

Turing Algorithms in Art

Arnold Cusmariu

Abstract: Exemplifying with sculptures the author created, the article shows that ontological algorithms can yield aesthetic content, while epistemological algorithms can capture it. Bridging the gap between art and logic creates new and exciting aesthetic opportunities, allaying Henry Moore's fears of 'paralysis by analysis.' On the flip side, appreciating all that algorithmic art has to offer poses intellectual challenges that run counter to subjectivist approaches to art and its education.

Keywords: sculpture, aesthetic content, aesthetic properties, Turing algorithms, sense-data, awareness categories, interpretation, mereology.

Background

Familiar definitions of 'abstract' and 'figurative' would classify my sculpture *Counterpoint A22* abstract and Wittgenstein's *Head of a Girl* figurative [Cusmariu 2022].



Cusmariu: *Counterpoint A22*, 2019
Alabaster on mahogany and marble
16.5 inches high



Wittgenstein: *Head of a Girl*, 1925-28
Fired clay
15.5 inches high

Head of a Girl is the only sculpture Wittgenstein is known to have produced. Quite possibly, however, he may have made others but were lost or destroyed. There is no evidence either way. Accordingly, we can only speculate whether sculptures he might have made after *Head of a Girl* would also have been figurative. After all, it is possible to start out working in one style and then stick with it, which

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is true of every major artist in the history of sculpture before the twentieth century and even after in quite a few cases. Stylistic changes amounting to a paradigm shift, such as a move from figurative to abstract, are very difficult to bring off, especially if the artist already has a financially successful market niche, a personally rewarding style, and sees no need to 'move on.' On the other hand, considering that Wittgenstein was a great innovator in philosophy, perhaps *Head of a Girl* would have been only a stepping stone to quasi-figurative sculpture, followed by a progression of sculptures all the way to full abstraction. Alas, we will never know.

These are not idle speculations. I am hypothesizing by way of preamble to the key consideration of this article, namely, an analysis of my own progression of styles over the years from figurative to quasi-figurative to abstract and beyond.

I am having to function as my own art critic for a number of reasons. Though my work has been on display in public exhibits, including juried exhibits, this was a while ago. None received media coverage. An article about my sculptures appeared in the Northern Virginia *Reston Connection* in 2000 but only early work was discussed and gave no hint of what was to come. Finally, the analysis below makes clear that my most innovative sculptures were made possible thanks to expertise in technical concepts of logic and philosophy. Art critics do not have this kind of training and are probably hostile to the very idea of such applications.

Question

Is there an analytic approach that can explain key properties of sculptures across the entire spectrum of my output from 1985 to 2023, including its evolutionary path? For instance, can an explanation account for *Study in Motion* (1985) and *Counterpoint A20* (2019), as well as the evolutionary path from one to the other and beyond that occurred over decades of artistic development?



Answer

Turing-type algorithms can solve this problem.

Turing Machines

The term “Turing machine” was coined not by Turing himself but rather by Alonzo Church (Church 1937: 42) in his review of Turing 1936. (Turing got his PhD at Princeton under Church in 1938.)

The author [Turing] proposes as a criterion that an infinite sequence of digits 0 and 1 be ‘computable’ that it shall be possible to devise a computing machine, occupying a finite space and with working parts of finite size, which with write down the sequence to any number of terms if allowed to run for a sufficiently long time. As a matter of convenience certain further restrictions are imposed in the character of the machine, but these are of such a nature as to cause no obvious loss of generality – in particular, a human calculator, provided with pencil and paper and specific instructions, can be regarded as a kind of Turing machine.

For example, ‘specific instructions’ exist for building a truth table, filling in its columns with truth-values, and then determining ‘with pencil and paper’ the truth-value of logically complex sentences based on standard truth-table definitions of logical connectives. Thus, truth tables are an effective method for determining whether a well-formed formula (wff) of the propositional calculus (PC), x , is or is not a tautology in PC. Truth tables can compute in a finite sequence of steps the values of a function F of PC whose domain is the set of formulas of PC and whose value for any given wff x , written $F(x)$, is 1 or 0 according to whether x is, or is not, a tautology. Thus, truth tables (discovered independently by Peirce and Wittgenstein) are an algorithm. Completing a truth table for a wff of PC consisting of ten variables (for example) ‘with pencil and paper’ is impractical and is best left to computers.

Two Algorithms

Computability algorithms in the form of instructions for sequences of 1 and 0 digits, important though they are in mathematics, would not be of interest in art or its interpretation. To be relevant to the context at hand, we need to distinguish between ontological and epistemological algorithms. I will state them first and then explain the concept involved.

Ontological Algorithm (OA): A finite sequence of tasks T applying concepts of phenomenalism or mereology such that if person P were to complete T , P would bring it about that an object exemplifies properties that determine aesthetic content.¹

¹ We should leave open the possibility that non-aesthetic properties can determine aesthetic content.

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OA Comment: T is a lengthy sequence of tasks, identified below for sculpture, completed by the artist.

Epistemological Algorithm (EA): A finite sequence of tasks T such that if person P were to complete T, P would bring it about that P is aware, in a sense to be specified, of properties that determine aesthetic content exemplified as a result of applying concepts of phenomenalism or mereology.

EA Comments: The artist as well as the viewer can complete EA tasks. Standard and non-standard concepts of vision may be involved, explained below.

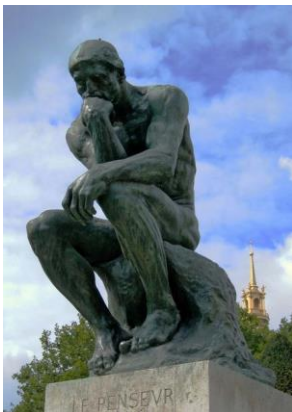
Musical Concepts

Three concepts are relevant: Consonance, dissonance and counterpoint.

Consonance

Standard reference works define consonance in music as combinations of tones that 'create the impression of stability and repose.' Sculptures can be described as consonant in two ways, depending on the kind of inferences that are valid:

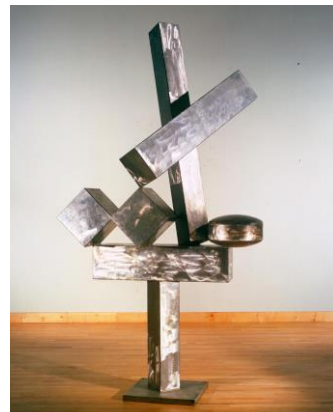
- For any viewing angle V of physical object O, properties of O that are not apparent from V can be inferred from properties of O that are apparent from V. It can be inferred from the fact that only two legs are apparent at V that a chair has two more legs attached the same way. This inference is obviously valid for figurative, quasi-figurative and even abstract sculptures, which are consonant in this sense.
- For any viewing angle V of physical object O, it can be inferred from properties of O apparent from V and from any other viewing angle that they are all properties of the same object. Thus, we can infer that we are looking at the same car as we walk around it checking its features. This inference is also valid for figurative, quasi-figurative and even abstract sculptures, which are consonant in this second sense.²



Rodin



Archipenko



Smith

² Images of famous artworks in this article are used for illustrative purposes only.

Consonant sculptures are, in a sense, 'worldly' physical objects with aesthetic content.

Dissonance

Dissonant sculptures are, in a sense, 'otherworldly' physical objects with aesthetic content.

Dissonant music has been said to use combinations of tones to 'create the impression of tension or clash.' Sculptures can be described as dissonant in two ways as well, depending on which of the above inferences breaks down:

- Properties apparent from one viewing angles cannot be inferred from properties apparent from other viewing angles.
- It cannot be inferred that properties apparent from different viewing angles are properties of the same object.

Here is one of many sculptures of mine, *Nici* (2002), which is dissonant in both senses. Other examples are noted and analyzed below.



Counterpoint

'Counterpoint' is defined as 'the technique of combining two or more melodic lines in such a way that they establish a harmonic relationship while retaining their linear individuality.' It is not paradoxical for an artform that does not have melodic lines to 'combine individual melodic lines to produce a harmonic relationship' because music and sculpture both use algorithms to combine components. (I have used the term 'counterpoint' to entitle many sculptures.)

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- In music, the building blocks are melodic lines and counterpoint is the algorithm by which they are combined to produce harmonic relationships. 'Harmonic' does not entail 'consonant' because counterpoint can also be used to produce dissonance. Mozart supplied an example in his C major String Quartet, K. 465.
- In sculpture, the building blocks are physical components degrees of arc apart or elements of mereological sums or both. Sequences of steps result in the exemplification and awareness of properties that determine aesthetic content.

Vision Relativity

The appearance physical objects present depends on several factors, lighting conditions being the most obvious. Assuming such conditions are standard, the next critical factor is position of the observer with respect to the object, i.e., the angle of vision. To put the point in terms of a philosophical theory called Phenomenalism, sense data associated with a physical object will vary depending on viewing angle. Usually, no matter how many degrees of arc apart, variations in viewing angle do not impact one's ability to recognize, classify, identify or describe the properties of sense data. Vision relativity offers one way of distinguishing two dimensional from three dimensional objects. Sculptures regarding which angle of vision makes no difference are closer to paintings.

