



The Crystal Interface in Contemporary Art: Metaphors of the Organic and Inorganic

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The term “crystal interface” is an expression that first arose and remains important in the science of crystallography. As a technical term, it describes the contact point between crystal compounds or a crystal and another substance. J.V. Smith describes the importance of this threshold area:

Consider two perfect crystals, not necessarily of the same type, meeting at an interface. The geometrical misfit between the lattice nodes provides the simplest possible guide to the energy at the interface, and can be used in understanding the textures of polycrystalline metals and of mineral intergrowths [1].

Crystals are not the province only of the sciences, however, nor are they always chemical or material. Crystals are incorporated physically into works of art and are often represented in the visual arts and in literature. Crystals, then, have both a literal dimension and a metaphorical presence. If we broaden the connotation of the “crystal interface” to include both meanings, we may better appreciate the remarkable ways in which crystals work in the contemporary visual arts. I argue that the crystal interface is a zone of exchange between the visual arts and the sciences and philosophies of the crystal.

THE PHILOSOPHY OF THE CRYSTAL

Artists and philosophers have used the image of the crystal with remarkable frequency. The solids that Plato described in the *Timaeus* were crystalline in form, their geometric stability a fitting cognate for the immutable Forms that he believed stood behind our everyday reality. Arthur Schopenhauer, one of the great commentators on Plato, used the crystal as a unique example in his attempt to understand the gradation of nature from the inorganic to humanity. “Every organism represents the Idea of which it is the image or copy,” he wrote in a particularly Platonic moment [2]. He asserted, “The boundary between the organic and the inorganic is the most sharply drawn in the whole of nature.” Yet in explaining the development of our defining “Will” in nature, he returned to the crystal as an anomaly. “In the formation of the crystal we see . . . a tendency to life,” but in fact, “the crystal has only one manifestation of life, namely its formation.” Tempted as he is to credit it with

living existence, for Schopenhauer the crystal is finally only “the corpse of that momentary life” [3]. Schopenhauer previews reasons for the philosophical and aesthetic fascination with the crystal that I explore below. Crystals are compelling because they are indexical of existential questions, poised at the crossing point of life and death. While their perfect forms appear lifeless, they suggest life because they “grow” and move. Even as “corpses” they function as physical reminders of life.

CRYSTALS IN ART AND ARCHITECTURE

The use of the crystal as form and metaphor recurs in the plastic arts so commonly that we can rightly think of it as an obsession. Without presenting a survey, an orientation to the attractions of the crystal could begin with Paxton’s famous Crystal Palace, the gem of the London Great Exhibition of 1851, and bring us to the present in Daniel Libeskind’s “Michael Lee-Chin Crystal” addition to the Royal Ontario Museum in Toronto (2007) (Fig. 1). A significant moment along this timeline is early 20th-century German Expressionist glass architecture. In all these examples, the crystal’s seduction lies in its ability simultaneously to materialize intimations of transparency, of vitalistic transformation and of a purist stability. As the Expressionist architect Adolf Behne wrote in a 1915 review of Bruno Taut’s architectural projects,

The longing for purity and clarity, for glowing lightness, crystal-line exactness, for immaterial lightness, and infinite liveliness found in glass a means of its fulfillment—in this most bodiless, most elementary, most flexible, material [4].

While crystals in the form of various geometrical solids appear in the visual arts over many centuries—examples include Jacopo de’ Barberi’s portrait *Luca Pacioli*, c. 1499, and Dürer’s *Melancholia I* of 1514, both of which represent polyhedra [5]—they became intensely interesting in the early 20th century and again in the earth art of the 1960s and 1970s. They are prevalent in contemporary art, not primarily because crystals are thought to be timeless, pure and stable forms nor because they offer references to earlier art practices. Crystals appear so widely and potently in art today because they help us to articulate the line between the animate and the inanimate,

ABSTRACT

What the author calls the “crystal interface” presents an opportunity to historicize and theorize the remarkable fascination with crystals found in contemporary art theory and practice. In aesthetics, science and art production, the crystal materializes intimations of transparency, of vitalistic transformation or of a purist stability. It powerfully articulates a line or gradation between the organic and inorganic. The author’s goal is to create a context in which to understand the recourse to the crystal in contemporary art, specifically in the work of Roger Hiorns, David Altmejd and Gerard Caris. As a frame, the author examines Schopenhauer’s, Worringer’s and Deleuze and Guattari’s adoption of the crystal as metaphor and material exemplar.

