Art and Infinity

Antony Gormley's *Infinite Cube*

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ABSTRACT

This essay explores how the concept of infinity is made visible and tangible in art, taking as its point of departure *Infinite Cube* by Antony Gormley—a work inspired by the designs and vision of Gabriel Mitchell. Through this collaborative and commemorative object, the essay reflects on how the infinite appears within the finite, drawing connections between artistic form, embodied perception, and mathematical abstraction. It weaves together historical and contemporary examples—from Renaissance perspective and Blake's "infinite particular" to Yayoi Kusama's immersive environments and speculative geometry—to argue that art offers a privileged site for encountering infinity not as abstraction, but as sensuous and relational experience. Combining personal narrative, critical theory, and visual analysis, the essay foregrounds the role of art in mediating between the cosmic and the intimate, the conceptual and the concrete.

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1   INTRODUCTION

A paper on art and infinity is in serious danger of going on forever, so
I want to begin by assuring you that this will not be quite that long.

2   BIOGRAPHY OF AN OBJECT

Let me start with the bare material facts about the *Infinite Cube* (fig. 1).
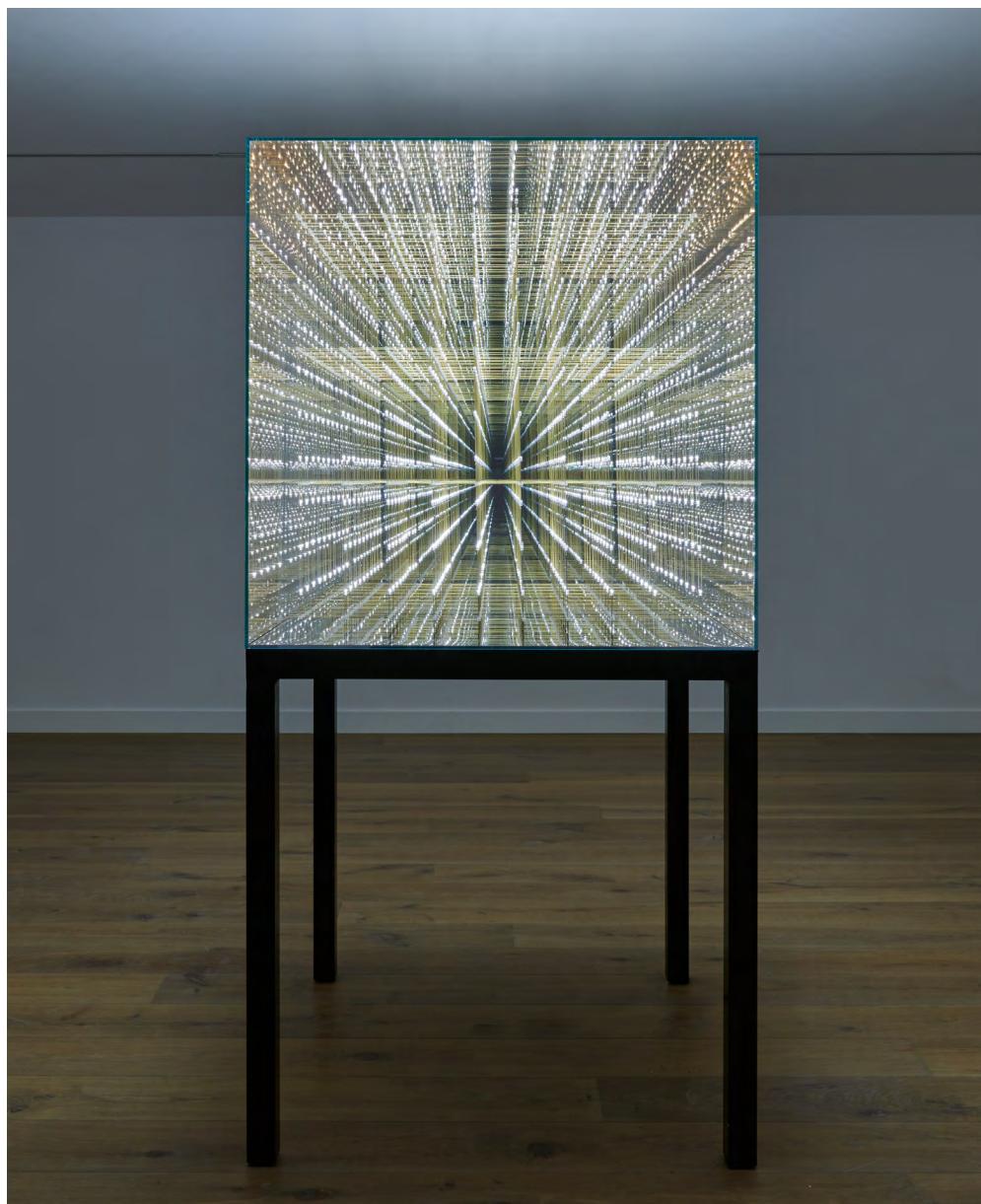
Figure 1.
Antony Gormley, *Infinite Cube*, 2014, mirrored glass with internal copper wire matrix of 1,000 hand-soldered omnidirectional LED lights, 91.4 x 91.4 x 91.4 cm.

