) and Johann Bernhard Fischer von Erlach (1721).¹¹ Perrault's proposal was not symmetrical like Villalpando's, and lacked the colonnades of the latter. Perrault claimed that Villalpando had not illustrated the historical truth and that he had mainly aimed to conform to Vitruvian rules, while claiming that Greek and Roman architects had taken inspiration from the Temple of Jerusalem (Perrault 1969: 146). Newton proposed a design different from Villalpando's, in that it had no grid plan, but agreed with the idea of the temple as the model of all temples, representing the 'Mind of the Supreme Architect – the Mind of God' – and the template for all Greek and Roman architecture.¹² This perceived great significance of the Temple of Jerusalem was the basis of Wilkins' theories, although without him referring to religion.

While Perrault had already ironically remarked that Villalpando and other writers thought that 'God had by special inspiration taught all proportions to the architects of the Temple of Solomon,'¹³ Piranesi did away with the idea that God had instructed the builders of the Temple of Jerusalem, in his *Della Magnificenza* (1761).¹⁴ Piranesi, however, did think that it was from the Temple of Jerusalem that the Greeks took their orders. Wilkins' opinion, that the Temple of Jerusalem was the model for all Greek temples, was thus not new. What was revolutionary, however, was his selection of the one temple at Paestum to represent these Greek temples, and most of all, that he modelled his reconstruction so closely after the Neptune temple that the Temple of Jerusalem began to look very much like a Greek temple.

Wilkins provided sections through the pronaos and cella of the Neptune temple, and combined them with a section through Solomon's Temple to show that the proportions were the same (**Fig. 6**). He proposed 'that the Temple at Paestum, as well as other Grecian temples of the same era, were designed after the model of the Temple at Jerusalem' (Wilkins 1807: xiv), and argued that their relationship was a special one:

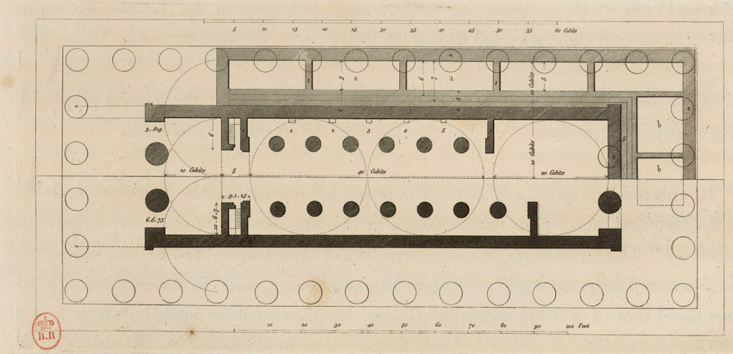
[T]here existed a connection between the plans of ancient Grecian temples, particularly that of Paestum, and the Temple of Solomon. The proportions

INTRODUCTION.

vii

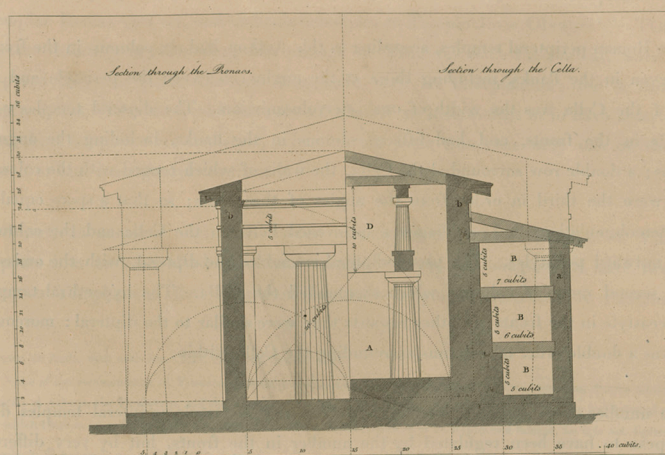
To render the proof of this proposition more easy, a Plan of the Temple at Paestum is here subjoined, reduced from real admeasurements. In the upper part of this Plan, such deviations as can be ascertained to have occurred in the Jewish Temple are expressed by a lighter shade; and a conjectural disposition of the chambers surrounding the Cella and Oracle is given³. To determine how nearly the proportions of the temple agreed with those of the temple of Solomon, the widths of both are here assumed equal: from thence it will be discovered how far the proportional lengths, and the arrangement of the interior of both, coincided. Some deviations will be found to occur, but such only as might naturally be expected in temples built for the celebration of rites differing so much as did the Jewish and the Heathen.

