Towards a Semantic Ontology: Creating meaningful Architecture from inert materials

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Abstract: Architecture is a discipline, where form is given to ideas of inhabitation, and to building materials and structures that make the inhabitation possible. In the tradition of Aristotle and Aquinas, the soul of a work of Architecture is postulated as the animating principle that enjoins matter and form in its design. This article presents an articulation of this animating principle. It describes a Semantic Ontology that explains existence, being, becoming, and reality in Architecture, in terms of meaning. Meaning is used in Semantic Ontology as a primary ontological category to address these four aspects of Being. The trajectory towards a Semantic Ontology is the quest for the soul of Architecture, the soul which unites and animates matter and form in Architecture.

Keywords: hylomorphism, semantic ontology, affordance, architectural Being, act, potency, architectural Meaning

Introduction
The aim of this article is to lay out a trajectory of thinking that articulates an ontological exploration of the creation of works of Architecture. This ontological exploration is called a Semantic Ontology. What is a Semantic Ontology? A Semantic Ontology is a theory within Ontology, which is an area of study that focuses on Being. A Semantic Ontology seeks to explain existence, being, becoming and reality in terms of meaning.

These four aspects are articulated as follows:

- Something exists if it creates a presence in consciousness. This presence is enabled by the thing’s
figural qualities. A figural quality is one that enables a figure to stand out against a background, because of the figure-ground phenomenon present in all human perceptions. In a Semantic Ontology this figural quality is generated by meaning.

- This meaning constitutes the thing’s being whether it is material or immaterial. Meaning is the primary ontological category that defines the thing.
- In a Semantic Ontology a thing transforms and changes primarily in its meaning. It ‘becomes’ in its meaning and can ‘become’ to mean something else.
- In a Semantic Ontology, reality is to be perceived and interacted with, in the realm of meaning.

Meaning is used in Semantic Ontology as a primary ontological category to address these four aspects of Being.

**Hylomorphism and creating architecture from ‘blueprints’**
In the cultural practice of the profession of Architecture, a work of Architecture is created by first creating a set of representations (which may be graphical, numerical, and verbal) that constitute the ‘blueprints’ for a building. Then an inordinate amount of effort, coordination and legal enforcement is applied to ensure that the work of Architecture being created ‘conforms’ to the ‘blueprint.’ There is a premium placed on the ‘fidelity’ of this process that is often contentious amongst the stakeholders involved. This is fully in line with the Aristotelian concept of ‘hylomorphism’ (matter made to ‘conform’ to a form) and has survived intact in the cultural practice of Architecture, the profession.

From the potential of all the forms that a work of Architecture can take, it is actualized by utilizing a particular set of forms designed by the architect(s) of the work of Architecture.
According to the four causes attributed to any ‘thing’ by Aristotle, which are the material cause, the formal cause, the efficient cause and the final cause, the material cause of a work of Architecture is its raw building materials; the formal cause is the set of design representations of the work of Architecture created by the architect; the efficient cause of the work of Architecture is its construction process; and its final cause is its purpose, which I am proposing, through the concept of a Semantic Ontology, is a primary ontological category of meaning. This ontological category of meaning is the basis of the ‘being’ of a work of Architecture (considered in all the four aspects mentioned before: existence, being, becoming and reality), much as the final cause of Aristotle is the driver of all the other three causes. It is curious, however, that in Architecture, this final cause can mutate in the adaptive re-use of buildings that changes the building’s purpose from one purpose to another. This is discussed in a later section.

Hierarchies of act and potency in Architecture
Here the concepts of act and potency follow from what was explicated by Thomas Aquinas based on the works of Aristotle. According to Edward Feser:

[I]n addition to the different ways in which a thing may be “in act” or actual, there are the various ways in which it may be “in potency” or potential. (Feser, 2009, p. 21)

So, as Aquinas says, “potency does not raise itself to act; it must be raised to act by something that is in act” (SCG I.16.3: Feser, 2009, p. 23). In the case of a work of Architecture, the architectural form is that which is “in act” (in the words of Aquinas). Therefore, the architectural form, and its implementing technologies, are what are instrumental in actualizing a particular potential.

Feser further asserts: it is not for nothing that the first of the famous Twenty Four Thomistic Theses has it that: “Potency and Act divide being in such a way that whatever is, is either pure act, or of necessity it is composed of potency and act as primary and intrinsic principles.” (Feser, 2009, p. 24)
In a finer-grained analysis, an architectural design is created and utilized through a series of actualizations of potentials into a particular design.