Collaboration between Antony Gormley and Gabriel Mitchell; installation view, Kettle's Yard, Cambridge, England. © Antony Gormley. All rights reserved. Photograph by Ben Westoby.

Despite its optical impression as a space that extends indefinitely in space, it is a finite material object, carefully measured and counted: It is a 36 × 36 × 36 in. (91.44 × 91.44 × 91.44 cm) cube of mirrored glass on a 36 in. high steel table containing a matrix of 10 x 10 x 10 copper wires with one thousand omnidirectional LED lights hand-soldered into the intersections (fig. 2).
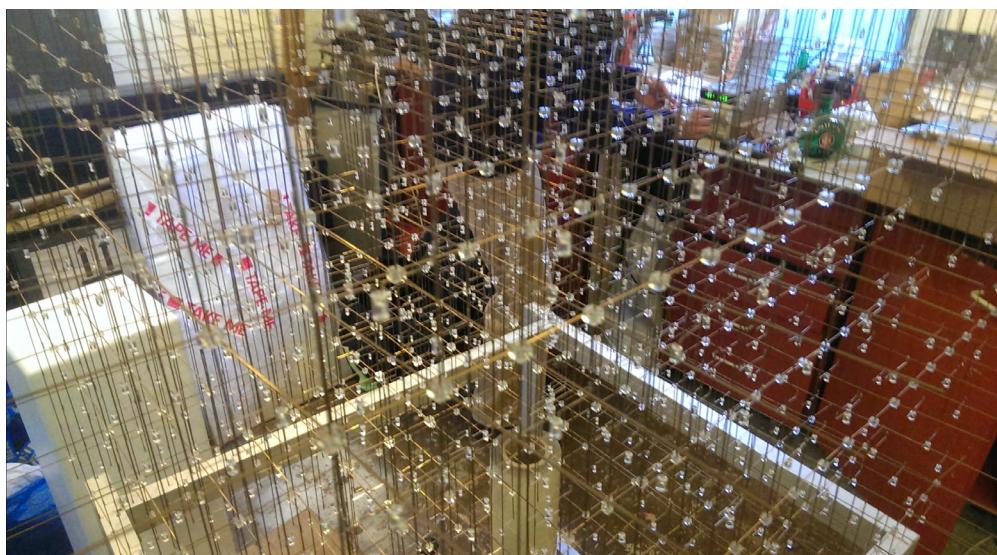

Figure 2.
Infinite Cube being assembled.

The concept of the Infinite Cube was first formulated about fifteen years ago by my son, Gabriel Mitchell, who made (fig. 3) diagrams and models of it which we will come back to at the end of this visual essay.

Figure 3.
Model of *Infinite Cube*.

