

## SPARKING THE IMAGINATION Exploring the Eureka Moment

### Kendra Schank Smith

Department of Architectural Science  
Ryerson University  
[kssmith@ryerson.ca](mailto:kssmith@ryerson.ca)

### Albert C. Smith

Department of Architectural Science  
Ryerson University  
[acsmith@ryerson.ca](mailto:acsmith@ryerson.ca)

### Jessica Stanford

Department of Architectural Science  
Ryerson University  
[jessica.stanford@ryerson.ca](mailto:jessica.stanford@ryerson.ca)

---

#### Abstract

*This article elucidates aspects of the creative imagination: inspiration and how this brief momentary revelation combines previously pondered thoughts, combined with the craft of implementation, to present a meaningful whole in an architectural design process. This imaginative spark or the eureka moment may be the resolution of an idea or the understanding of a perplexing concept. Using Vitruvius' story of Archimedes as an analogy, this exploration utilizes myth to bring concepts of inspiration to contemporary architecture. Thus, a new understanding of inspiration may assist architects to better utilize this important capacity and potentially unlock the principles that lead to understanding the beginning of design.*

**Keywords:** imagination; design process; spark.

#### INTRODUCTION

'Inspiration' implies that it is based on the creative imagination. The word itself stems from 'to breathe' or 'to bring life,' and suggests ecclesiastical connotations. Scholars of philosophy and psychology, in attempting to define imagination, find that it contains numerous dimensions. The human mind contains potential to bring forth images from memory, compose images that recombine thoughts of things seen, or bring entirely new form into the mind (Casey, 1976). This article attempts to elucidate aspects of imagination to explore brief momentary revelations combined with previously pondered or ruminated thoughts in an architectural design process. The purpose is to understand architects' early design thinking and find its relevance to contemporary architectural inspiration by re-visiting Vitruvius' story of Archimedes as an analogy,

The imaginative "spark," as a faculty of the mind, depends on how images are brought to life or how their form is initiated. Connected to imitation, philosophers and psychologists, including Aristotle, Rudolph Arnheim, Sigmund Freud, and Richard Kearney, have long studied how the mind creates images and how they are affected by their relationship to an original. More specifically architects need images to encourage inspiration, record what has been seen for further use, test ideas, visualize things too complex to retain in the mind and communicate concepts to others and as such these uses of the imagination are essential for architects. As a creative visual endeavor, imagination represents the mental impressions that are personal to

each individual. Images also constitute the physical manifestations that architects manipulate in a design process. Thus, a renewed understanding of the qualities of the imagination may assist architects to better utilize this important capacity and potentially unlock the principles that lead to an understanding of conceptual beginnings.

It is possible to study documentation of what buildings meant to those who created them or those who experienced them. At some point that first hand knowledge can no longer be obtained, but these buildings can be understood through those who critically assess their current significance or speculate on their future value. The study of hermeneutics, once the sole realm of manuscripts, has been expanded to all texts including multimedia (Reeves and Nass, 2003). Since we can never alter our place in time, we can only attempt to understand a historic period (Gadamer, 1975). The study of *Objective Hermeneutics* suggests that quantitative methods can generate data but only qualitative assessment can find knowledge that is both precise and valid (Oevermann, Tilman, Konau, and Krambeck, 1987). This approach builds on the work by Paul Ricoeur that dispels the belief that historical knowledge can be in any way definitive (Ricoeur, 2004). Ricoeur writes that this validation “is an argumentative discipline comparable to the judicial procedures of legal interpretation. It is a logic of uncertainty and qualitative probability” (Ricoeur, 1991, p. 159). The study of architectural history, and design research, or the assessment of its current uses requires interpretation through hermeneutic methodology, based on analysis, comparison (including analogy) and documentation (Groat and Wang, 2001 & Snodgrass and Coyne, 2006).