The Vignette given at the head of the Introduction is intended to represent sections through the Pronaos and Cella of the Temple of Solomon. The proportions are taken from the Temple at Paestum. The extent and position of the peristyles of the latter temple are shown by dotted lines. The height of the columns of the Pronaos is divided into eighteen parts, which serve as a scale for the measurement of the heights; and the width of the Cella into twenty, as a scale for the widths.



³ The chambers a. a. b. b. are arranged very nearly after the idea which Sir Isaac Newton entertained of their disposition about the *ναός* of the temple. The three ranges of chambers are represented in the Section which forms the Head-piece of the Introduction; and are distinguished by the letters B. B. B.

Figure 5: William Wilkins, Superimposed plans of the Temple of Neptune and the Temple of Solomon, from Wilkins (1807: vii).



INTRODUCTION.

BEFORE we attempt to describe the Antiquities which form the substance of the following Work, it may be expedient to offer some remarks upon the principles, by which the construction of Grecian Temples appears to have been generally regulated.

Vitruvius, who, in his history of Architecture, commences with its earliest infancy and traces its progress down to his own time, has undertaken to explain the rules which the Ancients followed in rearing their various edifices, either for private use or public ornament. He has however directed his attention more particularly to temples, inasmuch as they were the primary object to which their knowledge of Architecture was applied.

The different forms or aspects of temples, which prevailed among the Romans and were borrowed from the Greeks, he thus enumerates: The *ναὸς ἐν παραστάσῳ* or *in Antis*, the Prostylos, Amphiprostylos, Peripteros, Dipteros, Pseudodipteros, and the Hypaethros; each of which had some peculiar character to distinguish it from the others. His method of classification under these separate heads is explained in the third book.

B

Figure 6: William Wilkins, Cross-sections of the Temple of Neptune and the Temple of Solomon, from Wilkins (1807).

of the latter may therefore be assumed as the standard, by which the early Greeks were directed in the construction of their temples; and which was followed, with little variation, by the Greeks of later times. (Wilkins 1807: xv)

In providing measurements of the 'Paestum temple' (as he called the Neptune temple) that he claimed corresponded more or less to the dimensions of the Temple of Jerusalem, Wilkins reasoned that small differences in proportion were normal, characteristic features of Greek architecture. Thus he notes,

We ought not however to be surprised that the proportion of the height to the diameter of the columns does not more exactly correspond: among the early Greeks, it does not appear that there existed any rule for determining the height of columns from the diameter. (Wilkins 1807: ix)

His reasoning is the outcome of the aforementioned historical development that had allowed proportions to be subjective or even arbitrary.

So convinced was Wilkins of the analysis he had presented in his book on Greek architecture that he revisited his idea of the closeness of the proportions of Paestum and those of the Temple of Jerusalem thirty years later, in a publication entitled *Prolusiones Architectonicae; or, Essays on Subjects Connected with Grecian and Roman Architecture* (1837). In one of those essays, entitled 'The Temple of Jerusalem The Type of Grecian Architecture', Wilkins again compared Paestum with Solomon's Temple, and concluded that 'a mode of constructing temples was transmitted directly, and with little of the intermediate assistance of a third state' (Wilkins 1837: 118). Although the arrangements of the Greek temples and the Temple of Jerusalem were different, Wilkins found a similarity between these buildings in their proportions: 'we shall find an intimate correspondence of proportions, which will lead us to the conclusion that both were constructed upon similar principles.'

According to Wilkins, there had been a historical transfer, regarding 'Syria as the parent of the settlers in Greece,' and the differences were only to be found in their respective rites: 'although the proportions externally might be similar, the division of the interior would be regulated by circumstances' (Wilkins 1837: 119). In stating how the knowledge and the tradition had spread through contacts between Minos and Solomon and between the Cretans and the Phœnicians, Wilkins argued that historical facts proved that 'the chain which connects Syria [. . .] with Greece, Sicily, and Magna-Græcia, connects also their arts and architecture' (Wilkins 1837: 121). The way Wilkins placed Paestum in a historical context, from its predecessor in Jerusalem to the Grecian temples of Sicily, was the result of a growing tendency among 18th-century critics and historians to put buildings in a chronological sequence or historical comparison, a method that had an important precedent in Julien-David Le Roy's comparative diagrams, and that would continue into the 19th century.¹⁵