Gabriel was inspired by Hannah Higgins' *Grid Book* of 2009 (fig. 4), which she gave him as a gift, and which he pillaged for images in a 2010 video entitled *Grid Theory*, with marimba music written by Gabe's mother, composer Janice Misurell Mitchell.[1]
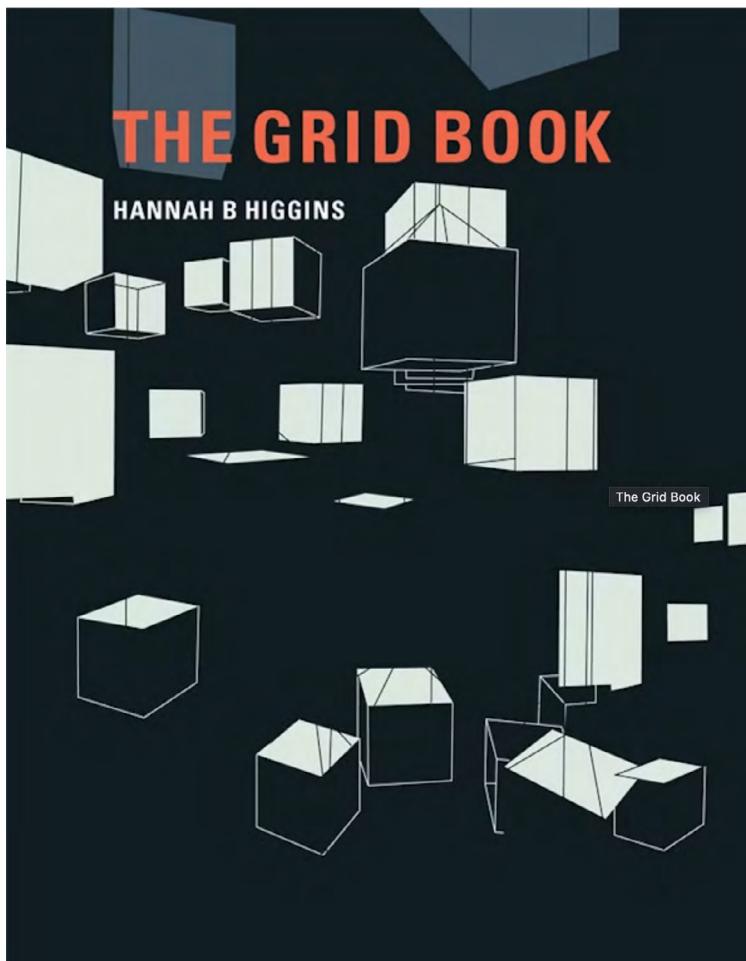

Figure 4.
The Grid Book by Hannah B. Higgins, published by the MIT Press. ©2009 MIT. All rights reserved.

He was also inspired by the work of British sculptor Antony Gormley, who had discussed Gabe's idea with him, and whose experiments with glass enclosures suggested practical ways of realizing it (fig. 5). After Gabe's death in 2012, he asked our permission to complete the project. The *Cube* arrived at the Smart Museum in December of 2014.

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1. *Grid Theory*, directed by Gabriel T Mitchell, 2012, 10:26, https://www.youtube.com/watch?v=c0AZoIGUiFc.

The *Infinite Cube* has always seemed to be an occasion for gathering
and collaboration, from its initial conception to its realization as an
object of public display. In its several Smart Museum installations,
school groups have gathered around it to make up stories about it, or
cluster close enough to leave nose prints which are duly washed off
every day (fig. 6).

Figure 6.
Elan touching *Infinite Cube.*

2. *The Infinite Cube*, directed by Janice Misurell-Mitchell, 2025, 7:46,
   https://www.youtube.com/watch?v=6gmoPKsu6XA.