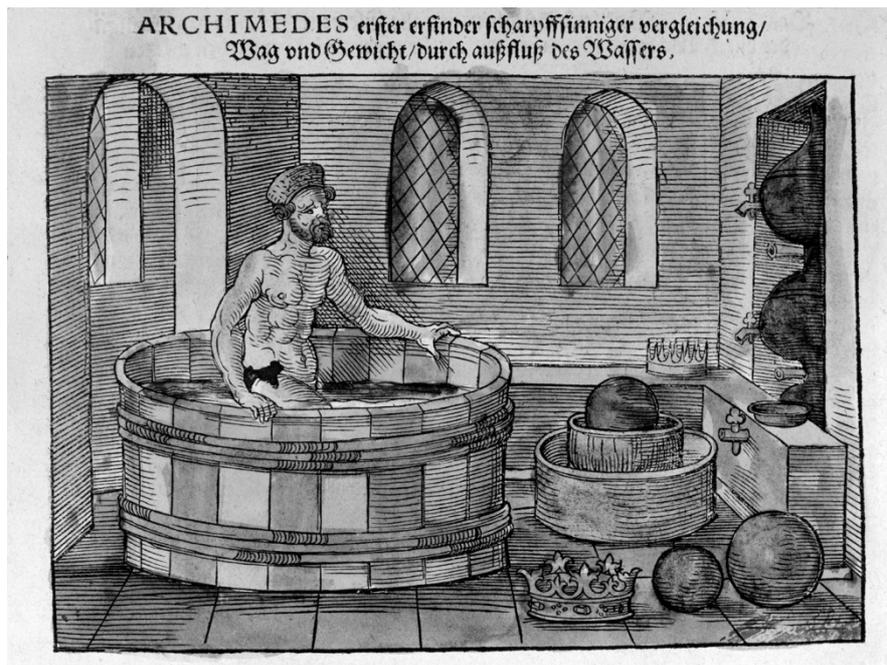


Figure 1: Archimedes of Syracuse, the 3rd century Greek mathematician, physicist, engineer, inventor and astronomer (Source: -- Copyright: Heritage Images/Corbis).

Turning to the roots of western architectural thought, the Roman architect Vitruvius wrote about the importance of the mind and imagination (Vitruvius, trans. 2004). Borrowing much from the Greeks, Vitruvius employed an allegory to explain a cognitive process of design. In his *Ten Books on Architecture*, representing the earliest and most complete text specifically concerned with architecture, he provides some historic authority and also opportunity for interpretation. His lesson from the preface of Book IX relays the story of Archimedes and emphasizes that the mind

must be trained in a way that is analogous to the training of the body. The question that arises, though, is what can be learned about the imagination by dissecting the allegory of Archimedes and the discussion regarding the accomplishments of the mind? Vitruvius tells the story of this great thinker (See Figure 1).

*Archimedes made many and various wonderful discoveries. Of all these the one which I will explain seems to be worked out with infinite skill. Hiero was greatly exalted in the regal power at Syracuse, and after his victories he determined to set up in a certain temple a crown vowed to the immortal gods. He let out the execution as far as the craftsman's wages were concerned, and weighed the gold out to the contractor to an exact amount. At the appointed time the man presented the work finely wrought for the king's acceptance, and appeared to have furnished the weight of the crown to scale. However, information was laid that gold had been withdrawn, and that the same amount of silver had been added in the making of the crown. Hiero was indignant that he had been made light of, and failing to find a method by which he might detect the theft, asked Archimedes to undertake the investigation. While Archimedes was considering the matter, he happened to go to the baths. When he went down into the bathing pool he observed that the amount of water which flowed outside the pool was equal to the amount of his body that was immersed. Since this fact indicated the method of explaining the case, he did not linger, but moved with delight he leapt out of the pool, and going home naked, cried aloud that he had found exactly what he was seeking. For as he ran he shouted in Greek: *heurēka heurēka*.*

*Then, following up his discovery, he is said to have taken two masses of the same weight as the crown, one of gold and the other of silver. When he had done this, he filled a large vessel to the brim with water, into which he dropped the mass of silver. The amount of this when let down into the water corresponded to the overflow of water. So he removed the metal and filled in by measure the amount by which the water was diminished, so that it was level with the brim as before. In this way he discovered what weight of silver corresponded to a given measure of water.*

*After this experiment he then dropped a mass of gold in like manner into the full vessel and removed it. Again he added water by measure, and discovered that there was not so much water; and this corresponded to the lessened quantity of the same weight of gold compared with the same weight of silver. He then let down the crown itself into the vase after filling the vase with water, and found that more water flowed into the space left by the crown than into the space left by a mass of gold of the same weight. And so from the fact that there was more water in the case of the crown than in the mass of gold, he calculated and detected the mixture of the silver with the gold, and the fraud of the contractor. (Vitruvius, trans. 2004, Book IX, p. 197-203, 207-209).*

By dissecting Vitruvius' description of Archimedes' discovery it becomes obvious there are three distinct aspects of imagination. First, the thinker was continually aware of his surroundings that provided precedent (the baths), whether knowingly or not. Second, in the moment of *eureka*, his mind made an immediate connection between the precedent and the problem. Last, he recognized and acted on his *eureka* moment and his experiment ultimately proved the crown was not made of gold.

While a common definition of imagination as an autonomous mental act could be "the power of the mind to form a mental image or concept of something that is unreal or not present,"

this definition does not convey imagination in its entirety (Soukhanov, 1984, p. 610). All humans experience imagination but the ability to describe the experience can be elusive. Philosophers and psychologists agree that imagination is tied to a *mental impression*; an image perceived in the mind. Different from the attitude that imagination is solely creative or independent of other faculties, the historian and philosopher David Hume felt that the role of imagination was that of mediation between impressions and aspects of memory and judgment (Casey, 1976, p. 17).