Properties

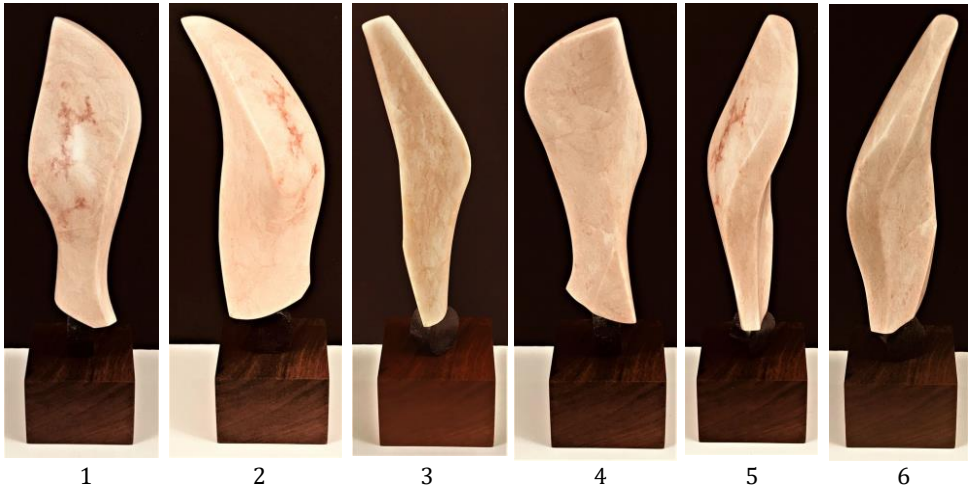
Reference in OA and EA to properties is not mere convenience. I am indeed a Platonist. I hold that there are properties (and relations) whose existence is independent of whether they are exemplified or even exemplifiable. See Cusmariu 1985, 1980, 1979, 1978A, 1978B and 1978C.

It will be helpful to note some properties that will recur in algorithmic analyses below. (Platonists accept properties of any logical complexity):

- *being the F of x and the F of y*: In my sculpture *Counterpoint A1*, shown below, a braid of hair is, and is seen as, a component of two adjoining figures, one larger than the other.
- *being the F of x and the G of y*: A component of a mereologically complex sculpture could be, and seen as, an arm of one component of the sculpture and a leg of a different component.
- Consonance and dissonance properties, which are logically complex, are also included.

Aesthetic Content

A general account of what it means for properties to determine aesthetic content is a book-length subject. The best that I can do here is to explain by example. Here is my *Alar* (2000), analysed later.



Phenomenalism

We should distinguish between ontological and analytical phenomenalism. Ontological phenomenalism (OP) is the view that physical objects are collections of actual and possible sense data. Analytical phenomenalism (AP) is the view that statements about physical objects can be analyzed into statements about sense data. I find OP useful and shall be taking it for granted, setting aside well-known problems with OP. OP does not logically imply AP.

I shall be speaking extensively of views of a sculpture and properties apparent. This will be shorthand for properties of sense-data. If it's not already apparent, the above images of my *Counterpoint A20* and *Counterpoint A22* are only some views of these sculptures. Thus, rotation a few degrees of arc in either direction will reveal other sense data in the collection to which they all belong, with different mereological properties, requiring different interpretations.

Mereology

This is a branch of metaphysics that studies part-whole relationships.³ Of interest here is the concept of mereological sum (MS), understood as a configuration of components that can be apparent horizontally or vertically. The full extent of horizontal MS configurations is evident only if a sculpture is rotated. The idea of a vertical MS occurred to me after starting a new *Counterpoint B* series in 2019. Here is the first sculpture in this series, analyzed below. It looks deceptively simple.

³ See Simons 1987.



Mereological sums fall under Phenomenalism but ‘drill down’ to offer new and potentially interesting aesthetic variations. MSs can be figurative, quasi-figurative, or non-figurative.

Figurative MS

Components are figurative and their configuration likewise corresponds to reality. Michelangelo’s *David* and Rodin’s *Thinker* are figurative MSs, as are virtually all sculptures before the 20th century and even after. For such artworks, mereology is consonant from view to view.

Quasi-figurative MS

Configurations correspond to reality but components do not, at most resembling components that correspond to reality. Giacometti’s *Walking Man* series are quasi-figurative MSs in this sense, as are Moore’s scattered object sculptures. Components correspond to reality but their configurations do not. David Smith’s *Cubi* series, whose components are geometric volumes, are quasi-figurative MSs in a second sense. Mereology is still consonant, as the reader can easily verify.

Non-figurative MS

Neither components nor their configuration correspond to reality. Non-figurative MS artworks, e.g., Cubist compositions by Lipchitz and Picasso, in a sense disconnect art from reality. What such artworks are about, what they mean and what they accomplish are challenging questions. I will characterize my own sculptures in due course.

Awareness

Perception is a key concept in epistemology. Philosophers are interested in (a) defining various concepts of perception and (b) studying the relation between perception and knowledge. Here, only issue (a) can be addressed and in a limited way at that; specifically, only as a path to awareness that an art object exemplifies properties that determines aesthetic content.

- **Standard vision:** This concept is expressed in propositional form using the locution “person P sees that object x has property F.” Standard vision is veridical. If person P sees that object x has property F, it follows that x has property F.
- **Seeing-as vision:** This concept can be expressed using several locutions:
 - (i) “person P sees x as an F”;
 - (ii) “person P sees x as the F of y”;
 - (iii) “person P sees x as the F of y and as the F of z.”
 - (iv) “person P sees x as the F of y and as the G of z.”

There are veridical as well as non-veridical uses of (i)-(iv). Non-veridical uses are well known. Just because we see a cloud in the sky as a bear does not mean there is a bear up there; just because we see a part of the cloud as the arm of a bear does not mean there is an arm of a bear up there; just because we see a part of the cloud as the arm of a bear and as the leg of a sheep does not mean there is an arm of a bear and a leg of a sheep up there.

Nevertheless, I show below with examples of my own work that component x of a sculpture can be seen as the F of component y and as the F (or G) of component z in a veridical sense. Components that do ‘double duty’ as the F of y and as the F of z exemplify an aesthetically valuable ambiguity and are an important feature of my work. While ‘in real life’ body parts cannot do ‘double duty’ as an arm here and a leg there, it does not follow that ‘in an aesthetic context’ seeing-as forms (i)-(iv) must be non-veridical.

- **Directional vision:** This concept can be expressed using locutions such as:
 - (i) “object x can be seen as having property F from left-to-right”;
 - (ii) “object x can be seen-as having property G from right-to-left”;
 - (iii) both (i) and (ii).

Properties F and G may well be dissonant and in fact they are dissonant in my sculpture *Prometheus* shown below, which is an important, and innovative, aspect of this sculpture. As far as I know, no one else has thought of applying directional vision in sculpture. Directional vision appears to be veridical if construed as above and avoids the thorny problem of attributing logically incompatible properties.

An Elementary Application

An ordinary physical object such as a chair is a mereological sum. The configuration of components is determined by the instructions in the box, if the chair is purchased unassembled, which consist of a list of tasks to be carried out in a certain order. The instructions are an ontological algorithm. Completed as described, the result will be an object that can function as chairs usually do. Thus, legs are to be attached under the seat; one leg would go behind another; armrests are to be attached opposite one another and above the seat; the back rest goes behind the seat; screws are to be tightened only provisionally until all the parts have been assembled and aligned correctly; overtightening screws risks stripping threads, which in time will cause the chair to come apart; and so on.

In addition to physical attributes of ordinary objects such as size, heft, color, and configuration of parts, aesthetic attributes can and sometime do merit attention, pertaining to individual parts as well as their configurations. Steps involved in becoming aware of aesthetic attributes of ordinary objects such as chairs would obviously not be included in the instructions manual for assembling them, so that EAs are seldom relevant and then in attenuated form. Art is a very different matter.

A Crushing Objection?

It will be instructive to face the music right away, so to speak, rather than at the end of the article under 'Objections and Replies.'

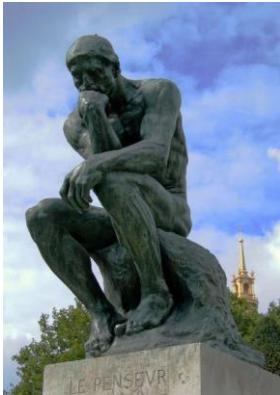
Artists, art critics, art aficionados and some philosophers may well object that a conceptual gap exists, always has existed, and always will exist, between art and logic so that attempts to bridge such self-evidently distinct categories – let alone trying cross the bridge – must amount to a category mistake. Moreover, algorithmic art is bound to be ... boring. The rest of this article, they would insist, is a road to nowhere. Algorithms have no place in art, ontological or epistemological.