The Smart Museum curators have experimented with a variety of installations, none more dramatic than the current exhibition in a dark room that makes it seem to float in darkness. But it has also been installed out here in the sun-drenched atrium, where it has the effect of incorporating the entire rainbow of colors and forms of the building into its structure. The *Cube* is a highly responsive object, resonating with every situation in which it appears. When dancer Irene Hsiao first encountered it, she immediately declared that she wanted to dance around it, and Dee Alexander was happy to join in with Janice Misurell Mitchell to provide the appropriate "music of the spheres."[2]

3   THE ARTS OF INFINITY

In pursuing the art of infinity, Gabe was in good company in contemporary art. Perhaps the most obvious parallel is Yayoi Kusama's *Infinity Mirror Room* (fig. 7), which immerses the viewer inside an illusion of infinite space, rather than enclosing it in a finite object. Kusama's room stabilizes the illusion by creating an invariant horizon line that suggests a nighttime view over a sea or a city. Gormley's *Cube*, by contrast, responds to every movement of the viewer's body, producing a constant fluctuation of angles, shapes, intersections, and colors.
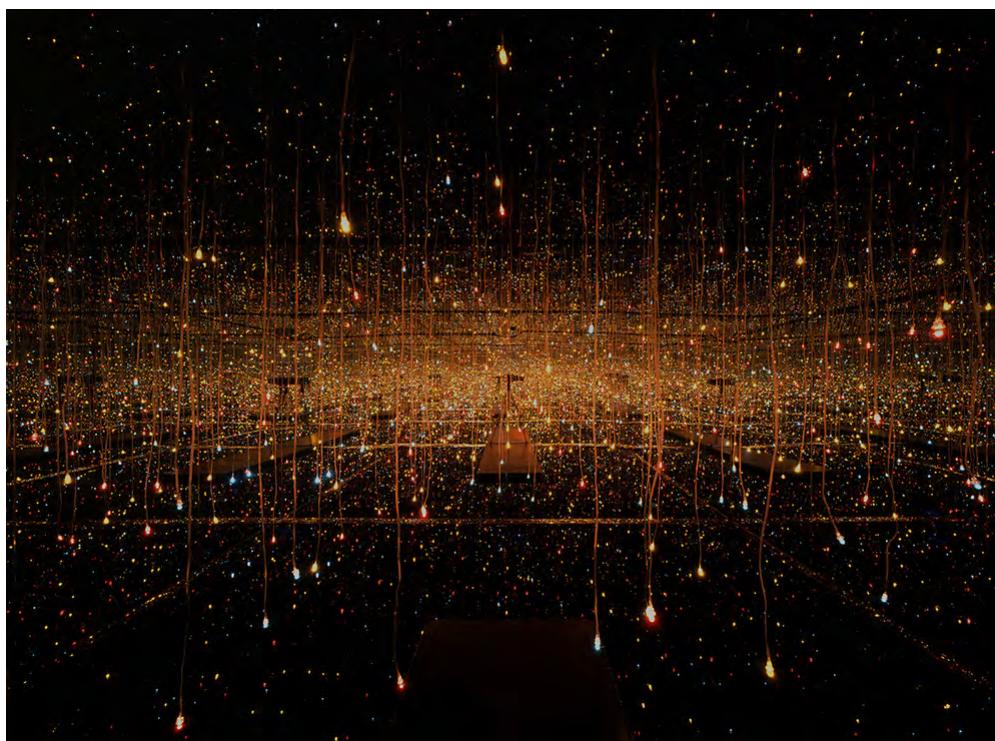
Figure 7.
Yayoi Kusama, *Infinity Mirrored Room - Fireflies on Water,* 2002.