First, there is the potency of the substances of building materials that are actualized by the act of the architect, who gives the substances, form through design. Then there is the potency of technology, when the substances are made to ‘conform’ to the forms. The act creates the actual form of the building materials. Then there is the potency of the assembly of the building materials into constructions or structures. The act creates the form of a building. Then there is the potency of the different ways in which the building can be used based on its affordances (Gibson, 2014). The act is the specific way in which the building is used. Then there is the potency of the building to fall into ruin in many ways. The act is how the building specifically falls into ruin.

From inception to ruin, a work of Architecture follows this course of actualizations of potentials.

**The hierarchy of being in Architecture**

In a Semantic Ontology, as applied to Architecture, the ‘being’ of any architectural component is not an isolated ontological category. The ‘being’ is a composite hierarchy of different levels of ‘being.’

The ‘being’ of ‘clay’ and ‘sand’ is subservient to the ‘being’ of a ‘brick’. The ‘being’ of a ‘brick’ is subservient to the ‘being’ of a ‘wall’. The ‘being’ of a ‘wall’ is subservient to the ‘being’ of the ‘feeling of security.’ This hierarchy of a Semantic Ontology in the experience of ‘shelter’ proceeds backwards from the final teleological experience of ‘being’ as a ‘feeling of security’ to the more basic ‘beings’ of ‘clay’ and ‘sand.’

**From Meaning to Matter**

In a Semantic Ontology, matter acquires meaning through a hierarchical progression from a meaningful intent to a physical form in the creation of a work of Architecture. This progression is realized by a reversed tracing from the physical form of matter to the meaningful intent at its inception.
The following graphic illustrates how this progression evolves through this reversed tracing.

**Figure 1: The hierarchy of transformation from meaningful intent to a particular form of matter in a reversed tracing.**

This hierarchy can be described through a scenario. Let us say you begin with ‘a desire to sit,’ which is a meaningful intention. Then you seek all the ‘places’ that afford the experience of sitting, such as a garden ledge or a windowsill (Gibson, 2014). By studying these ‘places,’ you derive what these places have in common, a functional set of forms that comprise a ‘seat’ and a ‘backrest.’ From these functional forms, you generate the design for a ‘chair’ - the form (described using geometry and numbers) that the physical matter that the chair will be made of, will take. You then build a ‘chair,’ using a physical matter of choice, say wood. The wooden chair has now proceeded to gain existence, from a meaningful intent to a form of matter, in an ontological chain of ‘being.’

**Adaptive reuse in Architecture and changing ‘beings’ of buildings**

In Architecture, a building is created for a purpose. This purpose often determines what the building is used for, by the inhabitants. Take this scenario, for example. A shopping mall that was initially designed as a center of commerce for buying and selling goods and services falls into disrepair and is repurposed through an adaptive reuse project into a medical facility for the community. When this happens, its ‘being’ has changed. This change has happened in the domain of meaning. Its ontology has changed. The physical materials that made up the original shopping mall become the community healthcare facility. Nothing has changed in one aspect of its Ontology (the physical), and everything has changed in its Semantic Ontology (the meaning).
Unchanging ontological properties of materials

The materials of the universe exist. Can their existence be described in terms of unchanging being? Their existence can be described using geometry and numbers in their role as *res extensa*, the aspects of their existence as extensions, presumably in space that distends to accommodate them. This may be an unchanging realm of Ontology. It is also, more importantly, a realm of agreement. Humans can come to an agreement in the realms of geometry and numbers more unequivocally than in the realm of meaning. Materials of the universe can also be described as qualia, the sensations they evoke in perceiving subjects. This aspect of Ontology can change but be consistent as a pattern. But the realm of cultural value demands that we describe them as symbols of meaning. For example, the letter ‘S’ can be described in terms of the geometry of the font and its dimensions as numbers. It can also be described in terms of the qualia it evokes, the color black. However, its cultural utility is as a symbol of meaning in a language system. This is the most fluid of a material’s ontological existence.

Semantic Existence

*Figure 2. A minimalist vase (Photo credit: Karolina Grabowska)*
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The existence of the thing shown in the image in Figure 2 can be described in terms of:

- geometrical features that are distended in a metric space of numbers as its dimensions
- qualia of the color and texture sensations that the thing produces
- or as a semantic entity – a minimalist ‘vase’

This last form of existence – a semantic existence, is the crucial one in the realm of cultural value.

