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RESEARCH ARTICLE

# The Fall of the *Tektōn* and The Rise of the Architect: On The Greek Origins of Architectural Craftsmanship

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The origins of architectural craftsmanship in ancient Greece are to be found in the archaic arts of tectonics. The first Greek architects, appearing under that name around the 6th century BC, rose out of and based their work on this age-old tectonic tradition, which semantically underwent a transformation during the time from Homer to Plato, the latter relegating the *tektones* to a lower rank in the order of craftsmanship. Through a detailed reading of the ancient Greek testimonies of the tectonic tradition, the paper demonstrates that in the Homeric tradition the *tektones* were hailed as versatile, first-rate craftsmen who created wonders out of matter, but in classical times they fell from their high status of old. In Plato's writings tectonics ends up at the lower end of the epistemological and ontological scale.

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## Introduction

Hector went to the fine (*kala*) house of Alexandros. He'd built (*eteuxe*) it himself with fertile Troy's best craftsmen (*aristoi tektones*). (*Iliad* VI 313–15)

Every architect (*architektōn*), too, is a ruler of workmen (*ergatōn archōn*), not a workman himself. (*Statesman* 259e)

More than three centuries separate these two quotations by Homer and Plato, and during that time the semantics of the ancient Greek words *tektōn* (roughly, craftsman) and *architektōn* (architect) underwent a profound change. In fact, the word *architektōn* does not appear in any of the Homeric texts handed down to us, and there may be no equivalent word for architecture in ancient Greek. Stephen Parcell claims that 'to speak of "the architecture of ancient Greece" – or even "architecture as a *technē*" – would be an anachronism' (Parcell 2012: 24).

Ancient texts do, however, refer explicitly to *architektonikē technē*, so conceiving of architecture as a *technē*, or craft, is not wholly anachronistic.<sup>1</sup> If we focus not on *technē* alone but rather on the concept of tectonics, the origins of architectural craftsmanship will crystallise. As we shall see, the word 'architecture' was not used in the earliest archaic tradition, nor throughout the ancient Greek tradition was anything like it understood in the way we understand it. Instead, architectural craftsmanship was in the beginning synonymous with the art of tectonics and remained conceptually bound up with other tectonic crafts. The first architects, appearing under that name around the 6th century BC, rose out of and based their

highly skilled work on the ancient tectonic crafts, which formed an important part in the erection of the first monumental stone temples.

Despite the obvious etymological link between tectonics and architectonics, the broader semantic implications of the relationship between the two concepts remain relatively unexplored. In 'Greek Architecture', a concise review of the state of the discipline, Barbara A. Barletta refers to Alison Burford's and J. J. Coulton's studies on architectural education and craftsmanship from the 1970s, as well as Marie-Christine Hellmann's and John R. Senseney's recent contributions (Barletta 2011: 628). These studies only touch upon the tectonic prehistory of architectural craftsmanship and do not bring out the multi-faceted content of tectonics. This paper therefore examines the semantic and historical links between tectonics and architecture, drawing on these authors' works and other etymological, archaeological and historical studies.

Because of the scarce textual evidence extant from this early epoch, we must approach with caution the complex semantic field in which the two figures, the *tektōn* and the *architektōn*, stand out and become interrelated over time. Delving into the origins of tectonics lies outside the scope of the paper; we can only speculate whether these origins are to be found in the Minoan–Mycenaean building tradition or in other traditions outside Hellas.<sup>2</sup> Speculation also arises around the origins of architectural craftsmanship, but arguments, conjectures and conclusions can be based on detailed, well-informed readings of the ancient Greek testimonies of the tectonic tradition, in a critical dialogue with recent research in the field. New light can thus be shed on the semantic transition, which took place around the 7th and 6th centuries BC, from the archaic culture of tectonics to the classical era of the master builder in the 5th and 4th centuries BC. Tectonics, one of the most revered skills in Homeric epic and also one cherished by

the first architects, ends up at the lower end of the epistemological and ontological scale in Plato's writings, hinted at in the second epigraph at the beginning of this paper.

### The Multiple Skills of the *Tektones*

Just as a mountain oak, poplar, or tall pine falls, cut down by working men (*tektones andres*) with freshly sharpened axes to make timbers for some ships. (*Iliad* XIII 390–91)

This passage from the *Iliad* highlights a constellation of words referring to phenomena closely linked to the skills of the *tektones andres*, 'working men'. The *tektones* are explicitly male, implying that it takes the strength of a man to handle the axe and fell big trees in a forest. As often happens in Homeric epic, the poet gives a detailed description of the whole setting around the tall pine which the *tektones* cut down with their newly whetted axes to produce timbers for shipbuilding.

Etymologically, the Greek term *tektōn* can be traced back to the Indo-European root *tek-* or *teks-* meaning to cut or fashion with an axe, but it also refers to weaving, building, fabricating and joining (Pokorny 1994: 1058; Chantraine 1968: 1100; cf. Karvouni 1999: 105–106; Woodard 2014: 230). The ancient Greek verbs related to tectonics, *tiktō* and *tektomai*, refer to the act of bringing forth and giving birth to something, which broadens the field within which the *tektones* can display their skills. Yet, the axe remains one of the emblematic, tectonic tools in ancient Greece, although the *tektones* also used other tools and worked in other areas where the axe was not used (Glantz 1965: 44). The cited passage from the *Iliad* serves as a simile within a fierce encounter on the battlefield, and Homer leaves no doubt that these men are well-prepared, and like warriors, they would not go to work without their 'arms' sharpened.

A similar passage can be found in the *Odyssey*, where the tools of the *tektones andres* are not mentioned, but the goal of the tectonic labour process is the same as in the passage from the *Iliad*, namely to produce timber for ships. However, the context in the *Odyssey* is not the battlefield but the sea, the element of those ships whose purpose is to 'sail across to other people's cities' where it is the custom to come together and trade (*Odyssey* IX 125–30). In this passage, the importance of the work carried out by the *tektones*, who are said to build well-decked ships skillfully, becomes manifest, as it lays the basis for something as vital and, for the ancient Greeks, humane as coming into contact with other people through travel and trade. In Homer the *tektones* are often shipwrights, and the specific tectonic knowledge of shipbuilding stands, so we are told in the ninth song of the *Odyssey*, in opposition to the ignorance of the wild, lawless Cyclopes about cultivating the earth, meeting in assembly and interacting with human beings in a civilised way. The best of the *tektones*, assembled by Alexandros to build his house in the sixth song of the *Iliad*, come, not coincidentally, from fertile Troy.