Several responses may be made:

- It is premature as well as bad method to argue against an empirical proposal without first examining evidence that may well turn out to support the proposal. Far better to wait and see what develops and then come to a conclusion.
- OAs and EAs already exist in music. For example, counterpoint is indeed a sequence of 'specific instructions' – taught in music theory classes – such that carrying them out correctly to completion would bring it about that overlapping parts in a piece of music would not sound like mere noise when performed. Moreover, a listener who applied knowledge of sonata form correctly to music in sonata form would thereby become aware that the music was in sonata form, thus following the appropriate EA.
- OAs are in fact routine in sculpture. Sculptors trained in traditional methods first produce models or drawings (or both) and use them as guidance to make

the sculpture. This means that two OAs are at work, involving different finite sequences of tasks. Arguably, model building is more of a creative effort than moving from models and drawings to produce the sculpture, though the production process can involve changes in design, major as well as minor.

- If the material is stone, creating the sculpture involves OA tasks such as (a) checking for cracks in the block; (b) removing stone using a variety of tools, including power tools, until the sculpture matches or resembles models or drawings; (c) polishing the stone; (d) building an appropriate base; and (e) securely mounting the sculpture on the base. Sculptors are known to have employed assistants to work on these tasks to varying degrees. For example, if the block is a large one, the sculptor may leave it to assistants to carve a rough outline – called ‘blocking’ – polish the completed sculpture, and mount it on a base.
- Direct carving, which I do, means ‘finding it in the stone.’ There are no models or drawings, so that task (b) is shorthand for a long list of tasks, too many to even list let alone arrange as a sequence. I very seldom use power tools and have never employed assistants to work on any (a)-(e) task. Indeed, expecting an assistant to work on task (b) would defeat the purpose of ‘finding it in the stone!’
- An EA already exists in sculpture. For example, many figurative sculptures (Rodin’s *Thinker*) and even some abstract sculptures (Archipenko’s *Seated Woman*) are best appreciated from a preferred viewing angle, namely, front and slightly off to the right (see photos).



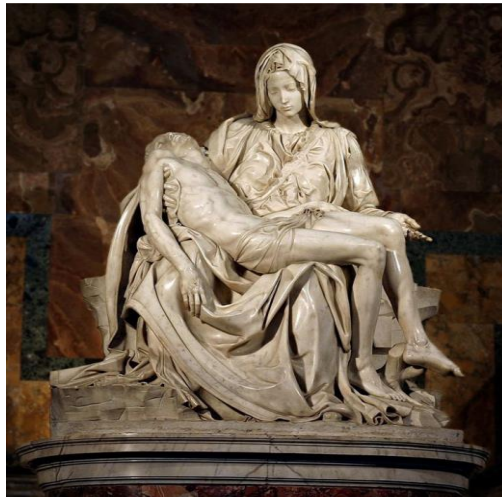
- Viewership instructions next to sculptures would help museum visitors understand the relativity of vision and appreciate its impact on interpretation.
- OAs already exist in figurative and even some abstract art that have the human figure as subject. Arms, legs, head, torso and so on are as they should be and so is their configuration. They are figurative mereological sums in the sense described above. Though stylized to varying degrees, arms, torso, head and legs are just where they should be in the Archipenko sculpture shown above, where configuration is that of the female figure. Henry Moore’s scattered object sculptures are quasi-figurative mereological sums. Jacques Lipshitz’s cubist

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sculptures, though considered abstract, are in fact figurative mereological sums.

Base Algorithms in Sculpture

Names of artworks function just like ordinary proper names, i.e., as disguised descriptions. Thus, *Pieta* is 'the sculpture Michelangelo completed in 1499 showing Mary holding Christ' (see photo.)



The referent of 'the sculpture' is obvious: 'the one and only one Michelangelo sculpture whose interpretation is that it shows Mary holding Christ.' It follows that the base underneath the sculpture thus defined is not included in the reference of 'the sculpture.' Indeed, this is true of the vast majority of sculptures made prior to the twentieth century and even after. Let us look into the matter further.

A sculpture can be displayed by placing it on the ground, with or without a base; or on a platform or pedestal, with or without an intermediate base. If the base only has a functional purpose, e.g., to prevent damage that might occur if the sculpture toppled or was bumped into, it does not matter whether the base has aesthetic properties, though its shape and size must be consonant with the sculpture placed on top. The bases of the Michelangelo, Rodin, and Archipenko sculptures are functional in this sense and also meet the consonance requirement. Base material can be different from or the same as the material used to make the sculpture. The material is the same in the Michelangelo and Rodin sculpture but not in the Archipenko.

If the base has more than a support function, then the question becomes how base algorithms relate to sculpture algorithms. Thus, a base can exemplify mereological and phenomenal properties consonant with those of the physical world, such as the cuboids used to support the Rodin and Archipenko sculptures. The sculpture, on the other hand, can exemplify mereological and phenomenal

properties consonant with those of the human figure. Consonance between base and sculpture that may or may not be important, depending on the artist's intent. The OAs of my bases evolved over time and are still in transition as this article is written.

As to EAs, bases of all traditional sculptures and even many contemporary sculptures do not raise EA-related issues at all. This is true of the bases of the sculptures cited above as well as purely functional bases of sculptures in general. My research has yet to identify sculpture bases that raise EA-related issues. EA algorithms do apply to some of my bases and will be discussed in due course.

Negative Space

Gaps and hollows are the principal types of negative space that I have exemplified in my sculptures, which raise a host of interesting and difficult questions about what philosophy calls '*negativa*.' I propose to sidestep these questions here.⁴ For present purposes, it will suffice to list varieties of gaps and hollows that I found aesthetically significant.

Anchored Gaps: Counterpoint A22



Gaps of various shapes and dimensions are discernible, open on three sides. Connectivity to adjoining components is achieved in a variety of ways.

Bordered Gaps 1: *Bolero III*



⁴ Casati & Varzi 2019 discuss the ontology and epistemology of negative space – but not its aesthetics.

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Two gaps are discernible, mirroring the adjoining solids. The two negative-space borders were cut from the adjoining positive spaces. Other examples of bordered gaps will be discussed later.

Bordered Gaps 2: *Counterpoint A20*



The gap is a window to another component of the sculpture. More on this sculpture later.

Bordered Gaps 3: *Counterpoint A24*



More on this sculpture later.

Bordered Gaps 4: *Counterpoint B64, Counterpoint B143, Counterpoint B76*



Components are 'found objects.' For analysis, see below.

Hollows: *Counterpoint A20, Counterpoint A27*



Analysis will be provided in due course.

An Avoidable Controversy

A statue titled “The Embrace” dedicated to Dr. Martin Luther King and his wife Coretta Scott King was unveiled in Boston in mid-January 2023, the work of Hank Willis Thomas. Made of bronze and weighing 19 tons, the statue cost a reported \$10.5 million to produce.

Coretta Scott King’s cousin, Seneca Scott, echoed the reaction of many who viewed the statue⁵:

The mainstream media ... was reporting on it like it was all beautiful, 'cause they were told they had to say that. But then when it came out, a little boy pointed out – ‘That’s a p*nis!’ and everyone was like, ‘Yo, that’s a big old d*ng, man.’

Radio host Megyn Kelly made the same comment⁶ on her show:

Okay, this is what they came up with. It was meant to be just the arms and the hands of the hug. What it looks like, I’m just gonna say it – is a giant p*nis being held by two hands.

Explanations Mr. Thomas offered were unhelpful. He posted a comment on his website⁷ that muddies the waters with vague jargon typical of much that passes for art criticism these days.

When we recognize that all storytelling is an abstraction, all representation is an abstraction, hopefully it allows us to be open to more dynamic and complex forms of representation that don’t stick us to narrative that oversimplifies a person or their legacy, and I think this work really tries to get to the heart of that.

⁵ See <https://nypost.com/2023/01/15/woke-mlk-penis-statue-insults-black-community-coretta-scott-king-kin>.

⁶ See <https://www.mediaite.com/podcasts/megyn-kelly-says-new-mlk-statue-in-boston-looks-like-a-giant-penis/>.

⁷ See <https://hankwillisthomas.com/public-art/the-embrace>.

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OA Comment: A photo on the artist's website shows that a traditional method was followed. A model was created first; then it was enlarged and cast in pieces – reportedly over 600 of them – that were welded together; finally, a patina was applied.



EA Comments:

- 1.It has been pointed out, correctly, that information apparent from several viewing angles is inconsistent with the sculpture's theme.
- 2.Mr. Scott and Ms. Kelly have suggested that information apparent from some viewing angles can be construed as overtly sexual, to which they evidently took exception.
- 3.Information apparent from some angles show no specific connection to Dr. King, his wife, and the loving relationship between them.
- 4.Absent knowledge that the statue was about Dr. King embracing his wife, the intended referents and their relationship could be inferred from only a few viewing angles, if at all.



5. The artist and the competition review committee would have preferred use only of viewing angles consistent with the photo of Dr. King embracing his wife.
6. However, a public exhibit cannot limit viewership to angles believed to be consistent with the artwork's intended theme to the exclusion of all other viewing angles.
7. The controversy that ensued could have been avoided by heeding elementary facts about three-dimensionality in sculpture during submission review stages.
8. The most elementary fact is the relativity of vision, which has been understood since Plato. One's perception of an object, any object, depends on one's position with respect to it.
9. Thus, it would have been helpful to think of the MLK statue as a collection of sense data, each potentially suggesting its own interpretation.
10. Taking a dozen or so photos of Thomas' model several degrees of arc apart would have revealed sense data viewers found objectionable later.
11. The significance of these points will become apparent as we proceed.