It seems, however, that rather than the Greeks basing the design of their temple on the Temple of Jerusalem, Wilkins used the Temple of Neptune at Paestum to reconstruct the Temple of Jerusalem. Just as Soane would use Paestum to illustrate the primitive hut, Wilkins based his interpretation of the Temple of Jerusalem on the Temple of Neptune (Wilkins 1837: 106). First he made a general connection to the architecture of early Doric temples, when he observed that the height of the different architectural elements in the elevation of the building of the Temple of Jerusalem is 'in perfect consistency with the proportions observed in such members of the early Doric order' (Wilkins 1837: 113). Even the 'lily-work' ornaments of the capitals of the Temple of Jerusalem probably resembled 'the painted ornament so frequently found in Grecian temples' (Wilkins 1837: 116). The resemblance to the Temple of Jerusalem was the closest in the Neptune temple, much more than in other Greek temples as in Sicily and Ægina, he argued, because at the Temple of Neptune in Paestum 'not only the proportions, but the actual magnitudes are so nearly alike, as to remove all doubt that the one served as the type for the other' (Wilkins 1837: 118).

In a lecture for the London Architectural Association in 1886, 'A Review of the Various Theories Respecting the Form and Style of Architecture of the Temple of Solomon', Edward Cookworthy Robins treated some of the reconstructions and theories about the Temple of Jerusalem 'chiefly by eminent architects' (Wilkins included) (Robins 1887: 2). He showed that, relying on different sources, or interpreting differently the biblical passage in Ezekiel that describes the Temple of Jerusalem, the reconstructions by diverse authors, continuing into the 19th century, are characterised by their dissimilarity. These reconstructions were most of all reflections of the authors' periods and their own theories. Robins identified three types of reconstructions: the African (Egyptian style), the European (Grecian) and the Asiatic (Phœnician, Assyrian, Babylonian and Persian).¹⁶

With Wilkins' reconstruction, Robins demonstrated how several elements were adapted to make the Temple of Jerusalem consistent with Paestum's Neptune temple. Wilkins introduced narrow passages in the thickness of the walls, said Robins, to 'eke out the thickness of the walls'; external dimensions were taken for internal ones. Robins said that Wilkins explained the 'lily-work' ornaments of the capitals as 'an ornamental fascia, resembling the painted ornament so frequently found in Grecian temples', making the assumption that the temple had classical features as an entablature and a pediment. In short, Robins claimed, 'every distinctive peculiarity of Solomon's Temple is merged into that of a succeeding period, of which it is proclaimed the type' (Robins 1887: 17). He demonstrated in images how different the outcomes were in the reconstructions – for example, the Egyptian version of the temple after Canina as opposed to the Grecian temple after Wilkins – and remarked that it was 'curious to observe how the Grecian architect Wilkins, and the Indian architect Fergusson [were] each seeing just what he want[ed] to see and establishing

its probability, but neither is supported by [the Bible]' (Robins 1887: 27).

Obviously, Wilkins's Temple of Jerusalem was an imaginary reconstruction, certainly based on sources such as Villalpando and Newton, as he claimed in a footnote, as opposed to the Temple of Neptune at Paestum, which he had seen with his own eyes and had measured thoroughly on the spot. Just as Soane had never seen the primitive hut, Wilkins had never laid eyes on Solomon's Temple. They both had been to Paestum, however, and both used the Temple of Neptune as a model for the building that was supposed to have been its model, be it a primitive hut or the Temple of Jerusalem. But in making a historical connection between the temples of Jerusalem and of Neptune, and subsequently relating them to all three temples at Paestum and the temples at Sicily, Wilkins aimed to give history a much more important place than Soane in the debate on proportions. Wilkins's interpretation of Paestum's proportions in a historical development that had started with Solomon's Temple imbued architecture with historical meaning.