Not only do the *tektones* form part of an organised society, but their skills play an important part in forming

society as such, helping to cultivate and make visible a certain worldly order through the creation of structures and artefacts, such as buildings, ships, floors, walls, armour, tools and jewellery, all testimonies of social life (McEwen 1993: 46, 72). The group of men in question has acquired specialised knowledge of how to cut materials to measure, join them together and use them for specific purposes within a social context. The tectonic know-how is very often applied to wood, and considering that the axe is the *tektones'* emblematic tool, and that the Greeks in ancient times had relatively easy access to wood, it was probably one of the preferred materials for many of them; but we should be careful not to announce wood to be a kind of singular *prima materia* of tectonics, as many modern theorists have maintained.

This assumption goes back to the influential German tradition of the 19th century, starting with Karl Otfried Müller, who focused primarily on woodwork and ceramics, excluding metal from tectonics (Müller 1848: 10). Gottfried Semper later privileged, despite seeing stone and metal as materials of tectonic craft too, an understanding of 'Tektonik' as carpentry roof work with a wooden timber frame as the principal constructive feature; an understanding upon which Kenneth Frampton based his seminal *Studies in Tectonic Culture* (Semper 2008: 10, 243, 253; Frampton 1995: 4).<sup>3</sup> It is true, as Cunliffe has observed, that 'a qualifying term' indicates that a *tektōn* works in another material than wood (Cunliffe 1963: 376), for instance horn (*Iliad* IV 110) or stone (Blümner 1969: 5; Glantz 1965: 42–44; Karvouni 1996: 79); nevertheless, the *tektones* without any further qualification are still praised for their skillful ability to use ivory and embellish their work with metals, such as bronze, silver and gold (*Odyssey* XIX 56–57; cf. Blümner II 1912: 165). Later in the 5th century BC, Aeschylus mentions the Chalybes, living near the Black Sea, and calls them metalbuilders, *siderotektones* (*Prometheus Bound* 714). Although wood is often mentioned in relation to tectonic work, it would be precipitous to limit the scope of tectonics to only one or two materials. As much as with the materials themselves, this ancient craft is concerned with the technical way of working with the materials to let them express their nature (Karvouni 1999: 106; Porphyrios 2002: 135–136).

It seems more to the point to say, as Maria Karvouni has proposed, that the *tektones* work in hard materials with strong tools (Karvouni 1999: 105), but again this observation takes into account only certain groups of *tektones*, leaving out those who had other tools at their disposal and even worked on their own and not in a group. When we hear speak of one *tektōn* in Homer, and not a group of *tektones*, it is very often a highly skilled artisan possessing a distinguished knowledge of his *métier*. It is as if Homer wanted to underline that each of these individual *tektones* stands out from the crowd and that their knowledge surpasses the knowledge other groups of *tektones* may have had. What kind of knowledge did these highly skilled *tektones* possess?

Starting with a shipbuilder, who is mentioned in the *Iliad* for his fine ability to set up timber in accordance with a chalk line, we move into a wider field of knowledge

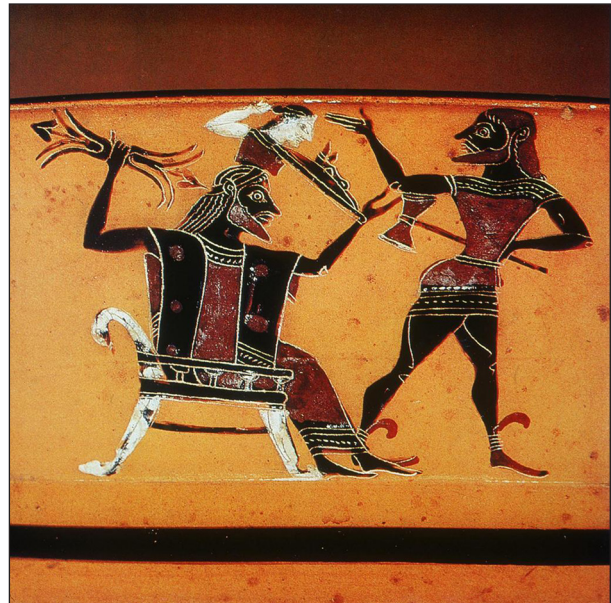
and skills which is not only bound to materials and tools, but covers more subtle phenomena such as human and divine affairs. The shipbuilder, whose identity is unknown, is said to make use of his hands in a skilled way. This indicates that he not only uses strong or heavy tools to carry out his work, but during the working process other small items, such as chalk and rope, are utilised for the finer and more dexterous work. Like any highly skilled *tektōn*, the poet tells us, he has a thorough understanding of his work and minds the advice of Pallas Athene, the goddess of all artisans, including the *tektōnes* (*Iliad* XV 410–12, *eu eidēi sophiēs*).

Two of these words, *eu eidōs*, that provide a deeper understanding of tectonics are employed in the same way in the fifth song of the *Odyssey*, where the protagonist, Odysseus, is compared to a *tektōn*, who knows the art of tectonics well (*Odyssey* V 250, *eu eidōs tektosynaōn*). In this case, tectonics also refers to the art of building a ship, and the text gives an extensive description of the way in which a highly skillful *tektōn* goes about felling trees with an axe, partitioning, polishing and piling the timber in straight lines and finally joining all the pieces harmoniously together into a seaworthy ship. The text describes in detail a highly skilled *tektōn* at work and highlights his tectonic knowledge, which can only mean that there are other craftsmen who do not necessarily reach the level of a shipbuilder or of other artists' mastery (Burford 1972: 107–111). In other words, *tektōnes* felling trees in a forest do not have to be shipbuilders as well, and they do not necessarily have an all-embracing knowledge of each tectonic detail. Odysseus is an example of a *tektōn* who displays a thorough knowledge of every step in the procedure of building a ship, which in the *Odyssey* is his only chance of getting home. When his newly made ship is again wrecked, it is Pallas Athene who saves him from dying in open sea and shows him the way to the nearest island.