A Vivid Recollection

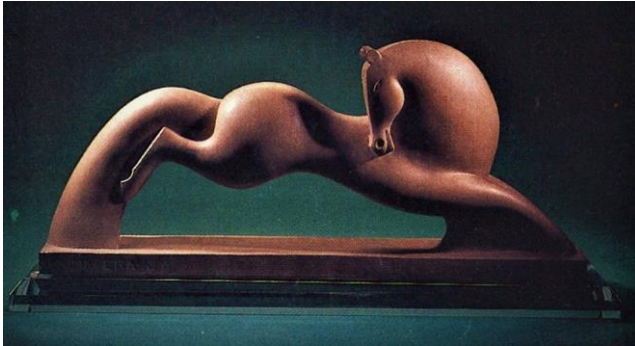
Impressions and ideas have a life of their own, operating in what has been called the subconscious mind. They can percolate for months and even years, one day bubbling up out of the blue in a form that may surprise and even shock. We would do well to ask, as philosophy teaches, how many of our beliefs are truly our own; how many were picked up willy-nilly along the way; and how many, as Platonic anamnesis theorizes, were held in a former life.

So, with that by way of preamble, there I was, sometime in the early '80s, about to walk into a Tower Records store in Washington DC when I spotted an imposing structure across the street. Assembled from metal railings painted black, it was attached to a concrete base and rose to some thirty feet. I assumed it was a work of art. Why? Well, it stood alone; it wasn't part of the building behind it; and had no recognizable shape or function. Ergo ... I walked over for a closer look. The artist may have been identified but I don't recollect the name or the title of the artwork.

I moved around it this way or that, changing perspective, trying to figure out what I was seeing as most people would when confronted with an unfamiliar object. Nothing came to mind. I walked back across the street and entered the store to add to my collection of classical records. Nevertheless, the experience became something of a stepping stone, though at the time I had no inkling that it opened a door I would walk through only a couple of years later and then keep going for decades.

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In the Beginning ...



A photo of an Art Deco horse in an issue of *Architectural Digest* – May 1984, page 280 – had me wondering if I could make something like that, out of curiosity.

The only way to find out is to try. I'd had no training in art but I knew my way around tools, having had carpentry in junior high school. So, I purchased wood boards, glued them together, and got wood carving chisels and a coping saw. A couple of weeks later, this is what I produced.



Producing a wood carving that resembled the original. My horse's head turned the same way and the hind quarters were consistent with the original's; but its front legs resembled those of an actual horse and I decided a freely hanging tail would accentuate the physical impossibility of hair supporting the weight of a horse. The base only served a practical purpose the original, so I eliminated it.

Having finished the work, it occurred to me that I may have what is usually referred to as a 'hidden talent.' If I could carve a little horse, maybe I could do something else too, but what? For inspiration, I decided to pay a visit to the Hirshhorn Museum in Washington, DC. I'd been there before but this time I'd be going with a plan and looking with new eyes.

I did not find inspiration in the museum's Sculpture Garden. As I recall, back in the early '80s the area had sculptures by, among others, Smith, Moore and even one by Brâncuși, *The Kiss*. I had more luck inside the museum. Displayed unobtrusively in a corner was another Brâncuși masterpiece, *Prometheus* (1911).



Prometheus was the ancient demigod who defied Zeus by giving mankind fire and was forced to endure horrific punishment as a result, to be chained to a mountain while a vulture pecked away at his liver. One day Hercules would come along and freed Prometheus.

OA Comments: Brâncuși's sculpture is a casting in polished bronze made from a model. It is quasi figurative and is consonant with features of the human head.

Interpretation: We see Prometheus worn out by his daily ordeal, lost in his own private world, perhaps resigned to his fate. The reader might want to compare this sculpture with paintings on the same subject, e.g., by Rubens. Lipshitz also made a Prometheus sculpture.

EA Comments: Standard vision is sufficient to capture aesthetic content and arrive at an interpretation. There seems to be a preferred viewing angle. As I found out at the Hirshhorn, moving away several degrees of arc in any direction definitely affected interpretation. Interpretations of this and other artworks on this theme have an important feature in common: There is a single story line or narrative, consonant in various ways with the ancient legend.

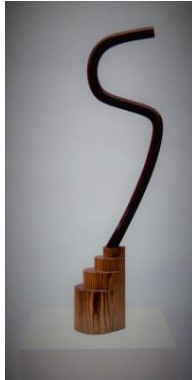
My Prometheus (1986)

There are many conceptual differences between art, on one hand, and science and mathematics, on the other. For example, science and mathematics cannot tolerate contradictions, whereas dissonances in an artwork are not just possible, they sometimes enhance aesthetic appeal.

However, artworks based on algorithms that could suggest (a) multiple stories that are (b) dissonant are in an entirely different category. What OA sequence of tasks could lead to the production of a sculpture on the Prometheus legend that exemplified (a) and (b); and what EA sequence would enable a person to become aware that the sculpture exemplified (a) and (b)?

Here is a photo of the *Prometheus I* produced in 1986 in reaction to the Brâncuși masterpiece.

My composition is also simple even though, unlike Brâncuși's, it is a mereological sum. The base is pine; the top is walnut I cut from a board. They are held together with a pin and epoxy. Height is 24 inches. (I also made a version in steel with a soapstone base of similar design.)



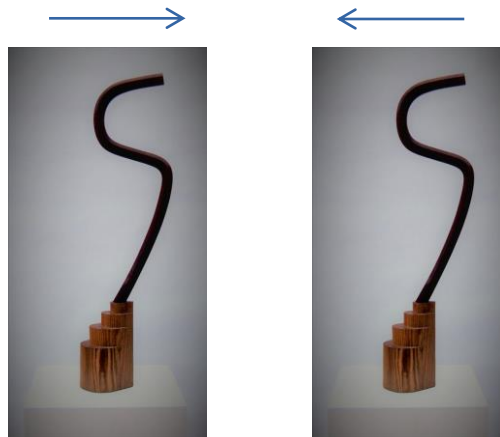
EA Comments:

- (1) If person P were to complete a finite sequence of tasks T1, then P would become aware that *Prometheus* exemplifies property F.
- (2) If person P were to complete a finite sequence of tasks T2, then P would become aware that *Prometheus* exemplifies property G.
- (3) F and G are associated with stories whose dissonance is apparent to P.

Here is the conundrum: Is step (3) realizable by applying perceptual concepts that usually make it possible for a person to become aware of the properties an object exemplified? I don't think so.

By 'perceptual concepts that usually make it possible for a person to become aware of the properties an object exemplified' I have in mind standard vision. As already noted, there is also directional vision, specifically (in coordinate terms), vision along the *x*-axis in both directions.

Here are photos of *Prometheus* side by side with arrows on top pointing in opposite directions.



Innovation: Use special vision to tell radically dissonant stories.

Left-to-right EA: The curved section expresses courage and optimism, even ‘in your face’ defiance. Prometheus is convinced that he had done the right thing by giving mankind fire. On this interpretation, the steps serve as a means to transcendence.

Right-to-left EA: A contradictory story emerges. Prometheus looks back and recoils with horror and justified rage, despite being convinced of the rightness of his cause. The steps are now interpreted as part of the ordeal Prometheus was made to suffer.

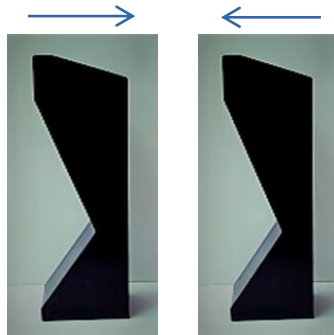
Viewers can experience these conflicting interpretations, and the emotions they arouse, in quick succession merely by shifting visual focus in opposite directions along the x -axis. The sculpture also poses an ontological conundrum: How many sculptures are there? Arguably, two: (1) *Prometheus-as-seen-from-left-to-right*; (2) *Prometheus-as-seen-from-right-to-left*.

David (1998)

Directional vision along the x -axis leads to dissonant stories in another sculpture I made based on an ancient legend, the Biblical fight to the death between David and Goliath. Once again, I was inspired by a famous sculpture, Michelangelo’s *David*. Here I am with the two versions of my *David*, painted wood (left) and stainless steel (right) at a Washington DC exhibit.



Here are two images of my painted wood *David* side by side with arrows on top.



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Left-to-right EA: The figure faces the target, stiff and unyielding, conveying certainty and confidence of victory; that, with God's help, David would prevail against the odds. This is the 'outer' David that Goliath was meant to see. An enemy must be shown resolve at all times.

Right-to-left EA: A dissonant interpretation comes into view: This is the 'inner' David, who realized that the future of his people rested on his frail shoulders and a lucky shot. The wedge-shaped negative space symbolizes the result of defeat.

***Andromeda* (1987 wood, 1998 bronze)**

I made another sculpture, *Andromeda*, based on an ancient Greek legend. Here is the bronze version. Readers are encouraged to supply their own analysis.



Doubling Up

It is fairly common for artists to make castings of an original. Here are three of mine.