The term imagination is frequently used in contemporary culture to envisage objects which are absent from view, to change or interpret that which can be observed, or to recognize and re-use items which are known (Warnock, 1976, p. 193). The philosopher Edward Casey writes about how humans engage imagination. "Imagining is remarkably easy to enter into ... we can also imagine *whatever* and *however* we wish to ... it is more difficult to fail than to succeed in imagining" (Casey, 1976, p. 5). Although humans can imagine when they so desire, it is difficult for these new mental impressions to be radically new, because the imagination is a synthesis of memory and perception, and all that can be originated is dependent upon these (Casey, 1976, p. 8). In many cases the 'picture' found in the imagination is a combination of previously seen concepts so that the mind "... invents a concept, or calls one up, to fit the visible or audible form before it" (Warnock, 1976, p. 49). Casey uses several paired concepts to explain qualities of the imagination. The first pair is spontaneity and controlledness. "[Spontaneity is] where imaginative acts and presentations appear in an irrepressible and sudden upsurge" (Casey, 1976, p. 66). This is an example of an associative spontaneous image in the form of a mental impression, but the spontaneous phenomenon can initiate itself rather than being initiated (Casey, 1976, p. 67-68). On the other hand, humans can control (controlledness) imaginings by simply deciding to and can do so without much effort. Imagination has two additional traits explained by Casey, those of self-containedness and self-evidence (Casey, 1976, p. 87-102). "The self-containedness of imagination, then eliminates the need for extraneous evidence and allows the imaginative act-cum-presentation to be experienced as genuinely self-evident" (Casey, 1976, p. 94). The imagination is self-evident in that all information appears at once, and issues of inconsistency are unimportant (Casey, 1976, p. 94-97). The last two aspects of imagination identified by Casey are indeterminacy and pure possibility. Objects imagined cannot necessarily be known in their entirety, as they are vague or perceived as parts (Casey, 1976, p. 106). To define pure possibility, Casey writes that "... the 'purity' of imaginative possibilities lies precisely in their independence of the mutually exclusive alternatives of reality and unreality" (Casey, 1976, p. 113). This aspect of imagination makes anything hypothetical and all things possible – this is where we can comprehend the creative imagination.

The three stages articulated by Vitruvius could be equated to a typical design process. The *pre-spark* may be considered identification of the issues required for design: the time when architects begin to contemplate how best to approach the factors involved. The *spark* could be the moment that everything makes sense and a cohesive approach is made clear – the moment of *eureka*. The *post-spark* suggests the development phases where the imagination is focused and used to implement the design. Archimedes had been contemplating an issue that bothered him; he associated his experience in the bath with the volume of gold and thus, the connections worked *spontaneously* in his imagination. "Association reduces essentially to contiguity, and his laws of association predicts that the mere repetition ('a sufficient number of times') of sensations in conjunction will give each of them the power to call to mind the corresponding ideas" (Beardsley, 1966, p. 177).

Being open to *pure possibility* assisted Archimedes to make connections and then *controlledness* helped him work through the details of the 'problem.' If the mind 'free associates' and lets unusual possibilities flow – one is intentionally choosing to allow them. In the act phase, functions consist of imaging, imagining-that, and imagining-how (Casey, 1976, p. 40-45). Imaging is a sensory aspect where imagining 'that' and 'how' are anticipatory, and are both intentional and creative. The philosophy of Carl Jung provides further perspective on these aspects of the imagination claiming that passive imagination is uncontrollable, where one is overwhelmed by the

upsurge of one's own fantasies - similar to the un-containing qualities of pure possibility. Conversely, the active imagination involves a positive participation of consciousness, as the conscious self enters into its own activity within three stages of thought: the *pre-spark*, the *spark*, and the *post-spark*.

### PRE-SPARK

The period of time prior to a moment of *eureka* is the free-fall of the imagination, the boundlessness of possibility and the semi-conscience thought that leads to discovery, to *eureka*, or to the spark, whether in the baths of ancient Greece with Archimedes or in the limited, brief pauses of contemporary life. Rightfully, the everyday mind exists within this stage, absorbing, creating, reflecting and consuming life as it passes through the eyes – each image stored in memory for later use destined to become part of the conscious or subconscious trail of inspiration.