### On 'Higher' Tectonic Skills and Daedalic Wonders

The passages from the *Iliad* and the *Odyssey* have shown that *tektōnes* work with all kinds of materials and tools. Wood and axe are undoubtedly essential elements in tectonic craftsmanship, but they are far from the only ones. Secondly, not all *tektōnes* are highly skilled. They all have some skill, but it may not amount to what is called throughout the ancient Greek tradition *technē* or *epistēmē*; *tektōn* and *technē* are linked through the root *tek-*, but not all *tektōnes* have *technē* in the same way as the god of craftsmanship, Hephaestus, who is described as being 'famous for his skill' (*Iliad* I 571, XVIII 143, 391, *klytotechnēs*; cf. *Homeric Hymn to Hephaestus and Odyssey* XIII 296–97, 327, 332)<sup>4</sup> **Figure 1**.

According to our readings of Homer, there are certainly *tektōnes* who possess the highest form of *technē*, but others do not, and they are *tektōnes* nonetheless. All *tektōnes* can display some skill when handling tools and materials, but, as said before, this does not mean that they have *technē* of the highest degree, which requires a thorough knowledge of the whole working process and the skillful



**Figure 1:** A black-figure vase painting, Athene's birth from Zeus' head cleaved by Hephaestus, Phrynos (signed), c. 560 BC, British Museum, London B24.

expertise to create a well-wrought final product. The skills of a *tektōn* depend on the knowledge he possesses, resulting in degrees of skilled knowledge; some go beyond mere pragmatic know-how.

Seen from this perspective, ancient Greek tectonics opens up a wider and more differentiated field than the concept of the tectonic delimited by the predominant, modern tectonic tradition (cf. Parcell 2012: 22). Even Aristotle testifies to the grading, since ancient times, of *poiētikē technē* in his discussion of *sophia*, used in reference to not only wise philosophers but also those who are 'the most perfect masters of their art (*technas*)', to which he adds, 'wisdom (*sophia*) merely signifies artistic excellence (*aretē technēs*)' (*Nicomachean Ethics* 1141a). This implies that there are different levels of technic and tectonic know-how, and that the concept of tectonics is not in itself sufficient to be identified as paradigmatic skill or knowledge, nor is architecture, which is still not an independent skill; neither is there a word for such a 'discipline' in Homer.

In the earliest ancient Greek tradition to which Homer belongs, what we today understand by architecture falls under tectonics, and tectonic craftsmanship can entail *technē* to a higher or lesser degree. In the passage from the *Iliad*, cited at the beginning of the introduction, the Trojan prince Alexandros, also known as prince Paris, had assembled the best *tektōnes* in the land to help him build a palace. The Homeric word for best, *aristos*, is the superlative form of being good at something, and it is closely related to *aretē*, which indicates that the *tektōnes* in question are wise and have reached the same kind of perfection of which Aristotle speaks. Homer even says that Alexandros built the palace himself, together with these men, which raises the question of whether he himself was a *tektōn* or just took part in the building process because of his status and power. The verb used for Alexandros' engagement in the construction of his own palace favors



the first reading: The verb *teuchein*, often used for fabrication and handiwork, is semantically close to *tektōn* and *technē*, and it seems logical that if he worked together with the best *tektōnes* to build his beautiful palace, he himself must also have had some knowledge of tectonics. However, if we read on, the text explicitly states that it was the excellently skilled *tektōnes* who made — *epoiēsan* — the sleeping quarters, the main part of the palace and the courtyard; almost nothing is left of which Alexandros himself could be the master (*Iliad* VI 313–316; cf. *Iliad* V 59–60).

Although we cannot know for sure what role Alexandros played in the building of his palace, posing the question about his engagement may be more important than giving a straight answer. The question points to an obscure realm which also remained unclear in ancient Mesopotamia, in the classical era of ancient Greece and later in the Middle Ages: Those who were hailed as master builders or who took credit for the built environment were rarely the ones who built the edifices, and were more often the powerful patrons standing behind and sponsoring the activities (Coulton 1977: 18; Kostof 2000: 5; Ettliger 2000: 115; Hellmann 2002: 50–55).<sup>5</sup> Maybe Alexandros was such a man, a precursor of the classical architect, who did not, according to Plato, take part in the construction of buildings with his own hands, but supervised the whole process (*Statesman* 259e).

If we come back to the *tektōnes* in Homeric epic, their principal activities are described with words such as *teuchein*, *arariskō*, *harmonīē* and *poiēsis*, which involve the manipulative and creative skills of the craftsman, who uses his hands or tools to cut, shape and assemble materials.<sup>6</sup> *Technē* is *poiēsis* elevated to a high level of craftsmanship and it can be elevated to still higher levels; *poiēsis* flows out into all the arts and is not limited to poetry. The poets belong to the same category as, for instance, metalworkers, carpenters and weavers, in so far as they are all involved in *poiēsis*. However, as we have seen, not all craftsmen or artisans are highly skilled — men felling trees in a forest are not, for instance — but the *tektōnes* involved in building Alexandros' castle are and they created something beautiful that was held in high esteem throughout the ancient Greek tradition. Beauty shines forth in the works of those *tektōnes* who also possess knowledge or wisdom, often referred to as *epistēmē* or *sophiē*, which goes beyond mere pragmatic know-how.

In the Homeric epic, these two words do not mean the same thing as *epistēmē* and *sophia* of classical times, when Plato and Aristotle praise both for being the highest of theoretical skills. Still, neither word should be reduced to mean mere pragmatic knowledge in Homer. The word *sophiē* in Homeric epic does indeed refer to pragmatics in the sense that it has to do with the knowledge of how to handle and manipulate things in order to make them well wrought. Ancient commentaries had already noticed this, for example in the *Suda*: 'Homer used the term "sophia" only once, although not to denote the development of character through word and deeds, but rather tectonic *technē* (*tēn tektonikēn technēn*)' (cit. from Squire 2011: 112).<sup>7</sup>

However, the *tektōn*, who is said to possess *sophiē*, is able to create wonders out of matter by rendering visible an invisible and immaterial order. In fact, shipbuilding was considered to be magical in that it brought to light something hidden. A shipbuilder would be praised as being in possession of *sophiē*, insofar as he shows some extraordinary, detailed knowledge of what a ship and its navigator need to adapt to under changing circumstances; he consequently builds the ship according to these navigational needs and takes into account the interplay of materials, construction principles and the forces of the universe. Such a ship would be beautiful in the sense of being harmonious and fitting into the world order. We shall later return to shipbuilding, which is one of the principal tectonic disciplines from which architectural craftsmanship springs. The architect rises out of the high order tectonic crafts, and a wise *tektōn* has a deep insight into the cosmological world order that grants him the status of being in contact with divine powers (Kurke 2011: 99). This is one of the main reasons why he can create such well-fitted and marvelously crafted things — *daidala*, as these beautiful wonders are often called in Homer.