What is not common – indeed, extremely rare as far as I know – is seeing two castings of the same original side by side in a museum or art gallery.

However, what if showing two castings of the same original side by side as mirror images of one another made possible communicating a story not possible by means of showing the castings taken singly? In other words, what if OAs and EAs were combined to produce such a display?

Doubling *Andromeda*

Innovation: *Tell different stories with copies of a sculpture placed side by side.*



In Greek mythology, Andromeda was the daughter of King Cepheus. When his wife Cassiopeia boasted that her daughter was more beautiful than Poseidon’s sea nymphs, the Nereids, the angry god sent the sea monster Cetus in revenge. Andromeda was chained to a rock as a sacrifice to sate the monster but was rescued by Perseus, who married her and took her to Greece to reign as his queen.

OA & EA Comments: Displaying *Andromeda* castings side by side (OA) allows viewers to see the result as two beautiful female figure silhouettes that (EA) help explain why Perseus risked his life to save a damsel in distress. Note how components do double duty.

View 1: In this assembly, Andromeda’s slender thighs are seen rising to her slim waist and above it we see either her folded arms or her ample chest.

View 2: Reversing the order of assembly leads to another interpretation. Here we see Andromeda’s ample hips, slim waist and a hint of her chest.

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Doubling David

A story that cannot be told by means of a single exemplar also applies to my *David*, and in a way that is even more interesting. Here is the side-by-side configuration I have in mind.⁸



This OA version suggests a very different EA, namely, that we are looking at the imposing physical stature of the giant Goliath, so that we can visualize that he must have been at least twice David's size, which is consistent with the Biblical account. A much sharper sense of what the boy was up against emerges as a result.

So, as with *Andromeda*, there is more here than is apparent at first, which only an analysis in terms of ontological and epistemological algorithms can bring out.

Bolero I & II (1998), Bolero III (2000), Infinity (1998)

Innovation: *Achieve dissonance by means of asymmetric mereology.*

Three sculptures I made during 1998-2000, *Bolero I-III*, exemplified bordered negative space. They create dissonance by throwing off perceptions of balance and expressing links between components not found in the 'real' world, which is ruled by ironclad laws of nature. As we shall see throughout this article, algorithmic methods have led to art that in many ways stands outside reality.

Bolero I and *Bolero II* (1998, painted wood) are shown next *Bolero III* (2000, aluminum). On far right, also exemplifying negative space, is *Infinity* (1998, mixed media), which was inspired by Brâncuși's *Endless Column* series, located in Târgu-Jiu, Romania.

⁸ I made four versions of *David*: two in painted wood, one in stainless steel and one in Mexican yellow heart wood. The latter required lamination of several boards.



1

2

3

4

Bagatelles I & II (1998)

Here is *Bagatelle I*. I sold *Bagatelles II*.



Materials included aluminum, wood, plastic, and paper. The general shape in each view is the same but surface mereological properties in views 1-4 are not inferable from each other. This is a variation of the first dissonance described earlier.

Stone Carving Begins

The Art League School associated with the Torpedo Factory Gallery in Alexandria, Virginia – where I had exhibited as part of juried shows – offered sculpture classes, so I signed up.

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On day one of class, the instructor asked which medium students wanted to learn: wood, metal or stone. I had already worked with wood; metal entailed welding, which was not for me. Stone became my medium by default.

My first carving was completed in 1999 and was an alabaster version of my wooden 1985 *Study in Motion*. I made bronze castings in 2000, pictured earlier.



Other figurative or quasi-figurative carvings followed in relatively quick succession.

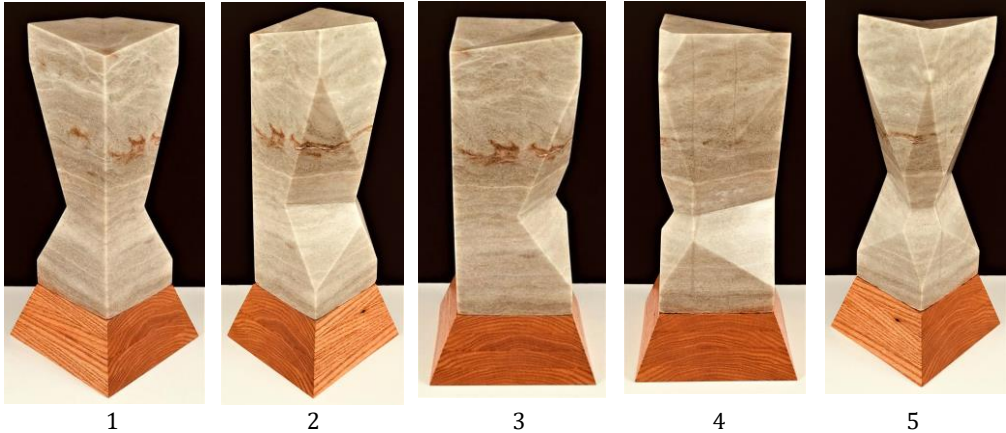


Mimi (1999, alabaster) *Nina* (1999, alabaster) *Ariadne* (2000, soapstone) *Venus* (2000, alabaster)

***Thy Fearful Symmetry* (1999)**

Innovation: *Achieve consonance and dissonance by changing perspective.*

A stone version of my *David* led to significantly different interpretations only a few degrees of arc apart. Several images are necessary to illustrate my points. This will be true for many other stone sculptures for reasons that will become apparent as we proceed.



All Views: The base is the only component that is symmetrical. *David* shapes are evident in views 1, 2 and 3 but not 4 and 5. The negative space of *David* acquires three-dimensionality here. It means very different things in views 1, 2, 4 and 5. The only one that resembles the negative space in *David* is in view 3.

Views 1 & 5: Symmetry is evident only here. Views are 180 degrees of arc apart but only the outline is consonant. Surface configurations are dissonant.

Views 2-4: Dissonance with the theme is exemplified. Dissonances with a theme do not exist in traditional or even contemporary sculpture.

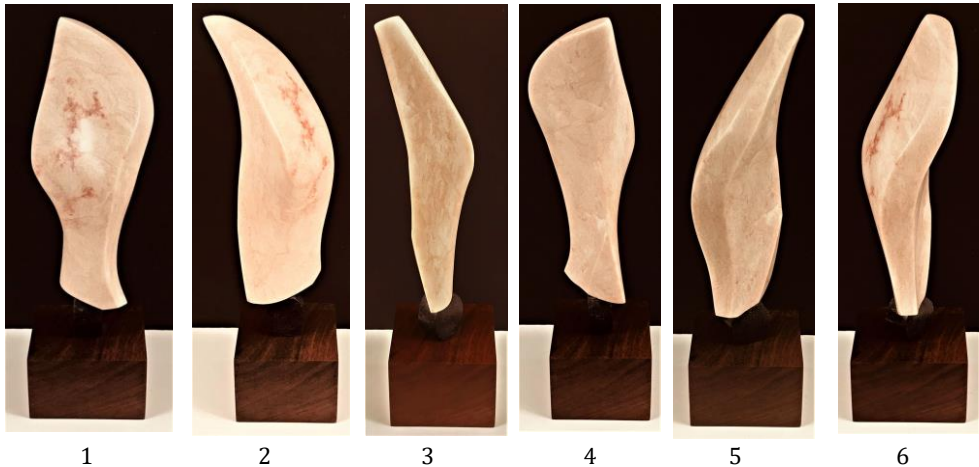
EA Comments: The sequence of tasks to be completed under EA begins with symmetry defined at view 1, then proceeds through a sequence of three views where symmetry is absent and ends in a different concept of symmetry defined at view 5. Another EA sequence begins and ends with symmetry is 5, 4, 3, 2, 1, though the symmetry of 5 and 1 will have a different impact this time. EA sequences are also possible that do not begin and end with symmetry, such as 2, 3, 4, 5, 1; or sequences that begin with symmetry but do not end with it such as 1, 5, 4, 3, 2. Finally, there is a sequence that begins with symmetry defined at view 1 and ends with symmetry at view 1 by rotating a full circle; likewise, one that begins with symmetry defined at view 5 and ends at view 5 also by rotating a full circle. The impact will be different each time.

Alar (2000)

In *Alar*, I applied the innovative lesson of *Thy Fearful Symmetry* without symmetry. I sought to create a sculpture such that views degrees of arc apart (a) formed a family resemblance around a wing theme, and (b) included dissonance. Task (a) is achieved in views 1, 2, 5 and 6. Task (b) is achieved in views 3 and 4. The dissonance of views 3 and 4 exemplify change of direction heard in classical music,

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where it occurs frequently, so sculptures evidently can express the musical concept of modulation.



The sequence from 1-6 reveals dissonance in our second sense, i.e., when it cannot be inferred from properties apparent from different viewing angles that they are properties of the same object. Thus, views 2, 3 and 5 cannot be inferred as the same wing even though they are only a few degrees of arc apart. View 4 shows an object in a different ontological category: a blade of fire! The blade of fire in view 4 morphs into a wing at 5 and then another wing appears at view 6.

Eve (2001)



Innovation: Use different carving techniques to create space-time dissonances.