Materiality and Locality

While Soane explained Paestum's primitive proportions from the idea of architecture as a basic function of shelter, and Wilkins presented the temples as buildings anchored in history, the French architect Henri Labrouste proposed a third way of giving cultural meaning to the proportions of Paestum in his account of the site. He visited the temples as a Prix de Rome winner in 1828, and decided to dedicate his fourth-year *envoi* (submission to the Académie des beaux-arts in Paris) to the site. Along with preparing drawings of existing conditions and reconstructions of the Paestum temple complex, as a *pensionnaire* (as a student at the French Academy in Rome was called) he was required to write a *mémoire*, explaining his reconstructions. Labrouste's *mémoire* sparked a fierce debate on the Paestum temples, on Greek architecture and on the applicability of the latter in contemporary buildings (Levine 1977; Bressani 2013; de Jong 2014).

In light of Soane's emphasis on the ancientness of Paestum in relation to the primitive hut, and Wilkins's proposed historical connection between the Temple of Jerusalem and the Greek temples in Sicily, Labrouste's view of the Paestum temples offers a very different interpretation. Labrouste did not associate the apparently peculiar proportions of Paestum with the origins of architecture, but with the artistic options an architect has in the process of designing a building. According to him, the chronology of the temples was not what other writers on Paestum had presented before, with the most primitively proportioned temple, the Basilica, as the oldest, and the temples of Ceres and Neptune as consecutive followers. To Labrouste, the Neptune temple was the oldest because it was the closest in style and proportions to the temples of mainland Greece, and the Basilica was the youngest because it was the most different in these characteristics from classical Greek architecture (Fig. 7). Thus while most authors dated primitive style before more sophisticated style, Labrouste argued that the builders at Paestum

progressively discovered a primitive style more in keeping with their own character.

Most of all, the Basilica, according to Labrouste, adhered to the local conditions of the site by incorporating two different types of local stone, and the characteristics of these stones had determined the architectural forms of this building: 'the use of different materials, the mixture of hard and soft stones, is a sign if not of an advance, at least of a better knowledge of the materials provided by the locality' (Labrouste 1877). Furthermore, the Temple of Ceres and the Basilica for him expressed how the inhabitants of Poseidonia had aimed to create a new architecture, independent of the architecture of their homeland:

These observations lead one to consider the Temple of Neptune as Greek Architecture and constructed in a period when the [. . .] founders of Posidonia had not yet forgotten the principles of architecture that they had brought with them from Greece; and to consider the Portico [the Basilica] and the Temple of Ceres as later than the Temple of Neptune and constructed in a Period when the Posidonians, having become more powerful, wanted to create a new architecture. (Labrouste 1877)

Labrouste argued that this architecture truly belonged to Poseidonia, and concluded that there could be no general norm of Greek architecture, but rather, that the design of buildings depends on local circumstances. He explained the primitive proportions of the Basilica as artistic choices. Labrouste thus tried to trace the origins of architectural invention. Because architectural forms were connected to local conditions, he thought it inconceivable to transfer Paestum's building forms, or even the forms of classical Greek architecture, to contemporary buildings in Paris.

Labrouste was wrong in his chronology of the temples of Paestum, but that does not matter; he presented their primitive forms and proportions as outcomes of artistic choice rather than representations of the origins of architecture, as Soane and Wilkins had done. In doing so, Labrouste introduced, next to the historical meaning of primitive proportions, the cultural meaning of those proportions. Labrouste's interpretation of Paestum's proportions as an outcome of the material characteristics of the stones and of the site, and of the genius of the place, attempted to explain how a society creates its own architecture. In his view these forms and proportions were the expressions of a specific society; the influences of local conditions should provide every society with its own unique architecture.

We have seen how the particular proportions of the temples at Paestum prompted architects to associate the temples with the origins of architecture either in the primitive hut or in Solomon's Temple, and to explain their perceived strangeness as a function of the ancientness of these buildings. In the case of the primitive hut they stressed the simplicity of the construction, while in the case of Solomon's Temple, the historical aspects were put to the fore. In the