One of the most famous *tektōnes* in the ancient Greek tradition was Daedalus. Considered to be divine, his name is intimately related to *daidala*. In Homer, the name only appears once, remarkably enough in a comparison with Hephaestus (*Iliad* 590–592), probably the earliest mention of Daedalus in European writing. The name springs from the praise of *daidala*, which most often refers to shiny and splendid things whose extraordinary beauty almost makes them come alive (Morris 1992: 10–13; Steiner 2015: 26–30).<sup>8</sup> The *daidala* are described as lively and wonderful, created by god-like masters belonging to the same tectonic tradition as Hephaestus, who is considered to be, together with Pallas Athene, the teacher of *technē* (*Odyssey* VI 233–234, XXIII 160–161). But these incredibly gifted craftsmen also have something more than other *technites* (technicians), namely the capacity to work so intricately with matter and in ways so well proportioned that the result is endowed with life and soul.

### The Fall of the Tektones

In the 5th century BC, Socrates recalled Daedalus' incredible skill in making his sculptures so realistic they appeared to move and come alive, which shows that the best of the ancient *tektōnes* still formed part of the classical canon (*Euthyphro* 11c–e). Indra Kagis McEwen goes so far as to claim that it is 'through the Daedalus legend that the architectural beginnings of Western thinking are to be understood' (McEwen 1993: 79). The status of the rest of the *tektōnes*, however, was fading, and there is an ironic tone in Socrates' comment on Daedalus' skill: The great *tektōn* may have made matter appear as if it could move itself, but according to Platonic philosophy of which Socrates is the spokesman, the skill is still about mere appearance. In his dialogues, Plato has Socrates looking behind the worldly phenomena for immovable ideas which only 'the mind's eye' can see and connect to. If there is a connection between Daedalus and Socrates, it is not that Daedalus animates things but that he possesses

the wisdom that allows him to see ideal forms either in or beyond material appearances.<sup>9</sup>

After Homeric times, the name of the *tektones*, together with their craft, which basically consists of cutting and combining, was borrowed by other artists, first of all the poets, and even Plato uses the term *ho tektainomenos* to designate the world god, the *demiourgos* (*Timaeus* 28 c). The legendary poet Pindar deploys *tektones* to refer to speakers and singers, associating the former with wisdom and harmonies (*Pythian Odes* 3.113–14, *Nemean Odes* 3.4–5), which means that rhetoric and music also form part of tectonic craftsmanship. Verbal forms of tectonics can express linguistic trickery, such as fabricating lies or deceiving (Heraclitus 1987: 20; Euripides 1998: 409) by making something unreal look real or playing with the intricacies of the spoken word. This evolution of the meaning of tectonics is not unrelated to Homeric epic in which we can find examples of verbal weaving (*Iliad* III 212) and the weaving of lyrics (*Odyssey* V 59–62, X 220–28; cf. Schmitt 1967: 296–301; Woodard 2014: 228–234), but despite these connections between the arts, tectonics as described in Homeric epic remains occupied principally with material work.

In the 4th century BC the terminology related to tectonics underwent a profound transformation, as did the status of its representatives. Richard Sennett observes that 'If the artisan was celebrated in the age of Homer as a public man or woman, by classical times the craftsman's honor had dimmed' (Sennett 2008: 22; cf. Holloway 1969: 289; McEwen 1993: 42, 75; Parcell 2012: 31). Not unlike the fall of public man, the subject of Sennett's diagnosis, the *tektones* suffer a fall from their high public position of old. The meaning and the function of *tektōn* is now reduced to that of a worker, most often a carpenter, who works in wood without having any direct relation to architecture to which he could only contribute under the supervision of an architect. The Greek word, which Sennett uses about the publicly celebrated artisan, is *demiourgos*, and for Plato the art of *tektōnikē* is a form of *demiourgikē*, entailing some skill (Protagoras 322d; Gorgias 455b; cf. Angier 2010: 6), but it is mere technical knowledge, which, except for the tectonic wisdom of the god-like *demiourgos*, does not rise above matter and take into account the whole order in which it partakes. To be more exact, the art of tectonics falls under the manual worker's domain, *cheiourgía*, practical handicraft knowledge (*Statesman* 258d–e), which is not the same kind of higher knowledge that allows the architect to rule: 'Every architect (*architektōn*), too, is a ruler of workmen (*ergatōn archōn*), not a workman himself' (*Statesman* 259e). Plato understands the profession of the architect quite literally as the master who rules over the workers, among whom we also find the *tektones*. The prefix of the word architect, *archē*, means both beginning and rule, and it seems to be an undisputed truism throughout the ancient Greek tradition that the person at the head of something, who thus comes first, would be in the privileged position of having the power to rule. Aristotle follows Plato in his elevation of the architect above other workers and states that the architect is more honourable and wiser than other

craftsmen (*cheirotechnōn*), who do not know why things are done in a certain way (*Metaphysics* 981a 25–31).

The classical Greek understanding of the *tektōn* as a carpenter gave rise to the misunderstanding that the *tektones* were originally only working in wood, which again led, mistakingly, to the definition of the architect as 'master carpenter' (Kostof 2000: 11–12; Callebat 1999–2000: 48; cf. von Hesberg 2015: 140). A more correct translation of *architektōn* would be 'master builder', which is also the most common one, but it does not give us any clue as to what lay behind this change in nomenclature and relegated the *tektones* to a lower rank in the working order. Another Greek philosopher contemporaneous with Plato and Aristotle, Xenophon, extends the low status of the *tektones* to cover all the artisanal crafts and claims that they are 'held in utter disdain in our states' (*Oeconomicus* 4.2–3). Yet this degradation of the crafts may have been more widespread among philosophers than among the common people. In the 3rd century Herodas describes poor people who cling to the archaic belief that there are *tektones* in possession of extraordinary skills: 'Who is the *tektōn* of this (marble)stone?', a woman asks, amazed by the high artistry of a votive in a shrine of Asclepius, and together with another woman she marvels at the lifelikeness of the dedications (Steiner 2015: 23).