This was my first narrative in stone, based on the biblical story of Adam and Eve. Base and stone components are much more closely linked than in previous sculptures. I also had a bronze casting made, whose patina has a different emotional impact.

OA Comments: Sculpture has always exemplified consistency of scale and surface configuration, which is a form of consonance. While Picasso distorted body parts for various reasons, that is not the same at all as using radically different scales for body parts. Carving techniques are also consonant in sculpture, even cubism.

Views 1 and 2: Scale and surface configurations are dissonant. In-the-round carving technique is exemplified in view 1 and bas-relief in view 2. Eve is shown as if from a distance in view 2 and close up in view 1. This is another new idea in the history of sculpture.

EA Comments: Surface details of views 1-4 are dissonant. Thus, view 1 shows what Adam saw that made him fall in love with Eve. View 2 shows Eve holding an apple, contemplating whether to bite into it. View 3 shows Eve as pregnant, which is not inferable from views 1 and 2. View 4 links the narrative contents of views 1 and 3. Views 1, 2 and 3 show Eve at different stages of life. Temporal discontinuity, exemplified only a few degrees of arc apart, is another new idea in the history of sculpture.

Here is why the primary base (mahogany) and the intermediate base (marble) are elliptical while the stone sits at one of the foci. The ellipse is the shape described by our planets as they revolve around the sun, which is situated not in the center – an ellipse does not have a center – but rather at one of the foci. Eve is in the sun position as a way of expressing that women are life-givers, as is the sun.

Leda (2001)



Innovation: *Achieve ontological dissonance by changing perspective.*

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Michelangelo's *David* and Archipenko's *Seated Woman* share an ontology: Only one person is the subject in both sculptures. This is apparent from any pairs of sense data no matter how many degrees of arc apart, as the reader can verify.

Dissonances: It is difficult to infer that the same woman is the subject from virtually any two sense data. There is reason to wonder if the same woman is shown in views 2 and 3. Views 5 and 6 should be mirror images of each other but evidently are not. The woman's stomach in view 5 is her posterior in view 6. Most radically of all, seen from left to right, most of view 4 is repeated in view 6. From right to left, the other half is view 5. This is a new application of directional vision. Previously, two copies of the same sculpture – *Andromeda* and *David* – were required to produce such dissonant effects. *Leda* is a five-in-one sculpture. But, is it really just one sculpture?

Cleo (2001)



1



2



3

Innovation: *Use a traditional approach to achieve dissonance.*

The head and the base greatly facilitate association with the same female figure. With some effort, it can perhaps be inferred that properties apparent from the three viewing angles are properties of the same figure. Base and head aside, however, we cannot easily infer any of the three views from the other two views,

so that dissonance appears to be exemplified. Properties apparent in view 1 cannot easily be inferred from properties apparent in views 2 or 3. The three poses are very different: 1 is aloof; 2 reclines; 3 is bold.

Nici (2002)



Innovation: *Use radically different styles to achieve dissonant mereology.*

It is hard to believe that views 1 & 2 are front and back views. View 1 is close in style to Cubism. The simplicity of view 2 recalls Hans Arp. Such radical stylistic differences are a form of dissonance. Views 3 & 4 face each other but are not mirror images. Details do not match fully. Anatomical dissonance with the female figure in view 1 is exemplified. View 2 is quasi-figurative but the other three are not. Identifying the four views with one and the same person or object is doubtful. This is our second dissonance. A female figure is discernible in view 2 but nowhere else.

First Game Changer

Counterpoint A1 (2002)



Innovation: *Relate components of different scales using a unique component.*

This sculpture exemplified differences of scale, as did *Eve* made the previous year. From one angle, two figures of different scale appear side by side, separated by a willowy braid. To the left of the braid, we see a figure in sitting position, her left arm reaching around to the front. The back and shoulder of the figure to the right of the braid are much larger. Despite the fact that the two figures are of different scale, there is no difficulty at all in seeing the willowy braid as belonging to both of them.

OA Comment: Having two figures of different scales share the same component was a major innovation and a novel application of our ontological algorithm. Let us restate it for ease of reference.

Ontological Algorithm (OA): A finite sequence of tasks T applying concepts of phenomenalism or mereology such that if person P were to complete T, P would bring it about that an object exemplifies properties that determine aesthetic content.

The finite sequence of tasks here is the usual sequence that is part of in-the-round composition. The new property is the mereological property, exemplified by the braid, of being the F of both *x* and *y*, where *x* and *y* are components of the figures flanking the braid.

EA Comment: Because the braid could now be seen as a component of both figures, a novel application of our epistemological algorithm also occurred. Let us restate it as well.

Epistemological Algorithm (EA): A finite sequence of tasks T such that if person P were to complete T, P would bring it about that P is aware, in a sense to be specified, of properties that determine aesthetic content exemplified as a result of applying concepts of phenomenalism or mereology.

The 'sense to be specified' is seeing-as-vision. The property in question is the mereological property noted above.

Then, something even more remarkable happened. I noticed that the braid could also be seen as a figure in her own right, so that the composition contained three figures, not two. The same figure could be seen-as a component of two adjacent figures and also seen-as a stand-alone figure.

OA Comment: This discovery meant that the cluster of properties that determine aesthetic content in *Counterpoint A1* also include a mereological property expressed by a sentence of the form 'being the F of *x* and being the F of *y* and being G.' This property is unprecedented in the history of sculpture.



EA Comment: This discovery also meant that we would see the braid as a component of figures flanking it and as a figure with an identity independent of and, indeed, incompatible with its identity as a component of the other figures. This discovery is also unprecedented in the history of sculpture.

General Comments: The mereological property of being the F of x and being the F of y and being a G opened the door to innovations that I am still pursuing twenty years later. Closely related to this property, and just as useful, is the property of being the F of x and the G of y . Thus, a mereologically complex sculpture could have a component that was the arm of one figure and the leg of another figure. Once the ontology is settled, epistemology can follow suit. Thus, we could see a component of a mereologically complex sculpture as the arm of one figure and as the leg of another figure. There may well be such a thing as epistemic consonance and dissonance. I'm not ready to suggest definitions of these concepts.

Counterpoint A2 (2002)

The floodgates literally flew open after I internalized the lessons of *Counterpoint A1*. Its successor is more complex and required greater carving skill.



Innovation: *Relate multiple figures in unique and dissonant ways.*

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Views 1-4: Mereological dissonance is exemplified. Mereological properties of views taken singly are logically independent of the mereological properties of any other view.

View 1: The quasi figurative on left supports an abstract one.

View 2: The long arm of the rightmost figure reaches across the figure attached to the base and grasps a figure with its back to the viewer, whose buttocks are evident.

View 3: Arms of an unseen figure reaches across the figure attached to the base.

View 4: Two figures are locked in an embrace while a component of a third points away.

Counterpoint A5 (2002)



Innovation: *Exemplify dissonance in stone by means of special vision.*

View 3: From right to left, the dominant figure on right is ‘trapped’ in the composition.

View 3: From left to right, this figure seeks to escape the confines of the composition.

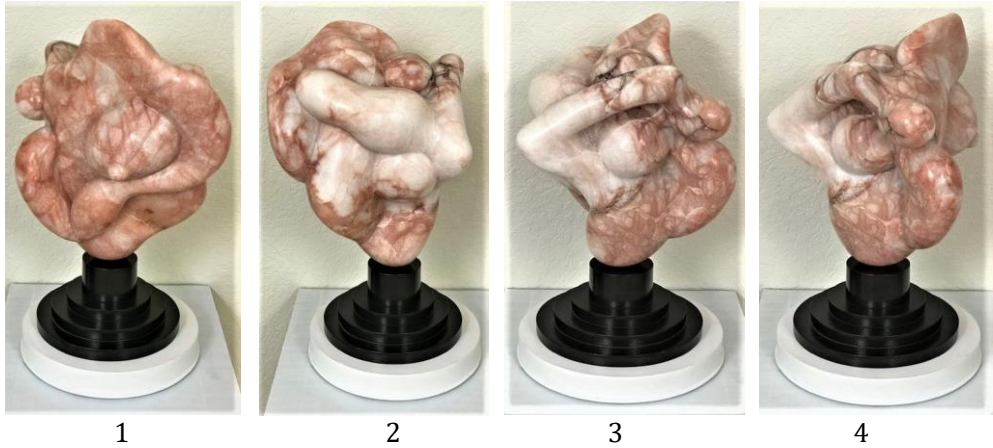
All views: The dominant figure in views 1-3 has been replaced by another dominant figure in view 4.

View 4: Very different and more abstract relationships are evident.

Views 1 and 4: Logically independent mereological properties are exemplified.

Views 2 and 3: Front and back views are dissonant.

Counterpoint A7 (2002)



Innovation: Use carving virtuosity to create components that do double duty. Carving virtuosity is exemplified throughout. The dominant figure in views 1 and 2 is gone in views 3 and 4, which have no dominant figure. Several components do double duty. Components point in opposite directions in all views. Different components appear to be attached to the base, exemplifying different grounding concepts. Grain plays a much greater role.