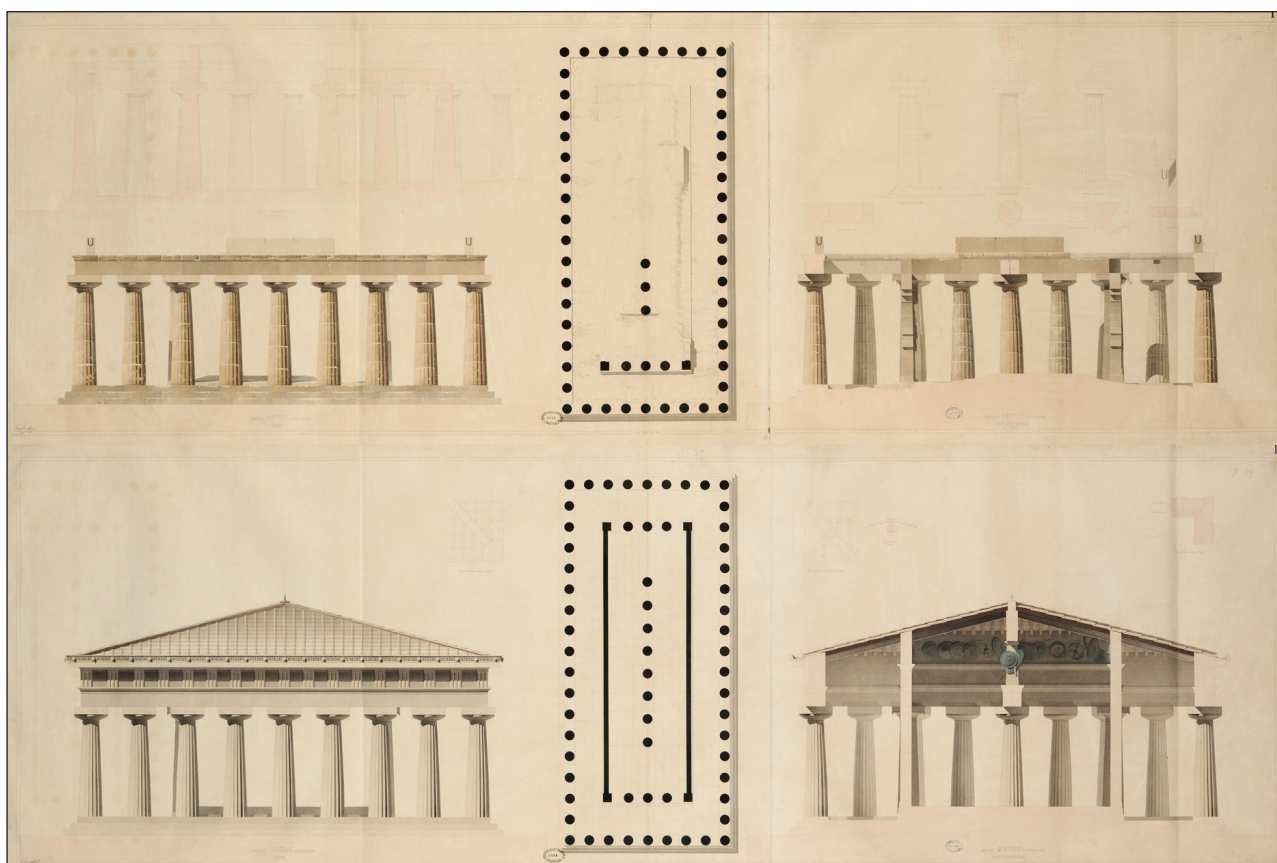


Figure 7: Henri Labrouste, Elevations, plans and cross-sections of the Basilica, current and restored, 1828. Paris, École nationale supérieure des beaux-arts, Env. 22.

latter we can detect a growing emphasis on history, already present in the architectural debates of that time.

Labrouste applied this importance of history in his interpretation of Paestum by proposing a different historical development of the three temples at Paestum: the temple with the most primitive proportions was not the oldest but the youngest. He interpreted the architectural forms and proportions as an artistic choice of the Poseidonian architects that was the result of the natural and local conditions of the site. Contrary to the arguments of many 18th-century architects, Labrouste argued that a direct use of Paestum's proportions and building forms in modern buildings was problematic. He stressed the importance of the architect as inventor of building forms, and most of all insisted on the use of local characteristics as a major factor in design.

Towards 1800 the role of history became increasingly important, not least in the debate on proportions. Architects came to stress the historical or cultural meaning of proportions, as Wilkins and Labrouste did. In that way 18th-century architects were able to apply strange and unfamiliar proportions to a discussion of the cultural meaning of architecture. They could explain architecture's basic functionality as shelter, architecture's place within a historical development, or architecture's creation out of local conditions and circumstances.