### The First Architects

Did the first architects start out within or outside the circle of the *tektones*? One of the few scholars who addresses this question, J. J. Coulton, believes that the Greek architects did not rise out of a tradition of master builders, but instead learned their new profession themselves, either by travelling or studying. He recognises, however, that many architects were versatile, prestigious craftsmen: 'the earliest monumental architects cannot have been just humble craftsmen trained in traditional skills'. The reason for this is that during the 7th century BC, 'a large number of new techniques was introduced and the temple changed radically in form and structure' (Coulton 1977: 23; cf. Parcell 2012: 30). In the wake of this evolution, around the late 7th and the early 6th century BC, building projects grew so large that both highly skilled and multi-skilled craftsmen were needed to supervise the whole enterprise (Burford 1972: 86, 94). The first architects fulfilled this role. In fact, there is more evidence that they did it from within the tectonic tradition than from outside it (cf. Burford 1969).

Coulton himself points to the fact that Greek architecture was based on 'traditional craft design', performed by eminent craftsmen, who earned little more than other skilled craftsmen. As an example, he draws attention to the gifted Theodorus as one of the first architects to work in many fields and on many worldly wonders, both the temple of Hera at Samos and the temple of Artemis at Ephesus. Theodorus invented new tools, fashioned unique gems, such as Polykrates' ring, and wrote a book on architecture, around the same time that the first Ionic philosophers, or *physiologoi*, Thales and Anaximander, wrote about their discoveries of the cosmological order (Coulton 1977: 23–24). Thales was also an inventor of tools and a practically oriented mathematician capable of measuring

what had until then been unmeasurable. He was considered to be wise for his capacity to look deep into the nature of the cosmos and foresee an eclipse. Robert Hahn has advanced the thesis that the rationalising mentality of the first philosophers, especially Anaximander's proto-scientific approach and invention of instruments and models, was inspired by the first architects' technical know-how and practical form of reasoning that led them to create what amazed the philosophers about the cosmos: *thaumata*, wonders of the world (Hahn 2001: 1–2, 85, 220; see also McEwen 1993: 21–32).

When Aristotle says that the architect is held to be wiser than other workers, he recalls the status the first-rate *tektōnes* enjoyed in the ancient tectonic tradition, namely that they were wise in the sense of being excellent in performing their art. In the earliest tradition of architectural craftsmanship the line between wisdom and art, theory and technical skill was blurred, which implied that 'architects' and 'philosophers' did not always see themselves as belonging to two distinct traditions, but rather as drawing on the same ancient tectonic culture to develop their visions of the world. While the first architects may not have risen out of a specific master builder tradition, they may still have been *tektōnes* themselves, albeit ones who had reached a high level of mastery of their craft through practice and research. If architectural craftsmanship grew out of traditional craft design and architects had more or less the same status as other craftsmen, it would be only natural if the first architects saw themselves as heirs of a tectonic craftsmanship that they may have then refined even further. Who other than the craftsmen, considered to be the most excellent of their generation, would be entrusted the daring task of steering the immense enterprises undertaken at the end of the 7th and the beginning of the 6th century? During this period, the most powerful people in Ionia and Samos, and on the Hellenic mainland, commissioned the huge, monumental temples that came to define the cultural landscape in the southeastern Mediterranean area.

From the archaeological evidence of 1100 to 700 BC found in this area, Mazarakis Ainian draws the conclusion that 'the origins of the Greek temple are to be sought in the "royal" dwellings of the Dark Ages' (Ainian 1988: 116; cf. Barletta 2001: 30). This evidence, says Ainian, shows that the rulers' dwellings described in Homeric epic correspond more clearly to those dating from the Dark Ages than to those of the Mycenaean Period. There is enough continuity, tectonically speaking, between the ages to see the Homeric *megaron* or *domos* – that of Odysseus and Paris, for instance – as the model or skeleton for the later monumental temples (Ainian 1997: 363–366). Another perspective, however, is that the temples were the outcome of the monumentalization of Greek sanctuaries, which often only consisted of a small restricted area, a *temenos*, and an altar. In this scenario the temple would become the monumental shelter of the divine and, not unimportantly, from the 8th century and onwards, an important centre of craft production (Sourvinou-Inwood 2005: 7–8). Yet Ainian's thesis is that the dwellings of rulers in the Dark Ages and the early Archaic Age also served religious

purposes, and that the model for temple building, including the monumentalization of sanctuaries, came from the plans and tectonic details of houses the highly skilled *tektōnes* helped to build. Ainian's studies support a view of the temple as the monumentalization of the archaic sanctuary, and supporting our thesis that the origins of architectural craftsmanship in ancient Greece are to be found in the higher arts of tectonic craftsmanship.

Seen in the light of the new role of the highly skilled craftsman as head of the monumental building projects around 600 BC, it seems plausible, as Plato ventures, to understand the architect as the steerer of the *tektōnes*, but we should not leave out the other meaning of *archē*, which is related to origin and being the first, in this case first among the *tektōnes* to excel in the art of tectonics. In Pindar's poems we find the word *archedikās*, meaning first right, and in classical times the prefix *archi-* is common, for instance in words for a ruler priest or a high priest, *archiereus* or *architheōros*. These two groups of words reflect both meanings: being first and being a ruler. Herodotus is one of the first to employ the term *architectōn*, in reference to the Samian chief builders, Rhoikos and Eupalinos, who were responsible for 'the greatest works of all the Greeks' (Histories 3.60).<sup>10</sup> The Greek historian highlights the Temple of Hera by the former and the one-kilometre long aqueduct by the latter; both are the greatest, by which he seems to mean greatest not just in size of the works, but also in that they testify to the greatness of their masters. What becomes clear from Herodotus' description is that an architect was not only a builder of temples and houses, but he could be involved in other projects whose extraordinary dimensions called for the skills of a *tektōn* mastering his métier.

Archaeologists and engineers still consider the aqueduct of Eupalinos to be a unique achievement, not comparable to any other constructions of its kind in ancient times (Grewe 2008: 324–325; Kienast 1995: 178; Burford 1972: 115). The architect, originally a Megarian, according to Herodotus, demonstrated his practical and theoretical aptitude, as he embarked on the daring task to excavate from both ends and succeeded in connecting the two meandering groups of the tunnel. Planning the route ahead, constantly controlling and correcting the direction of advance, negotiating topographical obstacles and resorting to structural solutions, were all key to Eupalinos' success. The tunnel embodies the ancient Greek ideal of tectonic wisdom as the ability to foresee, measure and create order in what appears to be unforeseeable, unmeasurable and disordered (Grewe 2008: 319–320; Senseney 2016: 65–70).