There are many narratives throughout history that lead to great discovery, one of the most famous being the aforementioned story of Archimedes' discovery of a method of measuring gold. Yet in exploring this pre-*eureka* stage we can turn our attention back once again to the Greeks and stories concerning the Muses. Daughters of Zeus, the Muses or *Musae* were goddesses of literature and the arts, a constant source of knowledge, and often known for advising their worshippers (Avery, 1972, p. 363). Vitruvius referred to the Muses while describing yet another famous ancient discovery, the Pythagorean Theorem, claiming that once Pythagoras had reached his *eureka* moment, he thanked the Muses for their advisement in his discovery (Vitruvius, 2004, p. 203). Related more to inspiration, they are also alluded to in several Shakespearean sonnets, Milton's *Paradise Lost*, and in Romantic poet, Lord Gordon Byron's poem *Childe Harold's Pilgrimage* as well as various other works of modern literature (Byron, 1936, p. 33). Since the Muses represent a wealth of knowledge, they are the source for inspiration for many a poet, author, or architect and throughout history they have been associated with the "dream in which a number of ancient poets imagined themselves on Helikon or Parnassos receiving inspiration from them" (Fitton Brown, 1961, p. 23). The etymological root of the word museum comes from the Greek *mouseion*, which was the temple or shrine of the Muses. Initially, it was in reference to the ancient Library of Alexandria, which existed as a "gathering place of objects and ideas that assist individuals in understanding the world around them," in other words, it was the first museum or the first collection of precedents (Pitman, 1999, p. 2). Inspiration is usually associated with the beginning of any project or idea; it is part of the gestation or conception period of design and it is in this initial phase that the imagination is primed and educated setting the path for discovery (See Figures 2 and 3).

Without either stimulation, or external images, the imagination would be limited to its own internal boundaries, unable to erupt into the endless possibilities each image could contain. The ability to refine the numerous images that nourish the imagination is paramount, without them ideas become forever bound in a static interpretation. The Greeks again, in their many myths and moral stories, allude to the concept of over-nourishment and over-indulgence. Specifically, the story of the god Trophonius can be used as a defining metaphor (Barthell, 1971, p. 80). Trophonius, with his brother Agamedes, built sanctuaries for gods and palaces for the aristocracy of the Greek society. On one project, the brothers laid a false stone on the external wall allowing them access to the treasury they designed. They stole gold and other valuables from the vault much to the confusion of the vault's owner. However, their endeavors came to an end when the traps were placed on the treasure itself, capturing Agamedes. Trophonius, to avoid detection, decapitated his brother and fled the site only to be swallowed by the earth at the place where his oracle later functioned. Trophonius' over-indulgence and general lack of restraint parallels this the idea of sensory overload and over-nourishment of the imagination. When Trophonius became an eternal oracle, reality existed no more - just as when one becomes overwhelmed by images and unable to refine them, they become lost in a multitude of diverse impressions. The moral, of course, pertaining to the imagination, is the importance of controlling the nourishment of the

imagination, refining what is necessary and eliminating what is not in order to gain full potential. However, in order to restrain this nourishment, a *eureka* moment, or a spark of the imagination acting as a limit to the never-ending precedents, is often required.



Figure 2: A Ryerson University Graduate Student sketching in Turkey (Source: Authors).



Figure 3: Ryerson University Graduate Students studying architectural precedents in Istanbul (Source: Authors).

Foreign Office Architects, a firm that had offices both in Barcelona and London before splitting to create two separate firms, created a modern version of priming *eureka* or igniting the spark. As their firm name suggested, they approached projects with a foreign perspective, allowing the local relationships and connections of a particular project to become more visible. In an era defined by globalization they argued that they long for something to identify with, something that “references

place, landscape and history ... without veering towards the kitsch of 1980's post-modernism" or something that "distills the character [and] crystallizes the ambience" (Design Museum and British Council, 2006). With each building denoting a set of particular characteristics, the firm created their own typology of projects with an emphasis on contextual design factors rather than a universal building type. Like Archimedes, they advocated their inspiration to more contextual factors while at the same time adding their own 'unintended' vision, gained experience, and the set of characteristics that fit to the project. Their pre-*eureka* process was a limited mix of foreignness, sublimity, contextualism and ultimately the unending search for identity and an escape from this "modern condition" of globalization (Design Museum and British Council, 2006). As partner Zaera Polo stated, "we want our architecture to be like entering a piece of music ... Music is about spatializing and distributing forms. It surrounds you" (Design Museum and British Council, 2006).

In regards to inspiration, Polo's metaphor can act as a near perfect definition. Precedents can surround, immerse and overwhelm human experience with endless ideas. They are what the museum encapsulates, the source of genius and the onset of discovery. However, just as a piece of music concludes so too must the precedents. Without limiting the nourishment to allow the growth of an idea, the architectural process will never come to a conclusion and design will likely never come to fruition.

### SPARK

The remarkable moment when Archimedes lowered his body into the bath, he felt a unique example of imagination that may be compared to a *spark*. In this moment, he realized that a particularly difficult problem connected with a thought about a possible solution. After a long period of contemplation, in a quiet moment or when the mind is at rest, this connection appears to arrive 'all at once' (Casey, 1976, p. 66). Vitruvius' story about Archimedes is an analogy to help understand a crossing point where discordant ideas find a logical relationship. The concept manifested in Archimedes' mind required much prior contemplation. The aftermath of this process is equally important. After conception of an idea, application transforms it into practical usage requiring determination and skill. The two sides may resemble a chiasmus – where the point of crossing is the spark (Weiner and Simpson, 1971). This syntactic inversion, or reflection, can be viewed as a rhetorical inversion of the second of two parallel structures, a crisscross arrangement – with pre-spark dominating one side, the post-spark dominating the other, and the middle marking the moment of *eureka*.