Counterpoint A8 (2003)



View 1: A figure bends at the waist over an abstract figure facing the viewer.
View 2: Concave negative space appears, while chest, arm and back of a large figure face away.
Views 2 and 3: Double duty is exemplified. The back of the figure in 2 is a breast in 3.

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Views 1 and 4: Dissonance with the bent figure shown in view 1 is exemplified in view 4. Dissonant mereology is exemplified only a few degrees of arc apart in views 1 and 4.

Counterpoint A10 (2003)



Innovation: Create radical dissonance by combining quasi-figurative and abstract components.

Mereology corresponds to human mereology only loosely. There are differences of scale. Mereological details are not easily inferable from view to view, creating dissonance throughout.

View 1: Two figures with different surface configuration point in opposite directions.

View 2: An abstract figure in sitting position is attached to the base.

View 3: This view is the 'back' of view 1 but the mereology is dissonant.

Views 1 and 3: The figure on right is the F in view 1 and is the G in view 3 as the figure on left.

Counterpoint A12 (2004) & Counterpoint A14 (2005)

Both compositions are much closer to traditional sculpture and normal perception seems sufficient for EA purposes. This, however, does not mean these sculptures are retrograde because figurative, quasi figurative and abstract components are present side by side, supplying dissonance.



There are figurative, quasi figurative and abstract components in A12.1 and A12.2. A14.1 has male and female figures locked in an embrace. A14.2 is abstract, creating dissonance. Details of front and back views are dissonant: they cannot be inferred from one another in either sculpture.

Florida Production

I relocated to Florida in the summer of 2012 and had an outdoor studio built in my backyard sheltered from the elements and equipped with lighting, which enabled me to get back to making sculpture in 2019. I produced five stone carvings that year, *Counterpoint A18-A22*, that satisfied variations of our algorithms OA and EA. Then, things changed.

Two New Counterpoint Series (2019-2022)

Consider sculptures that are such that:

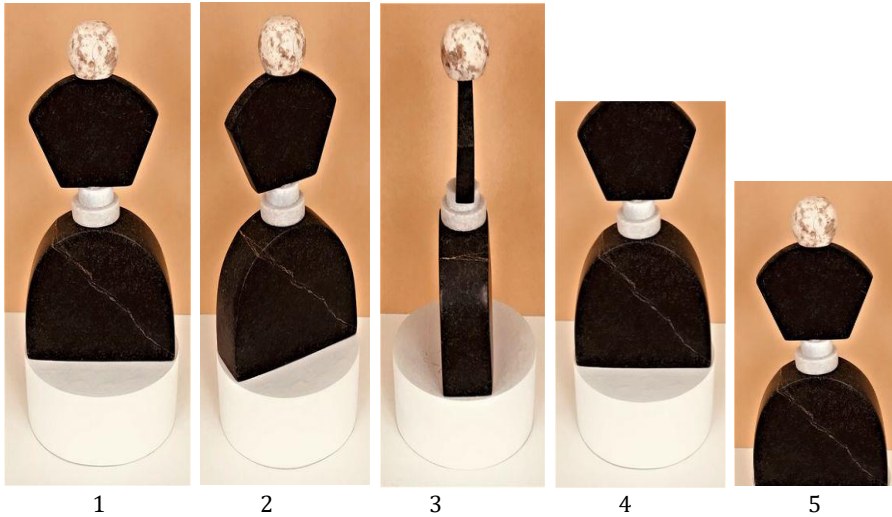
- a) seeing-as applied vertically is the operative concept in EAs
- b) assembly of mereological sums is the *modus operandi* of OAs
- c) assembly consists of stacking components vertically in various ways
- d) materials such as glass, wood, metal and ceramic are used for components
- e) component colors do not necessarily match
- f) component shapes and sizes do not necessarily form a consistent set
- g) components are 'found objects' in Duchamp's sense

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The two new B and C *Counterpoint* series based on (a)-(g) proved remarkably prolific. In the space of a mere three years, I created a total of 176 sculptures! Moreover, (a)-(g) led to a new generation of *Counterpoint A* sculptures that broke away from in-the-round methods, as we shall see. But first, analysis of *Counterpoint B* series is needed to lay down some conceptual markers.

Counterpoint B Series (2019 – 2022, 120 sculptures)

Counterpoint B1 (2019)



Innovation: *Use vertical awareness to change the epistemology of mereological sums.*

Views 1-3: The object in view 1, O1, resembles a perfume bottle. This interpretation does not change in view 2. Only rotation 90 degrees of arc in view 3 changes interpretation.

Let us list the five components in View 1 from the bottom up.

- C1: a thick disc made of wood painted white
- C2: half an ellipse made of soapstone
- C3: two small marble disks glued together
- C4: a soapstone chunk resembling a hand-held fan
- C5: a small multi-colored marble sphere

View 4: The object in this view, O2, is a mereological sum that is a subset of object O1 in view 1. C4 is and is seen as the head of figure O2; C3 is and is seen as the neck of O2; C2 is and is seen as the arms and torso of O2.

View 5: The object in this view, O3, is another mereological sum that is a subset of O1. C5 is and is seen as the head of O3; C4 is and is seen as the arms and torso of O3; C3 is and is seen as the waist of O3; and C2 is and is seen as the body of O3.

Here are photos of more Counterpoint B sculptures to which the above analysis applies as well.



Counterpoint B33 (2019): In Memoriam

The Holocaust has been the subject of many artworks, though none by the foremost artist of the 20th century, Pablo Picasso, who lived in occupied France during World War II and died in 1973.

The photo that inspired my sculpture was taken during the Warsaw Ghetto uprising.



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Counterpoint A20 (2019)



Innovation: *Use negative space to relate components.*

View 1-3: The three views are dissonant with respect to one another. Rotating any view degrees of arc away changes interpretation significantly.

View 1: Combines a see-through gap (top) with a window gap (bottom).

View 2: A bordered hollow has a component in the center.

View 3: Combines a see-through gap (top) with a filled hollow (bottom). This is the only view that is quasi-figurative. The frame of the hollow can be seen as arms. The head is in the center of the hollow. The figure leans perilously to one side, adding drama.

Views 1 and 3: The leg of the figure in view 3 is an arm in view 1.

Counterpoint A21 (2019)

Innovation: *Create dissonance by means of components suggesting different species.*

View 1: It is possible to see-as a female figure and also a wide-mouthed fish. The woman's breast doubles as the eye of the fish. Her shoulder doubles as the jaw of the fish. Her back doubles as the nose of the fish. Her unusually long and supple left leg doubles as a gill. The component that attaches to the base is also part of the fish.

View 2: What was part of the fish's gill is seen as the dancer's upraised leg.

View 3: The right leg of this dancer doubles as the right leg of the dancer in view 2.



2 & 3: See through gap in view 2 is a windowed gap in view 3.

Counterpoint A22 (2019)



Innovation: Use anchored gaps to facilitate awareness of dramatic effects.
View 1: Two components are discernible: One quasi-figurative, one abstract.

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View 2: The companionship aspect of view 1 is absent, which suggests a single figure.

Both views: Figures hang precariously, heightening drama. They are front and back but are not inferable from one another, creating dissonance. The anchored gap visible in view 1 is not visible in view 2. The intermediate base can be seen as a component in both views. The different material (mahogany) is another source of dissonance.

An Interlude: Untitled (2020)



Components are found or manufactured objects. A Japanese motif seems to be exemplified.

Counterpoint C Series (2021 - 2022, 56 sculptures)



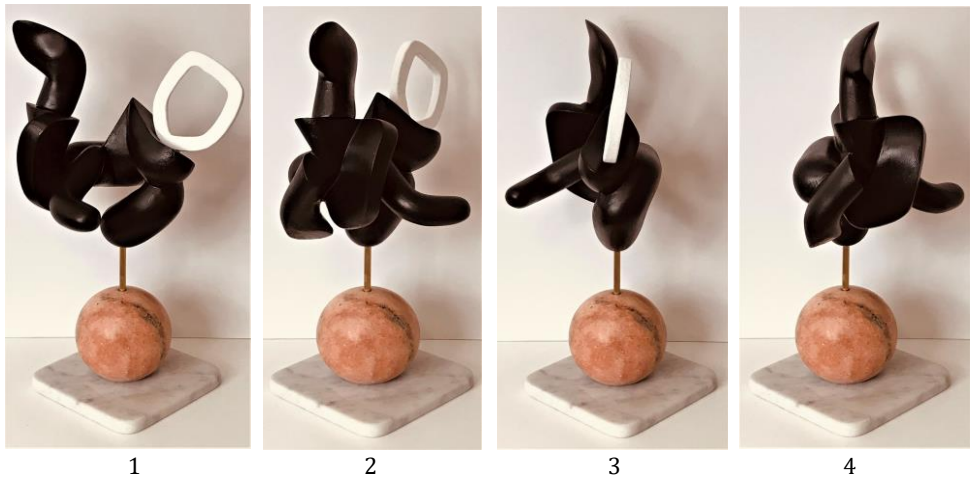
These are mereological sums of found and manufactured objects. I wanted to make something that children can relate to. Turing might have cracked a smile, at least I hope so.