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Article Frontispiece. David Altmejd, *The Index*, multimedia sculpture, 333 × 1297 × 923 cm, 2007. Art Gallery of Ontario, Toronto. **Detail.** Crystals abound in this sculpture, both as specimens and as vital entities that rend Altmejd’s figures. (© David Altmejd)



Fig. 1. Daniel Libeskind, The Michael Lee-Chin Crystal, Royal Ontario Museum, Toronto, 2007. (Photo © Mark A. Cheetham) Libeskind continues the tradition of using crystalline forms in architecture.

as Schopenhauer understood. To comprehend why this distinction should be of pressing concern today is beyond the scope of this paper, but certainly our technological prowess has made the distinction between human and machine one to question. Our sense of what “nature” is and what it is not is also of pressing concern today. It is the source of what I would call “natural anxieties,” many of which are worked out in the visual arts. Worldwide, millions flock to art museums to see what we would normally think is external to us and beyond our control, such as Olafur Eliasson’s magnificent indoor sun—called *The Weather Project*—seen at the Tate Modern in London in 2003. In smaller numbers but with great conviction, art tourists also seek out “natural” experiences in the most contrived, high-tech creations of recent land art, such as James Turrell’s unfinished *Roden Crater* in the Arizona desert, a geological form turned into a colossal eye on the cosmos. What we witness in these pilgrimages is new. More than a symptom of our nostalgia for a benevolent nature or of our fears about the destruction of the environment, it is a sign of confusion about what and where nature is and also, potentially, an indication of revisionary thinking. The contemporary art of the crystal manifests analogous fears and hopes. By examining several instances that involve the science, aesthetics and art of the crystal, I hope to establish a context in which to understand this recent return to the crystal. Again, I claim that part of the fascination and recourse to the crystal as form and metaphor lies

in its liminal position on the border between the inanimate and animate, the inorganic and the organic.

CRYSTALS IN SCIENCE STUDIES

Crystals are important substances in many sciences. In chemistry, biochemistry, molecular biology, physics and environmental science, a crystal is defined routinely as “A homogeneous regularly shaped solid with flat surfaces (faces) and specific angles between the faces. The crystal form varies from one substance to another, reflecting the atomic, molecular, or ionic structure of the crystal,” and “any three-dimensional solid aggregate in which the plane faces intersect at definite angles and in which there is a regular internal structure of the constituent chemical species” [6]. However, science is not limited to studying and producing crystals: As Donna Haraway has argued, the crystal and the regular morphologies of crystallography have been guiding metaphors in biological fields, perhaps because crystals are eminently visualizable. Working against what she construes as positivistic science, Haraway contends that in science, as in culture generally, “There is no absolute court of appeal; there are only alternate world views with fertile basic metaphors” [7]. The crystal is one of these enabling metaphors, which is not to say that it is just a metaphor for scientists or for artists. In addition to its existence in the realms of language and imagination, for both groups crystals are also irrefragably

material. The metaphor of the crystal in part guides what scientists can discover experimentally. For example, Haraway argues that Ross G. Harrison—“who virtually founded the science of experimental embryology in the United States”—deployed the crystal metaphor to understand that “axial differentiation in the embryo could be compared to spatial relations of atom groups in certain carbon compounds,” thus spanning the presumed gap between the organic and inorganic. “Harrison’s use of crystal analogies allowed him to bypass assumptions of the mosaic-mechanistic theories of development about part-whole relations” [8]. I argue below that the experiments with pentagons and dodecahedrons pioneered by contemporary Dutch artist Gerard Caris explore from the side of art what crystallographers subsequently found compelling about five-sided crystal structures as well as speculations in neuroscience about crystal-like organization in the brain.