This accomplishment was probably what inspired the French poet and essayist, Paul Valéry, to praise Eupalinos for knowing how to make the invisible visible and to ennoble matter so it would vibrate with the human soul in an almost imperceptible way (Valéry 1944: 23–24). In the same vein, another modern commentator wondered about the marvel it must have been to see such a gigantic temple as the Temple of Hera (Holloway 1969: 282), which, apart from requiring the most intricate and detailed tectonic know-how, demanded an amount of work force and



logistic strategies never before witnessed in Greece, to get the stone from the quarry to the building site.

Rhoikos, a sculptor and metalworker, was often connected to the name of Theodorus, who would rival ‘that other, greater craftsman-inventor, Daidalos’, and together they were perceived as ‘larger than life’ (Burford 1972: 192). In a similar way, Coulton remarks that the architects of the first stone temple of Apollo at Delphi were celebrated as ‘legendary figures, almost on a par with Daidalos’, underlining that ‘the late seventh to early sixth century is the time when practical matters had the highest status in Greek society’ (Coulton 1977: 23–24). Moving into the 5th century BC, rationalization and self-reflection increased among artists and craftsmen, accompanied by a pronounced distance between them and their work, which takes on fewer and fewer lifelike features (de Angelis 2015: 77; Gensheimer 2015: 94). At the end of this movement away from the *tektōnes*’ involvement with their lifelike work, we find Plato’s Socrates, who turns towards theory and the architect’s overview of the whole building site without getting involved in the work (Parcell 2012: 31–38). In classical times, more people than just the architect oversaw the monumental building projects; the legendary sculptor, Phidias, worked as overseer (*episkopos*) for Pericles at the Parthenon together with other architects, according to Plutarch (*Life of Pericles* 13.4). There seems to have been a clear order between the *architektōn*, the *hyparchitektōn* and other assistants inspecting the buildings and the sites (Kostof 2000: 22).

A good deal of exuberant praise has gone into the description of the first Greek architects. These texts allow us to reestablish the connections back to the older tectonic tradition that was not completely forgotten, and to see that not all the *tektōnes* at that time work under the order of an architect. Rhoikos and Theodorus, who became famous for their versatility and extraordinary insight into the art of tectonics, often worked together, which reminds us of the best of the *tektōnes* in Homeric epic, who also sometimes teamed up, or of the 6th-century team of Eurykles and Kharmophilus, who built a bridge on Samos and called themselves *tektōnes* (Hurwit 2015: 52; cf. Coulton 1977: 28). Rhoikos and Theodorus would surely benefit from each other’s knowledge, complementing each other, and their architectural fame is invested with all the distinctive attributes of the ancient tectonic tradition: They are highly skilled, versatile craftsmen with a divine status and they are in possession of the technical know-how to create wonders out of matter in hitherto unseen ways.

### Architectural Imagery: The Temple and the Ship

In a text titled ‘Kosmos: The Imagery of the Archaic Greek Temple’, Clemente Marconi reminds us that the ancient Greek word for order in the world, *kosmos*, is used about the whole temple, ‘referring not just to the frieze, but also the columns, the entablature, and the statues. *Kosmos* signifies “ornament” and “splendor”, everything that goes beyond the purely structural and imparts beauty to the architectural form’ (Marconi 2004: 211). This is, of course,

not possible without a highly developed knowledge of harmoniously assembling well-adjusted pieces, i.e. a tectonic know-how of cutting, combining and making different materials fit into a greater whole. Even Plato, despite his ambiguous and at times pejorative attitude towards tectonic craftsmanship and the arts as such, lets the *demiourgos* in *Timaeus* proceed like a skilled *tektōn*, as he forms the world order according to ideal measures, which points to an essential aspect of the art of tectonics, namely its inherent quality of making apparently disparate phenomena fit harmoniously together. When describing the details of the *demiourgos*’ elaborative work, Plato employs terms from the vocabulary of tectonics to specify how the tangible and the intangible, matter and soul, become interwoven so as to create the cosmological world order (*Timaeus* 28b–29b, 32b–33a, 69a–70e).

Since Homer, no Greek poet or thinker appears to have doubted that what is well ordered, be it the human body endowed with a beautiful soul or an artefact brought to brilliant perfection, is also well built according to tectonic principles. As we have seen in Homer, the most eminently skilled *tektōnes* use their hands-on knowledge to make the intangible tangible, creating things that are experienced as amazingly well fitting. The world order as such presents itself in the tectonic creations and, not least, in the archaic temples, which are ordered, monumental compositions of different materials, joined together in such an artistic way that none of the parts stand out or appear as isolated pieces. The first architects were aligned with Daedalus and other masters of tectonic craftsmanship, such as Hephaestus, not because they worked in a particular material or developed certain structures, but because their skillful handling of matter enabled them to create things which had the stamp of something immaterial. The immaterial could take the form of a vision of the world order, like the one Hephaestus created on Achilles’ shield in the eighteenth song of the *Iliad*, or some ethereal form pointing towards the sky, like the feathered wings Daedalus created for himself and his son to escape from Crete (McEwen 1993: 63–68) **Figure 2**.

As to the origins of the orders of ancient Greek temples, Barletta proposes to tackle this issue ‘by interweaving the tectonic and ornamental-symbolic interpretations’ (Barletta 2001: 143). Interweaving seems to be an equally adequate approach when searching for the origins of architectural imagery in tectonic visionary forms.



**Figure 2:** 17th-century relief, Daedalus and Icarus, Musée Antoine Vivenel (Wikimedia Commons).



**Figure 3:** A black-figure cup painting of a vessel, c. 520, Leagros (inscription), Bibliothèque nationale de France (Wikimedia Commons).

McEwen and John Onians have argued that the imagery the first architects and possibly also their fellow men saw realised in the monumental temples was of a seaworthy ship, a paradigmatic example of masterful craftsmanship for many maritime communities in ancient Greece **Figure 3**. In fact, a series of semantic and architectonic features of some of the temples support this speculative argument: The shrine, *naos*, of the god was semantically linked to vessel, *naus* (Hahn 2001: 87). Both were originally made of wood and had a similar cabinet design with what could be interpreted as prow, keel and stern, and ‘[T]he beak on a Greek war vessel occupied a similar position in the ship’s silhouette to the steps on the Ionic temple’ (Onians 2005: 54). Like a ship, the so-called peripteral temples also had wings, *ptera*, which refers to the external colonnade of columns sustaining the temple, a unique feature of many of the ancient Greek temples which ‘had much to do with an early understanding of architecture both as embodied flight and as navigation’ (McEwen 1993: 103). When a ship takes on wings in Homer and Hesiod, it appears to be flying, and one can imagine that the oars stretching out from the side and moving in unison look like wings. People and goddesses, armour and words could also become ‘winged’, which suggests the presence of an extraordinary force that links the earth to the sky.