The visual representation of the infinite is not a uniquely modern phenomenon. Fascination with infinity seems hard-wired in human consciousness, and appears everywhere in ancient art and religion, where ideas of the godhead often turn to immortality and vastness. Here is a set of examples (fig. 8) that includes the ouroboros, the dragon swallowing its own tail, the ancient Greek pattern of the meander, the *yin yang* map of the poles, the Hebrew Kabbalah's "there is no end", and the figure eight on its side that is now the international symbol of mathematical infinity.
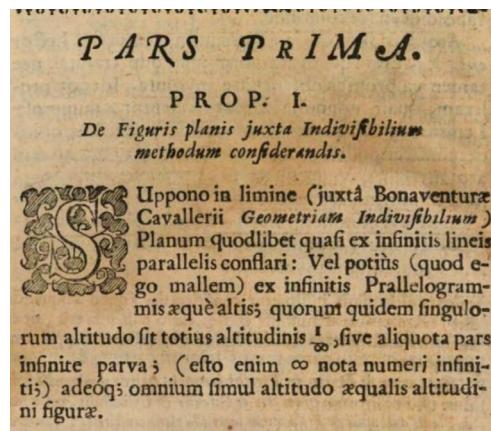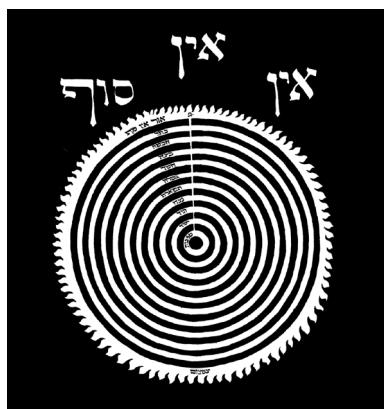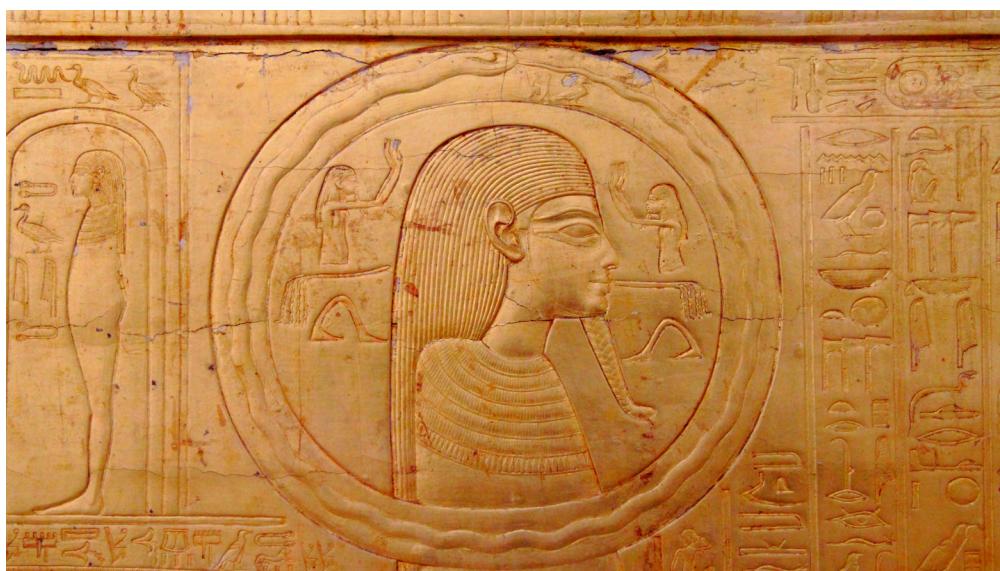

Figure 8.
Ancient signs of infinity.
Top: First known representation of the ouroboros, on one of the shrines enclosing the sarcophagus of Tutankhamun. By Djehouty - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=57397072
Middle-left: Kabbalah's *Ein Sof.* (Public Domain: This work is in the public domain in the United States and other countries where copyright terms extend to the author's life plus 70 years or less).
Middle-right: Yin Yang symbol in Temple of Supreme Purity of Tai Qing Gong at Laoshan. Steve Heap/Shutterstock.com.
Bottom-left: Roman meander mosaic of a tepidarium, Herculaneum, Italy. By Amphipolis - Herculaneum — Women's Baths, CC BY-SA 2.0, https://commons.wikimedia.org/w/index.php?curid=52684189
Bottom-right: First known usage of the infinity symbol, Wallis, J. (1655) *De sectionibus conicis nova methodo expositis tractatus.* John Wallis, Public domain, via Wikimedia Commons.

In the Chinese "Infinity Stone," the emphasis is on intricate complexity rather than indefinite extension in time and space (fig. 9).