The Physical Effect of Architecture

In a fourth way of giving meaning to proportions perceived as peculiar, architects found that it was crucial to be *in situ*. Unlike Labrouste, however, who had exam-

ined the temples thoroughly at the spot, concentrating on their history and materiality, other visitors were more emotionally engaged in experiencing the building first hand. They had begun to walk through the temples and to write about how this experience affected them. These visitors saw the proportions not from a historical perspective, nor from the point of view of the architect as designer. Rather, they concentrated on the impression building forms made on them when they moved through architectural space.

Several of its 18th-century visitors associated Paestum's architecture and proportions with human characteristics. The French architect Antoine-Laurent-Thomas Vaudoyer, for example, observed that 'this order conveys sadness in its character and its proportions, as well as in its sense of closure, an allusion to what one experiences during misfortunes.'¹⁷ To French architects Jacques-Guillaume Legrand and Jacques Molinos the temples' 'robust proportions and masculine style' recalled the athletic forms of sculpted depictions of Hercules (Le Barbier 1808: 300–301).

At Paestum the German poet Goethe succeeded in transforming his initial bewilderment into a familiarity with the temples after he moved through them and began to comprehend their strange architectural forms (von Goethe 1988: 205–206): 'It is only by walking through them and round them that one can attune one's life to theirs and experience the emotional effect which the architect intended'¹⁸ The Scottish traveller Joseph Forsyth similarly came to a positive

assessment of the proportions of the temples, after having perceived them by walking among the architectural spaces of the temples. Forsyth claimed not to agree with Vitruvius' statement that 'the intercolumniations should be in direct proportion to the relative thickness of the columns'. At Paestum Forsyth had observed that

these, in proportion to their height, are the thickest columns that I have seen, and yet their relative distance is the least. This closeness makes the columns crowd advantageously on the eye, it enlarges our idea of the space, and gives a grand, an heroic air to monuments of very moderate dimension. (Forsyth 1813: 341–342)

Forsyth's account of Paestum recalls how Julien-David Le Roy described the Louvre colonnade. He focussed entirely on the movements of the spectator in perceiving the different scenes the architecture has to offer when the viewer, in moving towards and through the building, becomes the actor and director in his own play. Le Roy described how this spectator came within touching distance of the columns when he approached them, and how each step meant a new scene, entirely conducted by himself. Le Roy examined the effects of the changing movements of the viewer's body and the altering of speed in these movements:

As we come closer, our view alters. The mass of the building as a whole escapes us, but we are compensated by our closeness to the columns; as we change position, we create changes of view that are more striking, more rapid, and more varied. (Le Roy 2004: 372; Le Roy 1770: vol. 2, viii)

The French architect and engineer Pierre-Joseph Antoine formulated similar bodily reactions to architecture when he interpreted the idea of breathing in connection to the movements of a spectator. He wrote about 'our physical constitution', and how one moves and breathes in architectural space, as the basis for one's appreciation of rhythm in architecture:

Our breathing is measured by equal moments; the working of the heart's valves, which causes the circulation of blood, is thus constituted as well; the movements of our body, when we walk, are repeated at equal intervals. Therefore poetry was found to be very agreeable, because it fits very well with these physical measures. (Antoine 1782: n.p.)

The travel accounts written about Paestum and similar ones about other buildings that stressed the role of the moving body in observing a building might have laid the groundwork for late 19th-century theories on how physical movements and reactions to architecture change the way buildings are viewed. The art historian Heinrich Wölfflin, for example, took the 18th-century ideas further when he asked, 'how is it possible that architectural forms

are able to express an emotion or a mood?' According to him, proportions have a major role in this expression (Wölfflin 1994: 167–71). Wölfflin connected proportions to forces at play in human beings' bodies:

Of great interest is the relation of proportions to *the rate of breathing*. It cannot be doubted that very narrow proportions produce the impression of an almost breathless and hurried upward striving. Naturally, we immediately associate them with the idea of tightness, which makes it impossible for us to continue to breathe deeply with the necessary lateral expansion. Thus Gothic proportions are oppressive: there is sufficient space for us to breathe, but in living in and with these forms we sense them to be squeezing together, pressing upward, and consuming themselves in their own tension. The *lines* appear to run together with an increasing *speed*. (Wölfflin 1994: 169)

According to Wölfflin, architecture can be understood in terms of the bodily movement of the viewer, and this movement is what gives life to architecture. Wölfflin associated bodily reactions to architecture with historical development:

Considering the importance of the rate of respiration for the expression of moods, this is a highly important aspect of historical character. It can even be observed that the older a nation is, the more rapidly its architecture begins to breathe; it becomes excited. How still and restful are the lines of the ancient Doric temple: everything is broad and slow-measured. With the Ionic there is already a quicker movement, a pursuit of slenderness and lightness. As antique culture approached its end, it ever more feverishly demanded faster movement. (Wölfflin 1994: 170)

In the same text Wölfflin addressed the impression a square ('bulky, heavy, contented, plain, good-natured, stupid, etc.') makes on a viewer, and what happens to its form if one changes its proportions, 'the relations of height to width', as he defined it:

With increasing height, the bulkiness transforms itself into a solid, compact form and becomes elegant and forceful. It ends up as a slim, unstable form, at which point the form then appears to deteriorate into a restless, eternal, upward ascent. Conversely, as the width increases, the figure undergoes proportional development from an ungainly, compacted mass to an ever freer, more relaxed figure, which in the end loses itself in a dissipating languor. One gets the impression that without support the figure would continue to spread out flat along the ground. (Wölfflin 1994: 168–169)

He added, 'This impression, I note in passing, has been observed in numerous experiments with people of all

ages'. The perceptions at Paestum have shown, much as Wölfflin later formulated, how ultimately proportions made the visitors aware of their own physicality, of the relationships and interactions between their bodies and architecture. Labrouste's argument resonates also in Wölfflin's reasoning when Wölfflin claims, 'Proportions are what every nation presents as its very own. Even if the system of decoration is introduced from abroad, the national character will time and again become apparent in the dimensions of height and width' (Wölfflin 1994: 170).

In Labrouste's ideas about Paestum, history had gained an even larger role than in Soane's and Wilkins' texts. He saw how the temples represented the development of architecture, which was the result of the interactions of a society with a specific natural environment.

At Paestum we have thus seen what happened when proportions became subjective. Different questions emerged about buildings once architects accepted that proportions are arbitrary: questions about the way architecture was constructed, about its place in history and in society, and about how buildings make people feel. The impact of 18th-century interpretations of Paestum on these different questions that determined architectural discourse was revolutionary. Architects saw with their own eyes that these subjective proportions could not to be judged on paper, but only on site in the directness of experience.

These architects' interpretations of the strange proportions of these ancient temples in southern Italy unveiled this much: that unlike proportion-as-ratio, which is objective, proportion-as-beauty is personal and the point of view of the observer is primordial. When architects were on the spot at Paestum, the temples inspired them to explore how to interpret architecture individually, and to imbue it with meaning as a kind of interpretation: from a basic function of shelter, as in Soane's lectures, to its place in history, as Wilkins did, to a local expression of a society, as Labrouste argued, and lastly, to an empathic reflection of an emotional response to a building, as Goethe demonstrated. The 18th- and 19th-century interpretations of proportion-as-beauty, here examined through reactions to Paestum, demonstrate the importance of studying how individual observers of architecture interpret proportions. Paestum revealed how these observers imbued architecture with meaning.

Competing Interests

The author declares that they have no competing interests.

Notes

¹ Lascelles Raymond Iremonger, letter to Sir Roger Newdigate, Naples, 22 July 1752, Warwick County Record Office, published in McCarthy (1972: 761).

² D'Hancarville's publication was meant to illustrate Hamilton's rich collection of vases; since 1764 Hamilton had been the envoy extraordinary of Britain to the Neapolitan court. The section in which he writes about Paestum is called 'De l'origine des Etrusques et de leurs lettres'.

³ In 1868 A Aurès published *Étude des dimensions du Grand Temple de Paestum au double point de vue de l'architecture et de la métrologie*. He used, and dismissed, earlier measurements by C M Delagardette, Ernest Beulé (in Beulé 1858), Léonce Reynaud (in Reynaud 1865: part 1, plates 14, 15), and Henri Labrouste (drawings given to him by an architect named Debacq, because these were not yet published, according to Aurès) (Aurès 1868: 7).

⁴ All translations by author, unless otherwise stated.

⁵ John Soane, on 26 January, in sketchbook 'Italian Sketches/J; Soane/1779', Sir John Soane's Museum, London, Drawings Collection, vol. 39, 31r.

⁶ The same lecture was read four times, on 8 January 1810, 12 February 1813 (altered), 20 February 1817 (altered), and 18 February 1819 (altered). The last version was read three times by Henry Howard, on 16 February 1832, 9 January 1834, and 7 January 1836. See Soane (1996: 731–732).