CRYSTALS IN THEORIES OF VISUAL CULTURE

A glance at the productive sharing of the crystal among visual theory, art history and art practice sets the stage for the contemporary art of the crystal. Aesthetician Wilhelm Worringer’s use of the crystal as a model of “the laws of regularity, [derived] from inanimate matter” articulated the core of his highly influential theory of the urge to abstraction, published in *Abstraction and Empathy* (1908) [9]. Worringer looks back to Alois Riegl, one of the founders of art history, for his vaunted view of the crystal, and ahead to artist Paul Klee, who famously characterized himself as a crystal in 1915 [10]. In our own time, the exchanges made possible by the crystal can be seen vividly in the writing of philosophers Gilles Deleuze and Félix Guattari. Deleuze theorizes the “crystalline” image in film theory and thus reminds us of the powerful organic-inorganic topos invested in the metaphor by Worringer. Beyond (and prior to) the examination of film, Deleuze’s adoption of the crystal can be traced back to a nexus of descriptions of mineralogy and geology, topics he developed extensively with Guattari in *A Thousand Plateaus: Capitalism and Schizophrenia* (1980). There they use the crystal as an example of a powerful “form of organization” [11]. For them, crystals do not simply grow and then “die,” which is Schopenhauer’s reading. They claim that

on a crystalline stratum, the amorphous milieu, or medium, is exterior to the seed before the crystal has formed; the crystal forms by interiorizing and incorporating masses of amorphous material. Conversely, the interiority of the seed of the crystal must move out to the system's exterior, where the amorphous medium can crystallize [12].

For Deleuze and Guattari, then, material existence—could we say “nature”?—is not divided between the inorganic and organic. Crystals have and are “seeds” that endlessly replicate. Deleuze and Guattari use the crystal to demonstrate that there are “many intermediaries between the exterior milieu or material and the interior seed: a multitude of perfectly discontinuous states of metastability constituting so many hierarchical degrees” [13]. Deleuze and Guattari offer the idea of all existence as a continuum rather than divided strictly between organic and inorganic matter, with crystals as a prime example.

Deleuze and Guattari's geoaesthetics can be tied to the prominent use of crystals in the work of earth artists, most famously Robert Smithson—whose signature work, *Spiral Jetty* (1970), is increasingly composed of crystals thanks to its location on the shore of the ever rising and falling Great Salt Lake in Utah, and who wrote on the subject in his 1966 essay “The Crystal Land” [14]. We should also recall Joseph Beuys's project *7000 Oaks*, begun at Documenta 7 in 1982, which, in the artist's terms, underlines the question of the organic/inorganic divide or spectrum that I see as the heart of the crystal as scientific phenomenon (actual crystals and the process of crystallization) and metaphor (the analogies with purity, growth, perfection and stability that I have noted). Beuys wrote:

My point with these seven thousand trees was that each would be a monument, consisting of a living part, the live tree, changing all the time, and a crystalline mass, maintaining its shape, size, and weight. This stone can be transformed only by taking from it, when a piece splinters off, say, never by growing. By placing these two objects side by side, the proportionality of the monument's two parts will never be the same [15].

These precedents inform our understanding of the contemporary life of the crystal in art practice. I have three further examples that I will use to examine more critically the import of the crystal exchange between art and science. Two are by newly prominent artists now in their 30s; the other is work by a veteran of European geometric abstraction.