Again, two of Edward Casey's descriptions of imagination can be understood here - spontaneity and controlledness (Casey, 1976, p. 87-102). Considering the story of Archimedes, spontaneity was critical to this inspiration but humans find difficulty imagining anything totally new. The imaginative images conceived by humans are usually a combination of things formally seen or transformations of things once comprehended – they relate specifically to a set of precedents already in the mind (Casey, 1976). When Archimedes "discovered" a method to measure the volume of gold through displacement, he was pondering possible solutions over a period of time. Although it appeared to be a flash of inspiration, this realization actually brought together a myriad of possibilities and his mind chose the most possible. Comparing himself to the volume of gold, Archimedes' mind reached the crossing point, the chiasmus, before stepping to the other side.

Architects experience this moment of understanding when everything they have been considering becomes clear. In keeping with myths as analogies to explain specific phenomenon, consider the example of the Greek god Hermes. Hermes was the messenger of the gods, and the inventor of fire. He exists as a parallel to Prometheus and originates from the Greek *herma*, a boundary stone or crossing point (Avery, 1972, p. 273). He was the god of roads and doorways and as an analogy to *transition*, the moment of inspiration transitions from the previous state of confusion to a state of understanding. Hermes was known for his excellent communication skills and the *eureka* moment may be the point of clear understanding equated to articulation. Once

the spark is realized, it assumes a new dimension, and returning to a previous time is impossible. Italo Calvino describes this inspiration when he writes;

*The imagination is a kind of electronic machine that takes account of all possible combinations and chooses the ones that are appropriate to a particular purpose, or are simply the most interesting, pleasing or amusing* (1988, p. 91).

Architects can identify with Hermes since he presided over things that required skill and dexterity. Furthermore, Hermes, as the root of hermeneutics, is also known as the “father of alchemy.” As a scientific discipline, alchemy is seen by some as an epistemological approach to change the state of materials, and by others as an opportunity to search for meaning in the obscure or ambiguous. As a search for truth it is derived from the Old French, and Arabic, “the art of transformation” (Fabricius, 1976). Although never achieving the goal of gold from various metals, the alchemists used the process as mystical or meditative opportunities. Long hours after staring into the smoking tort or inhaling the fumes, the transformation came in the form of meditation. The contemplative process allowed the mind to wander and thus relax, opening up to the possibility of *eureka*. Calvino, speaking in this context, suggests that imagination is “... aimed at tracing the lightening flashes of the mental circuits that capture and link points distant from each other in space and time” (1988, p. 48).



Figure 4: Janus, the Roman god of beginnings and transitions  
(Source: -- Copyright: Bettmann/Corbis).

With this moment of inspiration and the cross-over from the pre-spark to the synthesis and dissemination of knowledge, there is yet another related ancient allegory: the Roman god Janus (See Figure 6). Janus, the god of doorways, passages, gates and bridges, is usually depicted with two faces looking in opposite directions (Bulfinch, 1942, p. 12-13). He developed into a god of all “beginnings,” and guarded crossing places and thresholds, beginnings and endings and

acted as an intermediary between the gods and mortals. When looking opposite directions, Janus accentuates the crossing between the pre and the post and, in this way, is similar to Hermes in the sense of transition. Allowing a view of the past and the future simultaneously, this threshold may be the place of understanding and true illumination, being a privileged position it is ultimate knowledge. The symmetrical aspects of the X, recognizes equally the value of the Muses' influence and also the refinement and applications that follow the moment of inspiration.

Architects have long been given credit for their creative imaginations. Frank Gehry provides an example of a contemporary architect who relies on this momentary recognition of inspiration in his design process (Gehry, Chan, and Webb, 2004). Employing a unique design methodology, Gehry manipulates materials through tearing and assembling strips of cardboard and paper until the correct (most plausible, beautiful or logical) solution occurs to him. With a conceptual approach in mind, he observes as the folded paper is applied to a model (See Figure 7). Through the seemingly random placement of form, he quickly assesses (and compares to an idea in his mind's eye) the shapes before him. During this process he remains alert to the discovery of an appropriate solution, very much like Archimedes' quick observation at the baths. His mind draws conclusions about the proposal with quick connections (and comparison) to the client's needs, program, site and context. This occurs while he evaluates the aesthetic qualities of the form. He watches for the visual stimulus of an order system, or composition, that is appropriate to the commission being explored at any given time. This process may be likened to the ancient caduceus originally known as the "enchanter's wand" (magic), carried by Hermes. Historically the caduceus was a symbol of enlightenment and acquisition of the ancient wisdom. Thus, metaphorically, Gehry conjures Hermes' magic wand to locate the inspiration as the torn paper models speak to him as a muse. Comparable to the allegory of Archimedes, Gehry creates a scenario that keeps the "problem" in mind while he can be open to accept the spark of the imagination.