Making Semantically

![Figure 3. A stone wall in vernacular architecture. (Photo credit: Pexels.com)](image)

Each stone in the wall in the photo in Figure 3 is not seen as a geometric entity that must conform to a pre-determined form, but as a ‘building block’ easily manipulatable by hand that is piled carefully to make a ‘wall.’ The wall emerges from a ‘semantic’ process of piling building blocks to create
a wall and is not a directed activity that forces conformation of matter to a form in the classical sense of hylomorphism. This a typical building process in vernacular architecture that does not use blueprints.

**Figure 4. A thatched hut in vernacular architecture. (Photo credit: Denniz Futalan)**

A more elaborate example of making semantically in vernacular architecture without blueprints can be seen in the photo in Figure 4:

- The thatch roof is meant to cover.
- The braces for the footings are meant to brace.
- The thatch panels are woven to make a sheet.
- The thatch panels are meant to close the window openings.
- The long pole is meant to brace the wall and roof.
- The pots are meant to protect the feet of the stilts from the wet ground.
- The stilts are meant to raise the floor off the ground.
All these meaningful intents are realized directly through the making of the structure without any recourse to a preceding blueprint.

**Creation of a meaningful architecture**

Architects take inert building materials and make symbols of meaning from them. They determine the geometry and dimensions of the building materials and their spatial arrangement. They also set the qualia that these building materials evoke, inherent in the choice of particular materials. The aspect of the architectural creation’s existence that seems associative and extraneous, is its role as a symbol of meaning. How can this aspect be made intrinsic? This is a significant problem because meaning has always been considered associative and not intrinsic. For that matter, are geometrical and numerical properties which exist in an unchanging realm (the primary properties of John Locke) intrinsic? It would seem so intuitively, only until you realize that the geometry and numbers of this unchanging realm can disintegrate in the process of ruin.

**Questions that arise from the framework of Semantic Ontology**

To conclude this article, here are a set of questions to ponder that further articulates the trajectory towards a Semantic Ontology for the creation of works of Architecture:

- **How do you create a specific symbol of meaning from inert materials?**
  
  This is wide open to possibilities. Matter can be made to conform to myriads of forms, essentially restricted only by the properties of the matter used and the technologies available to make matter ‘conform’ to the forms. These forms can be associated with multiple meanings based on how the forms respond to meaningful intent.

- **Is the process any deeper than arbitrary associations or transient cultural conventions?**
  
  The process of integrating meaning with matter can go deeper than association or arbitrary conventions, if the generation of the forms that the matter ‘conforms’ to is based on semantics and not technical
manipulations of geometry and numbers. The manipulations of form through geometry and numbers have gained a strong foothold in the creation of works of Architecture because of their implementation in computational technologies. A method to manipulate form based on semantics is yet to be rigorously developed, even though it exists indirectly as part of the thought process in the manipulations of geometry and numbers.

• Can a semantic ontology supplant a physicalist ontology?

This is a very plausible scenario. A physicalist ontology in Architecture is needed for many reasons. This includes the commerce aspects of Architecture, where economic transactions have their monetization based on quantities; the safety of the works of Architecture, which can be predicted only with numerical calculations, such as the calculation of the stability of a structure; and its implementation in the process of building, where quantities of materials and labor resources play a crucial role. A work of Architecture is managed and implemented as a configuration of matter using quantities to a large extent, which are a legacy of the physicalist ontology.

• What are the problems associated with understanding an ontology from the point of view of semantics?

The main problem associated with a Semantic Ontology is persistence, and resistance to change, in the ontological entities, in this case, the architectural components and the whole work of architecture. A constantly changing realm of meaning allows the ‘being’ of a work of Architecture to be continuously transformed, raising many contentious situations along the way.

• Can Architecture be valued in the cultural realm primarily as a semantic commodity?
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This is an exciting alternative to estimating the value of a building in terms of elements of a physicalist ontology, such as the square feet of rentable space in the building. As with any cultural process that involves politics and administration, valuation based on a semantic ontology can lead to a lot of strife.

• Can the making of Architecture be guided by semantics in an instrumental way?

This trajectory is what this article aims at - how can you create architectural elements through a process of semantic articulation and actualization. How can existence, being, becoming and reality be considered in a realm of meaning during the process of creating a work of Architecture? This seems like a new quest for architects and much work remains to be done. However, there is promise in that rich lessons on how to do this are already available in vernacular architecture.

The trajectory towards a semantic ontology is the quest for the soul of Architecture, the soul which unites and animates matter and form in Architecture.

References

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1 The perception of our environments based on what they afford to our intentions was articulated by the renowned psychologist James J. Gibson.