In different ways the temples underwent vertical alignments and refinements, causing in some cases ‘an overall upward thrust of the platform’, according to Nancy L. Klein, a thrust which conveys the impression that the temple swells or even soars (Klein 2016: 115–116). Insofar as the first architects looked for such an effect, they seem to have relied on the archaic art of tectonics to recreate a subtle, lifelike movement in symmetrical, harmonious orders. It is likely that the Ionic style of the Samos bases, with their *torus* and *trochilus*, meaning knot and pulley, reproduces ship-like features to a higher degree than other orders. Following the analogy, if the whole rows of columns were seen as wings or sails lifting the temples, the columns themselves could be imagined as masts or even looms holding textiles (Onians 2005: 55; McEwen 1993: 100–111).

Further research needs to be carried out in this field of architectural imagery, which might change according to the cultural tradition and the available materials in each region of ancient Greece. Barletta has argued that the architectural orders, far from being direct translations

from wood into stone, may differ and manifest small variations depending on the use of materials and symbolic representations. Archaeological remains point to certain temples that appear to be conceived and built in stone from the beginning (Barletta 2001: 7, 27), a possibility also opened up by our research on the multi-skilled *tektones*, who worked in stone. We should keep in mind that the *tektones* were not only carpenters and shipbuilders; if the first architects sought to convey tectonically well-built forms, they may not have relied exclusively on the symbolic imagery of vessels, at least not in all areas of and outside Greece. If the maritime imagery had any foundation in the architectural reality of ancient Greece, then it was most likely in the area around Samos and Ionia, with their architectural strongholds in the temples of Hera and Artemis at Ephesus respectively. Both lay close to the sea, and the first Heraion of Samos in particular was surrounded by wells and water, and little boats have been found inside it whose origin and function are still unknown (Kyrieleis 2005: 107–112).

It is hardly a coincidence that Herodotus highlights Samos as the cradle of the first architects. The island, which was the dominant naval power in the Mediterranean Sea in the 6th century, is found just off the Ionian coast, where the first big temples in the Ionic order were built, and it lies closer to ancient Troja and Egypt than to the Hellenic mainland. If around the 7th century BC there had been any knowledge left of the age-old arts of tectonics, it would without a doubt have been handed down to the Samian architects through traditions linked to the Trojan and Ionian past. We remember that the earliest testimonies of architectural craft in the Greek archipelago revolve around Daedalus, who built, according to Homer, a dance floor in Knossos on Crete, just south of Samos. Samos became the culturally most prolific island in the Mediterranean Sea in the 6th century, containing traces of Egyptian art, Minoan culture and Mycenaean occupation together with daedalic sculptures and some of the first large-scale monumental works in ancient Hellas (Shipley 1987: 25–27, 57–58). Legend has it that Daedalus came from the near East, at least from outside Greece, which may have been a way of putting into mythic words that the Greeks learned from other Mediterranean cultures, in particular Egypt, when it came to architecture.<sup>11</sup> Diodorus had no doubts when he stated that ‘the rhythmos of the ancient statues of Egypt is the same as that of the statues made by Daidalos among the Greeks’ (Diodorus 1933: 1.97.6), the rhythm being the calm movement inherent in statues and temples which appear to come alive and lift themselves from the ground (Philipp 1968: 47; McEwen 1993: 115–116). Apart from being a sculptor, Daedalus was the famous builder of the labyrinth for the Minotaur on Crete from where he had to flee either by boat or on the wings he had himself made (McEwen 1993: 63–68).

Although the ancient Greeks learned from the Egyptians, ‘the great Ionic temples at Samos, Ephesus and Didyma rose to the Egyptian challenge, though using a substantially non-Egyptian vocabulary’ (Jones 2014: 96). This vocabulary contained references to wood and vessels, wings and masts, but probably also to other tectonic



disciplines, such as sculpture and weaving. The temples rising ‘to the Egyptian challenge’ cannot be separated from the rise of the first architects out of the age-old tectonic tradition that had not been forgotten, but was very much present in the minds and the work of not only the architects, but also of the people working for them. It was because the temples incorporated solid, harmonious and well-fitting features which only the best of the *tektones* could produce that the first architects needed people from the tectonic disciplines to work for them, particularly shipbuilders, carpenters, sculptors, stone masons and metalworkers.

From around the 7th century BC, stone became the predominant material. The *architektōn* was that overarching figure who made possible the daring transition from the older wooden structures to the monumental construction of stone temples. Wood continued to play a small but important part in the monumental stone temples, especially in the roof construction, which was meant, not unlike the hull of a vessel, to be a barrier against water. There are striking resemblances between the roof constructions of some early shrines and the structures of a hull,<sup>12</sup> but what links the temples to their tectonic past is the harmonious *kosmos* appearing in them through the joining together of well-adjusted elements in an intricately articulated way, elevating the architectural craftsmanship to a higher artistic level associated with a divine dimension of beauty and order.

## Conclusion

The ancient tectonic tradition was still present in the minds and the works of the first architects, who rose out of it and relied on its wisdom in order to carry out the monumental works of the 7th and 6th centuries BC. The first architects were the most highly skilled tectonic masters, who dominated other disciplines and manipulated materials in a marvelous way surpassing ordinary technical skills. To succeed in creating harmonious order out of matter, particularly when erecting the monumental temples, they had to orchestrate the different units of workmen of the tectonic crafts. As most of the ancient tectonic know-how went into the building of the first temples, the orders of columns can be seen as representing everything that the ancient Greeks regarded to be well built according to tectonic principles of joining and interweaving members harmoniously together. In the Ionic order the temple’s resemblance to a ship is more manifest than in other orders, but whether the ordered structure of the columns is interpreted as representing a ship or a series of looms, the temple makes incarnate principles of tectonic craftsmanship and makes visible an invisible order on earth through harmonious, rhythmic orders. The first architects had the capacity, like the ancient masters of the tectonic arts, to make *kosmos* shine forth in well-crafted artefacts and monuments.