Nowhere is this complexity more thoroughly explored than in the mathematical approach to infinity. The concept of the boundless, endless, and uncountable has fascinated mathematicians from Aristotle to Einstein, so much so that they have actually tried to count the number of different kinds of infinity. This attempt goes well beyond the disciplinary triad of mathematics, physics (is the universe infinite?), and metaphysics, which I find a bit disappointing since it leaves out the arts, where ideas of the infinite appear in concrete, sensuous forms. Both science and religion conjure up images of the infinite, gathering groups of both skeptical researchers and true believers around iconic forms. Modern mathematics, beset by the uncertainties that surround quantum mechanics, developed set theory in order to distinguish "cardinal infinity" (the natural numbers, 1, 2, 3, etc) from "ordinal" (first, second, third, etc.), along with

potential and actual infinities. "Infinity at a point" becomes available to visual representation in the phenomenon of the "vanishing point." It also distinguishes smaller and larger orders of infinity, best illustrated by the difference between "natural" and "real" numbers. Strange, brain-teasing conclusions emerge from these speculations. The set of real numbers (which includes fractions and decimals) is a larger infinity than the set of natural numbers. But the set of even numbers is exactly the same scale of infinity as the totality of natural numbers, when intuition tells us that it should be only half the size. The most mind-boggling frontier of set theory has now concluded that there may be an infinite number of infinities, nicely illustrated in *Quanta Magazine* by a volcanic eruption/tornado of infinite Gothic castles spiraling up into the heavens to the amazed contemplation of a bemused mathematician.[3]

The Quanta cartoon suggests that even the most abstract speculations of mathematics can never entirely free themselves from concrete images, whether diagrams or landscapes or forms. As the philosopher Gilles Deleuze put it, "Philosophy does not free itself from the element of representation when it embarks upon the conquest of the infinite. Its intoxication is a false appearance. It always pursues the same task, Iconology."[4]

The spiral form reminds us of the cyclical structure of Nietzsche's "eternal return," and the vertiginous descent into the maelstrom described by Edgar Allan Poe. This scene of the bemused set theorist echoes quite precisely the traditional depictions of sublime landscape in a variety of traditions. Mathematics is caught between the worlds of physics and metaphysics, in a state of uncertainty about its relation to the real world. Do its numbers help to anchor us in actuality, or do they suck us into a black hole of abstract speculation, a vanishing point beyond comprehension? (fig. 10)

3. Natalie Wolchover, "How Many Numbers Exist? Infinity Proof Moves Math Closer to an Answer," *Quanta Magazine*, July 15, 2021, https://www.quantamagazine.org/how-many-numbers-exist-infinity-proof-moves-math-closer-to-an-answer-20210715/.

4. Gilles Deleuze, "The Simulacrum and Ancient Philosophy," in *The Logic of Sense* (Columbia University Press, 1990), 260.
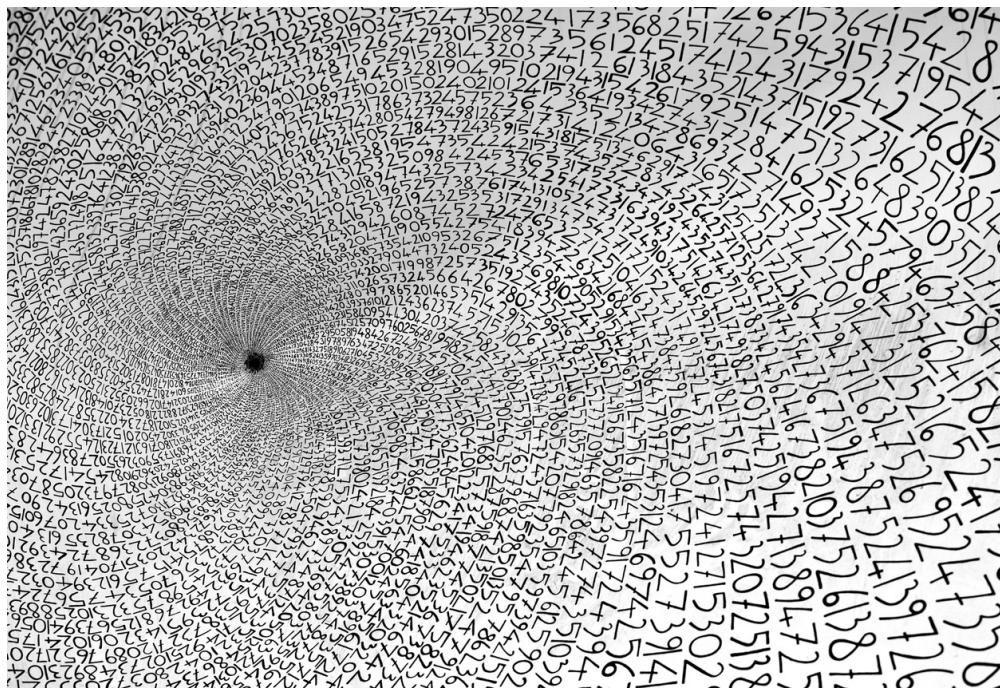
Figure 10.
infinite pattern of numbers in
whirlpool. Balaz5/Shutterstock.
com