Figure 5: Frank Gehry at work in his design studio  
 (Source: -- Copyright: Douglas Kirkland/Corbis Art).

## POST-SPARK

The post-spark describes the phase when an idea becomes a tangible reality. It captures the potentiality of ideas and consideration of precedent of the pre-spark while exposing the spark and *eureka* moment itself; it is the process that initiates design development, the other side of the X, and the second face of Janus. With the mind already filled with precedents and enlightened with

the *eureka* moment, the post spark has fulfilled the steps needed to develop something tangible. This post-*eureka* phase of the imagination relates to Archimedes' experiments with the weight of silver and gold. His observation of the water displaced by his own volume at the baths, his *eureka* moment, was translated to this experiment and ultimately discovered the crime of the contractor. Without this phase, *eureka* moments would never become recognized. Equally, without the development stages an idea can never be realized.

Ancient Greek mythology provides yet another analogy to describe aspects of the imagination: the post-spark and Daedalus as the prototypical mythical Greek architect (Perez-Gomez, 1985, p.49) (See Figure 8). As Francoise Frontisi-Ducroux explains, "he was an Athenian and son or grandson of Metion, Daedalus was a man who had been endowed with 'metis,' a kind of practical intelligence and ingenuity which could be deployed in many ways but was mostly associated with the wisdom of craftsmanship in the Athenian tradition" (Frontisi-Ducroux, 1975, p. 90). It is this practical intelligence, inventive creativity and his method of translating the imagined to the real, that make him a perfect example of the third and final stage of *eureka*, the post spark. Daedalus acts to explain how the mind has been nourished with ideas, reconciled to a solution, making it prepared to develop this solution. Frontisi-Ducroux tells us that he was more than an architect, even stretching the limits of the term to involve an engineering perspective (Frontisi-Ducroux, 1975, p. 90). His projects became greater than simple fabrication – they approached the mystery of the divine.

The name Daedalus has been suggested by Alberto Perez-Gomez to be a play on the word *daidala* which appears in archaic literature as a complement of the verb to make, manufacture, to forge, to weave, to place on, or to see. *Daidala* were the implements of early society: defensive works, arms, furniture, and so forth. It is in the post-*eureka* stage that ideas become manufactured and visible, as Perez-Gomez writes, "the *daidala* in Homer seem to possess mysterious powers. They are luminous--they reveal the reality they represent. It is a metaphysical 'light' of diverse and often bizarre qualities, evoking fear and admiration" (Perez-Gomez, 1985, p. 50). The principal value of *daidala* is that of enabling inanimate matter to become magically alive, of 'reproducing' life rather than 'representing' it. The more primitive Homeric texts emphasize the ability of the *daidalos* to seem alive" (Perez-Gomez, 1985, p. 50). Certainly Daedalus can be linked to the *daidala* through his automata such as lifelike statues, machine-like bull (which he built for Queen Pasiphae), his wax-and-feather flying machine and finally his labyrinth at Knossos. Daedalus' ability to create the machine-like *daidala* placed him in an extremely powerful position in his society as he had the ability to create that the rest of society did not possess. Therefore, the *daidala* can inherently represent the post-spark phase and the ability to make the spark or the *eureka* moment come alive.

Humankind has a basic need to create order from chaos, similar to how the mind focuses from overwhelming sources of images. Daedalus' structure the labyrinth at Knossos serves to explain human's attempt to formulate such an order. It is not important that we know whether Daedalus' labyrinth actually existed, since it is generally accepted that the labyrinth is an analogy for a paradigm. The shared assumption that constitutes a society's attempt to set the standards of order is the 'primordial idea' of architecture. Perez-Gomez writes, "the labyrinth is a metaphor of human existence: ever-changing, full of surprise, uncertain, conveying the impression of disorder" (Perez-Gomez, 1985, p. 51). Unfortunately, since Daedalus was considered by the classical Greeks to be simply an uneducated craftsman, this degree of influence may have been somewhat unsettling to some. Perez-Gomez believes that Daedalus can be seen as an architect-craftsman of ambiguous character. He writes,

*He [Daedalus] opened the statue's eyes to reveal the divinity of the gods, but he also concealed a monster within a labyrinth and a deceptive woman in a machine of leather and wood. The craftsman creates form and beauty, but also illusions. In giving form and meaning to matter, art is also in danger of*

*falsifying the divine truth. This ambiguity, which is a part of the human condition, is as prevalent now as it was then (Perez-Gomez, 1985, p. 52).*

In classical Greek society, Daedalus was seen as a demiurge, a subordinate god who fashions the sensible world in the light of external ideas. Daedalus fashioned his *daidala* (machines) through manufacturing or fabrication, with the understanding and inspiration he gained from priming the spark, he found his *eureka* moment and constructed it. He manufactured the labyrinth to demonstrate the chaotic warnings of the monster, as a way to make the divine tangible and the imagined real.