Second Game Changer

Counterpoint A23 (2022)

Innovation: *Combine carved components with found objects to achieve radical dissonance.*

Component details: The two bases, the rod and the white component were found objects. The black component is an assembly of carved and painted stone.



Views 1 and 3: Dissonant interpretations are suggested.

View 1, interpretation 1: A leaning figure is seen facing us, turned at an angle. Its head, painted white is shown as negative space. The arms are flexed and hang down. The left arm is connected to the rod attached to the base. An unusually limber right leg is raised high

View 1, interpretation 2: We can also see a mythical creature. Its legs were formerly seen as the legs of the figure in view 1.1. Its head is held high pointing left. The head was a leg in view 1.1. It would fly off if not tethered to the base!

View 2: The mythical creature is now in full flight. The dissonances in view 1 are gone, replaced by others. Perhaps we're looking at a ... rooster? The white negative space is its plumage. Its head was a leg in view 1.1 and a head in view 1.2

View 3, interpretation 1: We see the creature/rooster from behind, flying away. The crest is still identifiable as such. The rest of the body is more difficult to categorize.

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View 3, interpretation 2: Another interpretation suggests a figure in prone position that seems to be coming toward us. The plumage is now a white bar, which appears to be attached to a head. Its right arm is stretched out, while the left arm is pinned to the base. A hind leg points up. It was a head in view 1.2 and the head of a bird in view 2.

View 4: Something wicked this way comes. Watch out!

Counterpoint A24 (2022)



1

Innovation: *Use sculpture to raise important philosophical questions.*



2



3



4



5



6

Let us begin by listing components shown in view 1, starting from the bottom.

- C1: A triangular prism made of mahogany
- C2: Two marble discs glued together, found objects
- C3: An alabaster globe, found object
- C4: Brass disk, found object
- C5: Found-object combination of wood and metal
- C6: Red alabaster carving.

View 2: C1 is and is seen as the body of object O1. C2 is and is seen as the neck of O1. C3 is and is seen as the head of O1.

View 3: C3 is and is seen as the body of figure O2. C4 is and is seen as the neck of O2. C5 is and is seen as the head (H) of O2.

View 4: C5 is and is seen as the arms and trunk of a figure O3. C6 is and is seen as the neck and head of O3.

View 5: C1 is and is seen as the lower body of figure O4. C2 is and is seen as the waist of O4. C3 is and is seen as the arms and trunk of O4. C4 is and is seen as the neck of O4. C5 is and is seen as the head of O5.

View 6: C3 is and is seen as the lower body of figure O5. C4 is and is seen as the waist of O5. C5 is and is seen as the arms and trunk of O5. C6 is and is seen as the neck and head of O5.

Comments on this analysis

A philosophically significant problem is how to determine the aesthetic content of art objects that are mereological sums. Perhaps the aesthetic content of such objects can be determined by 'adding' the aesthetic contents of component objects. Or, perhaps the aesthetic content of art objects that are mereological sums is a truth-function of the aesthetic content of the component objects. It is unclear at this point how to make these ideas precise. Finally, compare the components seen in view 1 with those in view 7, which was the result of turning the sculpture 90 degrees counter-clockwise.



1



7

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For ease of reference, here are components C1-C6 shown view 1:

- C1: A triangular prism made of mahogany
- C2: Two marble discs glued together, found objects
- C3: An alabaster globe, found object
- C4: Brass disk, found object
- C5: Found-object combination of wood and metal
- C6: Red alabaster carving.

View 7: C1 ontology is the same but a new sense datum is apparent. C2 and C4 are unchanged. C3 ontology is the same but a new sense datum is apparent. C5 ontology is the same but a new sense datum is apparent. C6 ontology is the same but a new sense datum is apparent.

My Latest Counterpoint A

Counterpoint A26 (2023)

Innovation: *Combine static and dynamic elements using a variety of components. Exemplify several types of negative space. Suggest radical dissonance by combining figurative, quasi-figurative and abstract components.*



1

2

3

4

There are seven components:

- C1: Black marble base, found object.
- C2: Wooden cuboid, cut and stained from a larger piece.
- C3: Alabaster cuboid, cut and finished from a larger piece.
- C4: White stone cube, found object, drilled and assembled.
- C5: Carved alabaster.
- C6: Small marble disk, found object, polished and drilled.

C7: Multicolored stone cube, found object, drilled and assembled.

Views 1 & 4: Gaps are mirror images of one another. Carved alabaster views are not mirror images of one another. This is dissonance with regard to mirroring expectations. C5 views suggest two different human figures. C7 suggests association with different human figures.

View 2: Another upright human figure is suggested, which is a third figure. The right arm of the figure defines the gaps in views 1 and 4. The left arm of the figure extends to the hollow in view 3.

View 3: A fourth figure is suggested, though C7 does not function as a head. A small hollow is enclosed in a larger one, suggesting the figure is not human. The hollows have different shapes. Grain helps to accentuate differences.

View 4: A human figure leans on his/her right knee; left arm and wrist are bent.

Views 1-4: Four figures total, three human and one non-human. This has never been done in the history of sculpture.

Innovations Summary

It might be useful to have a list of innovations identified above.

1. Use special vision to tell radically dissonant stories.
2. Tell different stories with copies of a sculpture placed side by side.
3. Achieve dissonance by means of asymmetric mereology.
4. Achieve consonance and dissonance by changing perspective.
5. Use different carving techniques to create space and time dissonances.
6. Achieve ontological dissonance by changing perspective.
7. Use a traditional approach to achieve dissonance.
8. Use radically different styles to achieve dissonant mereology.
9. Relate components of different scales using a unique component.
10. Relate multiple figures in unique and dissonant ways.
11. Exemplify dissonance in stone by means of special vision.
12. Use carving virtuosity to create components that do double duty.
13. Create radical dissonance by combining quasi-figurative and abstract components.
14. Use vertical awareness to change the epistemology of mereological sums.
15. Use negative space to relate components.
16. Create dissonance by means of components suggesting different species.
17. Use anchored gaps to facilitate awareness of dramatic effects.
18. Combine carved components with found objects to achieve radical dissonance.

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19. Use sculpture to raise important philosophical questions.
20. Combine static and dynamic elements using a variety of components.

A Comparison

How do the sculptures discussed in this article, on behalf of which a large number of claims to innovation were made, compare to sculptures by famous artists considered innovative? Below are necessarily brief comments on two sculptures: *Agricola* by David Smith (1906-1965) and *Seated Man with Guitar* by Jacques Lipshitz (1891-1973). The issue is a book-length subject.



Smith



Lipshitz

Smith Comments: The sculpture is painted steel. If it weren't for the mounting on a base, one would be hard put to consider it significantly different from a painting – Smith is known to have held that sculpture and painting aren't far apart. Components are contemporaneous and mostly coplanar. We seem to be looking at a barnyard denizen, whose mereology has been replicated. We see plumage, a hind leg and a crest. Front and back view are consonant. Standard vision is sufficient to capture content because no components do double duty. There is no dissonance in either of our two senses. Only a single story is told, e.g., crowing at sunrise? The association with the title would disappear if a side-view photo were to be taken. Moreover, such a photo would not show anything dissonant, e.g., a member of another species. There is a preferred viewing angle, so vision relativity is not a factor.

Lipshitz Comments: This is a quasi-figurative sculpture. Components are not coplanar but are contemporaneous and only one story is told, of a person strumming a guitar. The mereology of the guitar player is consonant with that of the human body. Arms and shoulders have the same scale and general shape, albeit stylized. There is a preferred viewing angle, as shown. Variations 90 degrees of arc away from the preferred viewing angle would lose contact with the theme; even 45 degrees would do that. The back is probably flat, so that a painterly impression is generated. A painting would have captured aesthetic content just as well. Some components do double duty: the legs double as chair legs; the left arm doubles as the chair's left armrest; and the guitar doubles as part of the head. The guitar itself is also quasi figurative. It's modern sculpture but suggests classical rather than modern music.

Concluding Comments

Henry Moore flatly refused to read a book analyzing his sculptures for fear it might inhibit his creativity – the ‘paralysis by analysis’ syndrome. For me, just the opposite has been the case. Analysis has boosted creativity and helped me understand factors driving existing paradigms so they can be changed. Cusmariu 2009 opened that door. I applied my training in analytic philosophy elsewhere as well: to film analysis in Cusmariu 2015 and to art criticism and music analysis in Cusmariu 2021A and B, respectively. I worked on my book *Logic for Kids* and several technical philosophy articles concurrently with making *Counterpoint* sculptures. I wrote three film scripts, *Muybridge*, *Fancy Free* and *Light Becomes Her*, while making sculptures, including the first *Counterpoint* series and its predecessors. Phenomenalism, mereology and logic have gotten me this far and I fully expect their concepts to continue to be productive. I look forward to new and exciting applications of Turing-like ontological and epistemological algorithms.

Postscript

After submitting this article, I began work on a new series of Counterpoint B sculptures based on the theoretical framework described above, inspired by Umberto Boccioni's Unique Forms of Continuity in Space. The sculptures will involve seeing-as vision for their interpretation, unlike Boccioni's. Some two-dozen pieces using found and manufactured objects are planned.

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