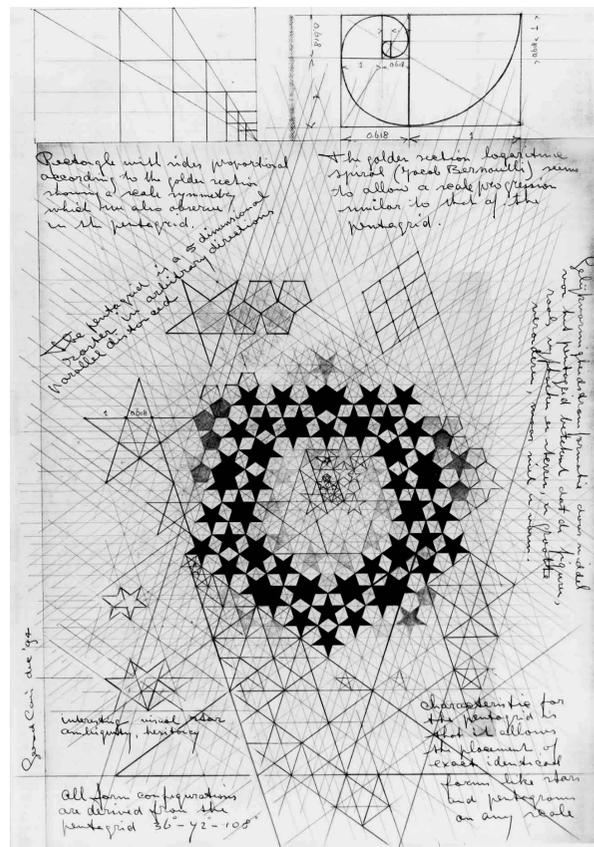
CRYSTAL INTERFACES IN THE CONTEMPORARY VISUAL ARTS

The literal and metaphorical dimensions of the crystal in art are most often found together, though not always in equal proportions. Famous in this regard is the overwhelmingly successful installation *Seizure*, by British artist Roger Hiorns, seen in London in the fall of 2008 and reopened because of audience demand in the summer of 2009 (Color Plate A No. 1). Hiorns took a ground floor apartment in a little-loved housing development that was slated for demolition, made it watertight and then filled it with 90,000 liters of copper sulphate solution. He then left the chemicals to form crystals, drained the space and encouraged visitors to tour the beautiful yet alien blue interior. In a manner reminiscent of Beuys's shamanistic side, Hiorns states, “I'm not a scientist. I'm more concerned with starting a natural process, which will go on happening by itself. It's never ending. It won't stop, whatever you do. I try to keep myself out of my work. SEIZURE is kind of autogenetic—growing by itself” [16]. His crystals have grown virally (to mix a metaphor), just as in J.G. Ballard's 1966 novel *The Crystal World* [17], a book that also informed Smithson's thinking. In *Seizure*, their animation is sinister,

yet their individual, saturated stillness remains seductive. Hiorns establishes audience expectation by issuing rubber boots and gloves in which patrons negotiate the wetness of the site. In this way as well as in the attention paid by the work to a decrepit area, the work is social. However, its use of spectacular crystals becomes personal too, given that many visitors have broken off parts of the work to take with them.

Crystals take over many of David Altmejd's violent and disturbing hybrid sculptures of the human, animal and crystal, especially in his room-sized *The Index* (Article Frontispiece and Color Plate A No. 2), which was first shown at the Venice Biennale in 2007. Grotesquely beautiful and compelling, the work has a science-fiction aura. It also returns us to Schopenhauer's thinking about the organic and inorganic. “Instead of rotting,” Altmejd asserts, “the characters in my work are crystallizing. This makes the narratives of the pieces move towards life rather than death” [18]. His central character here is a fusion he has been revisiting since 1999, a rebarbative werewolf, now ripped apart to reveal a crystal armature that appears to be growing. The unstoppable crystals pry the animal body apart. “I saw these crystallizing werewolf heads as energy generators,” Altmejd reports [19]. In this part of the

Fig. 2. Gerard Caris, *Pentagrid*, mixed media on photostatic paper, 42 x 25.9 cm, 1994. Artist's collection. Photo courtesy the artist. (© Gerard Caris) Caris's signature “Pentagonism” is a 40-year experimental series focusing on five-sided figures.



work and in smaller, quieter, display-like side niches, Altmejd uses “real” quartz crystals to exploit their metaphorical resonances. These contrast both with the roughly made crystals of mirror glass that he uses throughout the piece and with the oozingly organic dripping runs of wax-like material that we see throughout the work. *The Index* deploys the crystal in a reconception of the animal and the human, their interconnections and ferocious metamorphoses. Not content with animal to animal, organism to organism transmutations, however, Altmejd makes corporeal the fundamental creative energies that cross borders between animate and inanimate matter. “What I am interested in making are sculptures not installations,” he claims; “I like it when my sculptures are like self-contained organisms” [20]. While his crystals are dynamic, they are also, to recall Schopenhauer’s phrase, “the corpse of that momentary life” that they seem to have both created and terminated.