⁷ Sir John Soane's Museum, London, Drawings Collection, Royal Academy Lecture drawing, 1807, Drawer 27, Set 2, no. 4.

⁸ Thomas Major, 'The Original Drawings for a Work Intituled the Ruins of Paestum or Posidonia Engraved by T. Major 1768', London, Sir John Soane's Museum, Drawings Collection, vol. 27; partly published in Major (1768), which is also part of the collection in London, Sir John Soane's Museum, Drawings Collection, vol. 28.

Soane also owned fifteen Piranesi drawings of Paestum, of which one is the interior perspective of the Temple of Neptune: Giovanni Battista Piranesi, study drawings for *Différentes vues de [. . .] Pesto*, London, Sir John Soane's Museum, Drawings Collection: plates II (F20 (71)), III (F9 (51)), IV (F78 (146)), V (F24 (76)), VI (F23 (75)), VII (F10 (54)), VIII (F70 (133)), IX (F64 (125)), X (F21 (72)), XI (F19 (70)), XII (F18 (69)), XIII (F22 (74)), XIV (F25 (77)), XVI (F76 (139)), XVII (F77 (140)). Two others ended up in the collection of the Bibliothèque nationale de France in Paris and the Rijksmuseum in Amsterdam. All were published as engravings in Piranesi (1778).

⁹ Soane showed other drawings of Paestum in the third lecture (two, a section and a perspective of the Temple of Neptune), and the fifth lecture (two, an interior view of the Temple of Neptune, and a perspective view of the three temples, from Major's *Ruins of Paestum*). Sir John Soane's Museum, London, Royal Academy Lecture drawings, Drawer 19, Set 5, drawing 1–5; Drawer 23, Set 3, drawing 8. In the second lecture Soane compared the columns of the Paestum temple with those of Corinth, the Temple of Theseus, the Temple of Minerva and the Temple of Augustus in Athens (Drawer 25, Set 1, drawing 1), but only with respect to their dimensions, the diameters of their columns and the proportions of their entablatures to the heights of the columns. See Soane (1996: 504)

¹⁰ He named Newton twice in a note (Wilkins 1807: vii, xv, xvii), and referred to Juan Bautista Villalpando on pages ix, x, xii.

¹¹ On Newton's reconstruction, see Morrison (2011). On Villalpando, see Morrison (2009).

- ¹² Isaac Newton, *The Original of Religions* (Yahuda MS 41), unpublished manuscript, Jewish National and Universal Library, undated, f.1r and 6r, cited in Morrison (2009: 596, n33).
- ¹³ Perrault (1683: xviii), cited in Herrmann (1973: 36).
- ¹⁴ As Kantor-Kazovsky (1997) states, 'the approach of the Enlightenment to architecture in the 18th century had no need of the hypothesis that God gave his instructions to the builders of the Temple of Solomon', cited in Morrison (2009: 596, note 39). See also Kantor-Kazovsky (2006).
- ¹⁵ See Hvattum (2004: 114–136).
- ¹⁶ Robins analysed Hosking, Canina, Thrupp and Count de Vogüé for the African method; Wilkins, Hakewill, and Josephus for the Greek; and Fergusson for the Asiatic. Robins mostly agreed with Fergusson's argument and reconstruction.
- ¹⁷ From a letter to Hippolyte Lebas, Rome, 10 August 1785, in Antoine-Laurent-Thomas Vaudoyer, 'Voyage pittoresque en diverses parties de l'Italie: Extraits de lettres adressées à Paris à M. Lebas père, par A.L.T. Vaudoyer, architecte, pensionnaire du Roi à l'Académie de France à Rome, années 1786, 1787, 1788', Paris, private collection, letter no. 49.
- ¹⁸ In German: 'Doch nahm ich mich bald zusammen, erinnerte mich der Kunstgeschichte, gedachte der Zeit, deren Geist solche Bauart gemäß fand, vergegenwärtigte mir den strengen Stil der Plastik, und in weniger als einer Stunde fühlte ich mich befreundet, ja ich pries den Genius, daß er mich diese so wohl erhaltenen Reste mit Augen sehen ließ, da sich von ihnen durch Abbildung kein Begriff geben läßt' (von Goethe 1988: 206).

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