The global engineering firm Ove Arup and Partners presents a modern example of Daedalus' qualities and of the third stage of Archimedes' creative inspiration. Known to work collaboratively with architects and urban planners, the firm exemplifies the ability to transform a creative idea into a buildable structure. Compared to the allegory told by Archimedes, the gestation of the imagination brings forth the momentary spark of logical connections. Following this inspiration, Archimedes then communicated and implemented his discovery. This action of making is as valuable as the idea itself, as architects run the risk of appearing impotent if their ideas remain unbuilt (Tafuri, 1978, p. 26-90). Ove Arup specializes in providing the structure expertise to assist in assuring unusual architectural designs become constructed, with such buildings as the Sydney Opera House, the London Gherkin, and the China Central Television Building (See Figure 9). Similar to Daedalus, Ove Arup manufactures the form often seen as an impossible illusion. This potential opportunity for falsity supports their abilities to bring fantastic architecture to fruition.



Figure 6: CCTV Building in Beijing, China  
 (Source: Photo Courtesy of Sam Luong).

The word 'design' is often misunderstood to mean the creative inspiration, but 'design' is first and foremost a process, one of uniting an idea with the function, economy of materials, proportional composition, efficiency and all other aspects of the design process. This combination is

reminiscent of Vitruvius and his important adage, Strength, Utility, and Grace, a truly unified and comprehensive solution (Vitruvius, 2004, p. 35). This ability to locate order out of chaos, associated with manual dexterity and the fabrication of the completed building, may be compared to a machine that brings order to the interconnected moving parts that multiply human might. The analogy of Archimedes may not be relevant without the practical lesson of implementation.

## CONCLUSION

Architects might question who or what act as contemporary Muses, how they themselves are seen as Janus-like characters with both an eye to the past and to the present, and how Daedalus' ancient actions reverberate their own. In this sense, what has changed about the design process? Or have architects simply applied the same rules century after century, adjusting where necessary, subconsciously impacted by the spirit of the time. Do today's *starchitects* look inwardly or externally to locate inspiration? Frank Gehry finds his muse in the participatory process of material manipulation, Peter Zumthor or Steven Holl linger in more phenomenological beginnings and attempt to evoke emotional response from space while firms such as the Japanese group SANAA attempt to evade architecture's presence in the environment at all. More often than not, architects will find imaginative connections in the societal or sustainable realm, in the limitations of site, in the push and pull of cultural demand, in the ideas that resonate within a people, and in their ability to impact it. As Jeremy Till describes in his book *Architecture Depends*, "architecture is thus shaped more by external conditions than by the internal processes of the architect... [it is] defined by its very contingency, by its very uncertainty in the face of these outside forces" (2009, p. 1). Are Till's external conditions, then, not shaped by imagination similar to Archimedes famous bath?

In the 1980's Richard Kearney wrote about the pervasive image of postmodern culture in his book *The Wake of the Imagination*. His thesis focused on the massive influx of images of contemporary media and how they became dependent upon representation so much so that culture reflected itself, endangering imagination. If this condition still resonates today, how can architects function, and expect to be original? As with Archimedes, the combination of previous impressions is not necessarily a bad thing. But can architects focus on meaning in their intention and avoid over stimulation? They must recognize the importance of controlling stimulation of the imagination by refining what is necessary and eliminating what is not. With contemporary concerns about globalization, environmental impact, and urban cultures architects should look both forward to the future and back to the foundations of precedent – they must act as a contemporary Janus.

Recognizing that imagination occurs in many stages of the design process, like Daedalus, architects must continue to explore and discover its potential. It is important to keep the main concepts in mind while being open to new inspiration, to continually develop and discover. Not every architectural practice can, or desires to, emulate Renzo Piano's Workshop where material properties are explored and details are intensely conceived or the model-based studio of Tod Williams Billie Tsien. How can architects retain the act of implementation so that it can continue to be a critical part of design?

In contemporary architects' return to imagination, can spaces find new inspiration; can these spaces come alive for their inhabitants like they once did in the minds of the architects who conceived of them? We might question if architects are losing dexterity and the skills of a craftsman. This does not mean that architects must pick up hammers and chisels, but rather engage in the 'dexterity' of crafting spaces of imagination and inspiration using light, color and experience. Where it may be easy to design high-rise towers that need to be resolved by structural engineers, architects may be losing opportunities to utilize imagination throughout the process. We may be at risk of cutting the imagination out of the process of design entirely – especially in the commercialized world that we currently exist within. However, if, like Archimedes, we allow our imaginations to possess a *eureka* moment, then we may salvage the remnants of an imaginative architectural mind. If the architect can embrace this world, this

commercialized, consumerist context, and bring with them their imagination as just another tool that allows them the ability to envision buildings and spaces, whether they are Gehry-esque or Zumthor-ian, then they can continue to positively impact the built environment.