The “Pentagonism” of Dutch artist Gerard Caris is at once an artistic and scientific exploration of the crystal interface and thus deserves a detailed commentary. Caris has been exploring the complex beauty of the pentagon and dodecahedron for over 40 years. Deploying what two prominent commentators have called an “obsessive” single-mindedness and energy [21], he continues to unfold for us the mysteries of these forms (Figs 2 and 3). One of the perpetually fascinating qualities of Pentagonism is its material expression of the focused yet extensive potential for connections allowed by pentagons and dodecahedrons, their repetition and growth through tiling and 3D adhesion along their faces. Caris writes, “Regular pentagons cannot tile the plane without leaving gaps; fivefold symmetry is impossible in periodic structures; regular pentagons can shape just one polyhedron, the dodecahedron” [22]. For Caris, this seeming irrationality is the lure for his life-long experiments with the pentagon:

The law of the golden section inherent to the pentagon continuously repeating itself in two and three dimensional structuring and exemplified by my pentagrid drawing [1994, Fig. 2] reveals a division of a line at 0.618 of its length seemingly conflicting with the harmony of the universe in that it is an irrational incalculable number. Yet this irrational given seems to underlie the very construction of the universe and everything in it . . . the flowers in the field, the crystals underneath, the shape of foam in any fluid, and solidification thereof all show a persistent preference for this ordering system [23].

In exploring the uniqueness of the pentagon and its 3D relatives, Caris partakes of what we can call a “crystal consciousness,” a quest for a clear and immutable understanding of natural, even cosmic laws through geometry and the habits of crystals. Caris has chosen to explore the pentagon because its “dodecahedra forms give rise to an entirely new form . . . in that it explores and shows creations never envisioned before in art.” Such precedents as there are in the visual arts—in Dürer for example—show singular dodecahedrons, not the space-filling extensions of regular and irregular 5-fold polyhedrons developed in Pentagonism. Tellingly, too, nature does not seem to replicate in this manner. In Caris’s words, this is “due to the scientific crystallographic restriction [to] twofold, threefold, fourfold and sixfold symmetry.” As Bohnen has rightly noted, only in 1984—well after Caris’s 3D experiments, which go back to the 1970s (Fig. 3)—did crystallographers manage to reproduce synthetically a 5-sided (pseudo- or quasi-) crystal [24]. Pentagonism is thus unprecedented in art and science. At the same time, it is profoundly representative of the crystal consciousness of Worringer, Klee and others that was central to abstraction and to other modes of contemporary art production that we have looked at above. For Caris, its forms are dynamic and endlessly regenerative, yet stable and in some way fundamental to the structure of reality.

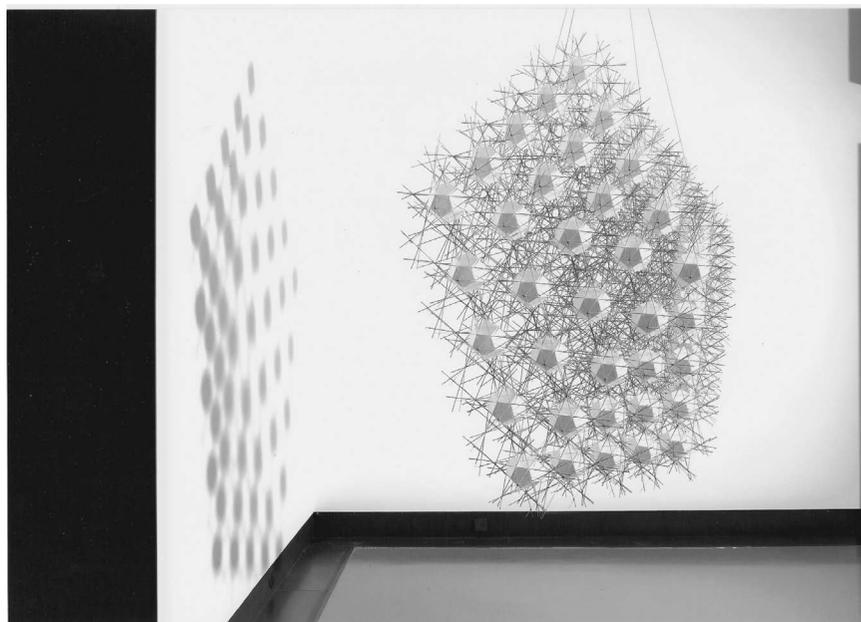
If Pentagonism can be the name we give to the geometricizing, crystal tendencies of certain forms of abstraction, it links to

contemporary art history in another important way. A central debate in this field today centers on the purported neurological bases of perception and meaning production. John Onians has called this frontier “Neuroarthistory” [25]. Barbara Maria Stafford makes the connection between art and groundbreaking scientific research that, in my view, Caris has anticipated with Pentagonism:

There appears to be an echoic relationship between the carpentered outer world of edges and our staked-out mind-brain. This hypothesis of congruity is supported by different kinds of research. First, the cortex has long been known to be made up of geometrically defined repetitive units. These cellular “crystals” are now the subject of mathematical investigations into the patterns of connection linking the retina, the striate cortex, and the neuronal circuits in V1 (= Visual Cortex 1) [26].