In the classical era the *tektones* fell from their high age-old status and were relegated by the philosophers to work under the rule of the architect, understood as the one in charge of supervising the *tektones*. The architects of the 5th and 4th centuries were no longer as deeply involved

in the tectonic working process as the first architects, and a division occurred between the architect in charge of supervising the work and the workers themselves that relegated the *tektones* to a secondary place in the order of craftsmanship. Without having a particularly high status in the classical era of Greece, the architect was, nevertheless, elevated by Plato and Aristotle above the other workers, because of his theoretical knowledge and power to rule over the ‘vulgar’ artisans, among whom we also find the *tektones*. The architect is not himself in contact with matter, as Plato observes, but is, so to speak, set apart from the rest of the work force, and is thereby distanced from his past among the *tektones*. Although the arts of tectonics were still respected in the classical era, over time the rise of the architect meant the fall of the *tektones*, who were reduced to being woodworkers, whose only share in the principles of construction came through the orders of the architect.

## Notes

- <sup>1</sup> In Plato’s *Statesman* (258d–261c), *architektonikon* and *tektonikē* are associated with *technē*. Aristotle uses *architektonikē technē* in *Physics* (194b), although Ross omits *architektonikē* in his translation. In the comic Sospater’s *False Accuser*, *architektonikē* is employed with reference to *technē* (*The False Accuser* 378d), and in the passage just before the verb form, *architektonēin* is specifically used to refer to the knowledge of how to design a kitchen while taking into account light and wind. For a semantic analysis of the many meanings of *architektonēin*, see Landrum (2010: 115–130).
- <sup>2</sup> Both Karvouni and Mazarakis Ainian find support for *tektōn* in the word TE KO TO NO on tablets of linear B script from Mycenaean times (Karvouni 1996: 80; Mazarakis Ainian 1997: 364), but, as far as I know, we have no sources to help us, if we want to find the exact meaning of the word and follow its meanings through to archaic times.
- <sup>3</sup> See also Azara (2005: 36–37), and Kostof (2000: 11–12) for tying tectonics to wood and carpentry. Kube bases his etymological understanding of *tek-* on Pokorny (1994) and adduces that *tektones* are woodworkers, but like Pokorny he recognises that both the etymology and the actual use of the word, especially in Homeric epic, include craftsmen working with other materials too (Kube 1969: 9–13). Among the few critics who see the limitations of understanding tectonics narrowly as carpentry are Karvouni (1999: 105) and Christiansen (2014: 26).
- <sup>4</sup> Castoriadis describes Hephaestus as incarnating skill: ‘Hephaestus’ art is surely superior to all human art [...] Hephaestus is *technē*, like Ares is war and Athena is wisdom’ (Castoriadis 2007: 16). For an interpretation of *technē* modelled on the art of the *tektōn*, see Roochnik (1996: 19–24), who relies, however, on the incomplete understanding of tectonics as woodwork in Pokorny (1994) and Kube (1969).
- <sup>5</sup> One famous example in 6th-century Greece was the so-called *polikrateia erga*, mentioned by Aristotle in *Politics* (1313b). The ‘commissioner’ behind these

works was the tyrant of Samos, Polykrates, whose role in these works is disputed, as is the identification of the works; for a short discussion of this, see Kienast (1995: 181) and Wescoat (2015: 177–178).

- <sup>6</sup> For establishing a connection between the root *tek-* and the semantically related root *ar-* in *arariskō* and *harmozō*, see Nagy (1979: 298–300).
- <sup>7</sup> Squire says that the right measure of *technē* and the whole order of *sophia* are closely related (Squire 2011: 106–109). See also Löbl (1997: 208), and Kurke's discussion of the ancient Greek concept of *sophia*, based on a fragment supposedly by Aristotle (Kurke 2011: 96–98).
- <sup>8</sup> Morris posits that Daedalus 'keeps company with Tektōn ("The builder"), Harmonidēs ("The joiner")', and she gives some legendary examples of *tektones*, 'celebrated with *daidal-* words': Daedalus, Hephaestus, Athena, and Phereclus (Morris 1992: 3, 20, 220–221).
- <sup>9</sup> About Socrates' ambiguous, ironic stance to Daedalus and his run-away statues which the philosopher finds most beautiful, when they are tied down, see Morris (1992: 234–35). Hugh St. Victor is one of the few post-classical thinkers who recalls Daedalus' manual skill as *sophia* (Pérez-Gómez 2008: 155).
- <sup>10</sup> Herodotus, who wrote down his *Histories* around the second half of the 5th century, cannot have been the first to use the word 'architect'. In Plato's and Xenophon's writings it is presupposed that every reader knows what the architect's work consists of, and from the same period, around the second half of the 5th century, we find a series of Attic inscriptions containing the word *architektōn*: IG I<sup>3</sup>.32, 50, 51, 52, 64, 78, 82, 130, 132, 474, 476. Landrum comments that 'earlier than all of these inscriptions, however, is a line of Aeschylus' fragmentary *Dikē* play (possibly of 476 BCE)', in which terms for architecting appear (Landrum 2010: 48, 115–118).
- <sup>11</sup> Morris argues that Daedalus, personifying an oriental legend, spans archaic and classical times and stands, not unlike Hephaistos, behind knowledge transfer to the Greeks (Morris 1992: 76–77, 99, 124, 235, 240–41). For a recent discussion of the influence of Egyptian art on Minoan-Mycenean and archaic Greek culture, see Watkin (2000: 19–26), and Wilson Jones (2014: 89–100). For the close relationship between Samos and Egypt, see Kyrieleis (2005: 109) and Rykwert (1999: 162).
- <sup>12</sup> Wiencke holds that 'Shipbuilders and house builders employ many of the same techniques' and in ancient Greece they would naturally have learned from each other (Wiencke 2000: 295; see also Wright 2005: 5). Dinsmoor maintains that the Lycian Tomb of Payava from the 4th century BC, also mentioned by Semper in *Der Stil* § 60, 'represents wood construction perfectly' and 'a boat turned upside down on the beach might have suggested the upper part' (Dinsmoor 1928: 67–68). See also Lawrence (1996: 5), for a brief comment on some gabled and hipped roofs of temples looking 'like a boat upside down'.

## Competing Interests

The author has no competing interests to declare.

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