## REFERENCES

- Avery, C. B. (Ed.). (1972). *New Century Reference Book, The New Century Handbook of Greek Mythology and Legend*. New York: Appleton-Century-Crofts.
- Barthell, E.E. (1971). *Gods and Goddesses of Ancient Greece*. Coral Gables: University of Miami Press.
- Beardsley, M. C. (1966). *Aesthetics from Classical Greece to the Present: a Short History*. Alabama: The University of Alabama Press.
- Bulfinch, T. (1942). *The Age of Fable or The Beauties of Mythology*. New York: The Heritage Press.
- Byron, G. (1936). *Childe Harold's Pilgrimage and Other Romantic Poems*. R. Shafter, (Ed.) . New York: The Odyssey Press.
- Calvino, I. (1988). *Six Memos for the Next Millennium*. Cambridge: Harvard University Press.
- Casey, E.S. (1976). *Imagining: A Phenomenological Study*. Bloomington: Indiana University Press.
- Design Museum and British Council. (2009, 9 March). "Foreign Office Architects." Design Museum, 2006, Retrieved from <http://designmuseum.org/design/foreign-office-architects>
- Fabricius, J. (1976). *Alchemy*. Copenhagen: Rosenkilde and Bragges.
- Fitton Brown, A.D. (1961, March). Muses on Pindos, *Greece & Rome*, 8(1) 22-26.
- Frantisi-Ducroux, F. (1975). *Dedale: mythologie de l'artisan en Grece ancienne*. Paris: F.Maspero, 1975.
- Gadamer, H. (1975). *Truth and Method*. New York: The Seabury Press.
- Gehry, F. O., Chan, E. and C. Webb. (2004). *Imagining: Gehry Draws*. Cambridge: MIT Press.
- Groat, L. and Wang, D. (2001) *Architectural Research Methods*. New York: Wiley.
- Oevermann, U., Tilman, A., Konau, E., and J.Krambeck, (1987). "Structures of Meaning a Hermeneutics" in V. Meja, D. Misgeld, and N. Stehr (Eds.) *Modern German Sociology, European Perspectives: a Series in Social Thought and Cultural Criticism* (pp. 436–447). New York: Columbia University Press.
- Perez-Gomez, A. (1985, Autumn). The Myth of Daedalus. *AA Files* ,10, 49-52.
- Pitman, B. (1999, Summer). Muses, Museums, and Memories. *Daedalus*, 128(3), 1-31.
- Reeves, B. and Nass, C. (2003). *The Media Equation: How People Treat Computers, Television and New Media Like Real People and Places*. Stanford,: Center for the Study of Language and Information, Stanford University.
- Ricoeur, P. (2004). *Memory, History, Forgetting* (Kathleen Blamey & David Pellauer, Trans.). Chicago: University of Chicago Press.
- Ricoeur, P. (1991). *From Text to Action: Essays in Hermeneutics II* (Kathleen Blamey & David Pellauer, Trans.). Evanston, Ill: Northwestern University Press.
- Snodgrass, A. and Coyne, R. (2006). *Interpretation in Architecture: Design as a Way of Thinking*. New York: Routledge.
- Soukhanov, A.H. (1984). *Webster's II New Riverside University Dictionary*. Boston, Massachusetts: Houghton Mifflin Company.

Tafuri, M. (1978). *The Sphere and the Labyrinth: Avant-Garde and Architecture from Piranesi to the 1970's*. Cambridge: MIT Press, 1978.

Till, J. (2009). *Architecture Depends*. Cambridge, MIT.

Vitruvius (2004). *On Architecture: Books I-V, VI-X*. (Frank Granger, Trans.) Cambridge: Harvard University Press.

Warnock, M. (1976). *Imagination*. Berkeley and Los Angeles, California: University of California Press.

Weiner, E. S.C. and Simpson, J.A. (1971). *The Compact Edition of the Oxford English Dictionary*. Oxford: Oxford University Press.

---

**Authors:****Kendra Schank Smith, Ph.D.**

Associate Professor  
Department of Architectural Science  
Ryerson University  
[kssmith@ryerson.ca](mailto:kssmith@ryerson.ca)

**Albert C. Smith, Ph.D.**

Associate Professor  
Department of Architectural Science  
Ryerson University  
[acsmith@ryerson.ca](mailto:acsmith@ryerson.ca)

**Jessica Stanford**

Graduate Student  
Department of Architectural Science  
Ryerson University  
[jessica.stanford@ryerson.ca](mailto:jessica.stanford@ryerson.ca)