Stafford’s source for this argument—a complex, technical article by Paul C. Bressloff and Jack D. Cowan provocatively titled “The Visual Cortex as a Crystal” [27]—claims that the visual cortex’s structuring crystals are perhaps hexagonal or square, not pentagonal. Thus not only does the brain respond uniquely to abstract art, as Semir Zeki’s research has shown [28], parts of the brain “echo” the structures of geometric abstraction and (so the argument would go) vice versa. However, no part of the brain is pentagonal, any more than Plato’s mysterious fifth solid actually mirrors the universe, as he intimated in the *Timaeus*. Pentagonism is the artistic side of what Stafford calls a “psychophysical parallelism”; its

Fig. 3. Gerard Caris, *Polyhedral Net Structure #3*, soldered steel wire, cardboard, linen, paint, 200 × 200 × 90 cm, 1973. Artist’s collection. Photo courtesy the artist. (© Gerard Caris)



crystalline abstraction does not exactly reflect nature or science or earlier art but rather establishes an exchange among these cultural discourses.

Oliver Elbs argues that there is little scientific agreement on the crystalline structure of the visual cortex:

when you *closely* look at the corresponding *microscopic image* of VI (obtained by mapping the inhibitory center neurons of each hypercolumn), you can see a pattern that may not be regular-hexagonal and periodic (or “crystal-like”) at all, but that may be rather quasiperiodic (or quasi-crystal like) [29].

Thus, the links I have projected between Caris’s art and the visual cortex as crystal interface are at best speculative. In John Onians’s neuroarthistory, however, I think there would be a profound historical and contemporary connection between the structure of the visual cortex and crystal forms. “Riegl,” he claims, “must have believed that the knowledge of the crystalline structure of matter derived only from some sort of empathy, with its roots in the nervous system” [30]. Again thinking historically, we might call this the “hopefulness” of the crystal as metaphor, especially given that Worringer’s use of the crystal to describe his ideal abstract mode of expression was in part inspired by Riegl. There is something persistent—if not precisely timeless—about the crystal in art. It turns on the optimistic view that mirroring and duplication between mind and world will continue. We have seen examples of this positive valence: The potency of crystalline generation is felt as Roger Hiorns’s *Seizure* transforms a condemned apartment into a site of beauty so magnetic that the exhibition’s run had to be extended twice to accommodate the crowds wanting to see it. David Altmejd recounts a narrative of a visit to his studio by renowned artist Matthew Barney (author of the *Cremaster* cycle of films) that concludes on a similarly regenerative note:

The visit lasted 45 minutes. . . . Everything he said [about my work] was haunting and optimistic at the same time. He was the first person to make it clear to me that all the organic growing shapes and crystals I was using were positive. He actually used the word “hopeful” [31].

CONCLUDING SPECULATIONS

Where does the current fascination for the crystal in the visual arts lead? I have emphasized that crystals are liminal entities, whether as substances that mark a crucial position on a continuum from the organic to the inorganic or in their work as metaphor. Thanks to this behavior, the

crystal interface offers a model for disciplinary exchange. It presents, through a practice of interaction, an opportunity to develop, theorize and historicize interactions among the humanities, science and the visual arts. More than simply allowing such interdisciplinary transfers to happen, the crystal offers the possibility of productive and deepened interaction, by which I mean work in each area that is cognizant of issues in the other fields.

References and Notes

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13. See Deleuze and Guattari [11]: 49; 50.

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20. See Dubé [19], p. 12.

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22. Unless otherwise noted, statements by Caris are taken from “Pentagonism,” Artist’s Statement <www.gerardcaris.com/statements.html>.

23. Letter from Gerard Caris to the author, May 27, 2008.

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29. Oliver Elbs, “Gerard Caris’ ‘Pentagonal Inverse.’” I would like to thank Dr. Elbs for allowing me to read and cite this unpublished article.

30. See Onians [25], p. 132.

31. See Gladman [18], p. 41.

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