How can we strap ourselves securely to a mast, like Ulysses listening
to the seductive call of Sirens, or JMW Turner (fig. 11) imitating
Ulysses' action to contemplate a steamboat trapped in a snowstorm?
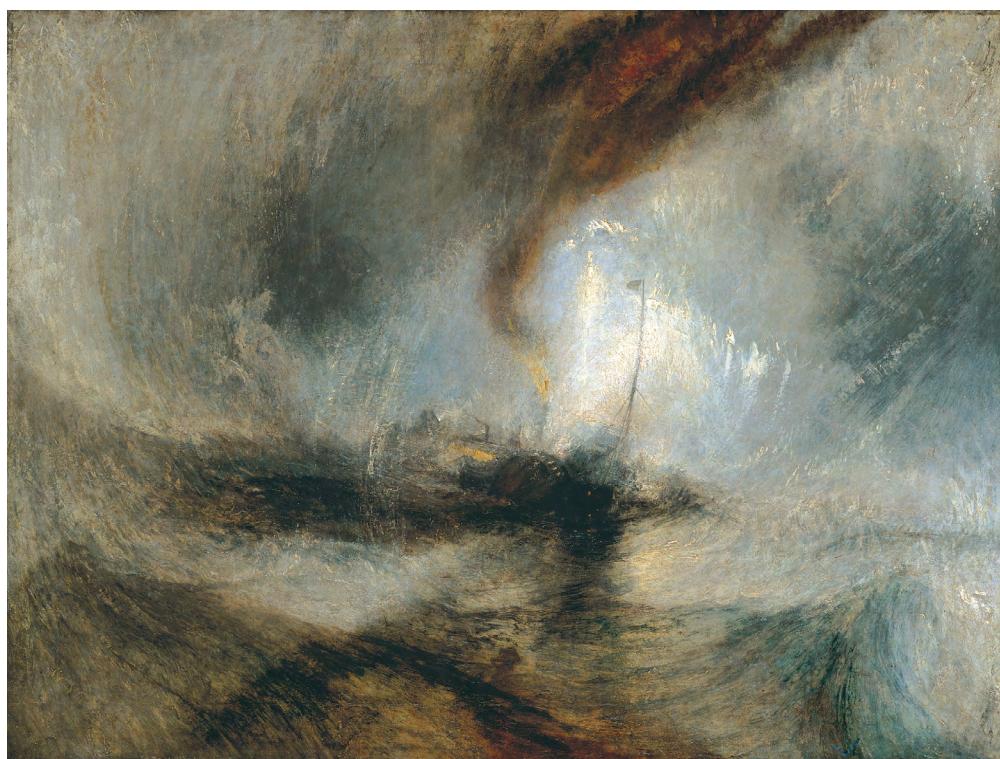
Figure 11.
J. M. W. Turner, *Snow Storm:
Steam-Boat off a Harbour's
Mouth,* 1842. Public domain, via
Wikimedia Commons.

Is our mathematician a master of the situation, like Caspar David Friedrich's *Wanderer Above a Sea of Clouds*, (fig. 12) or more like his *Monk by the Sea* (fig. 13), a tiny witness awestruck by the vastness of nature.
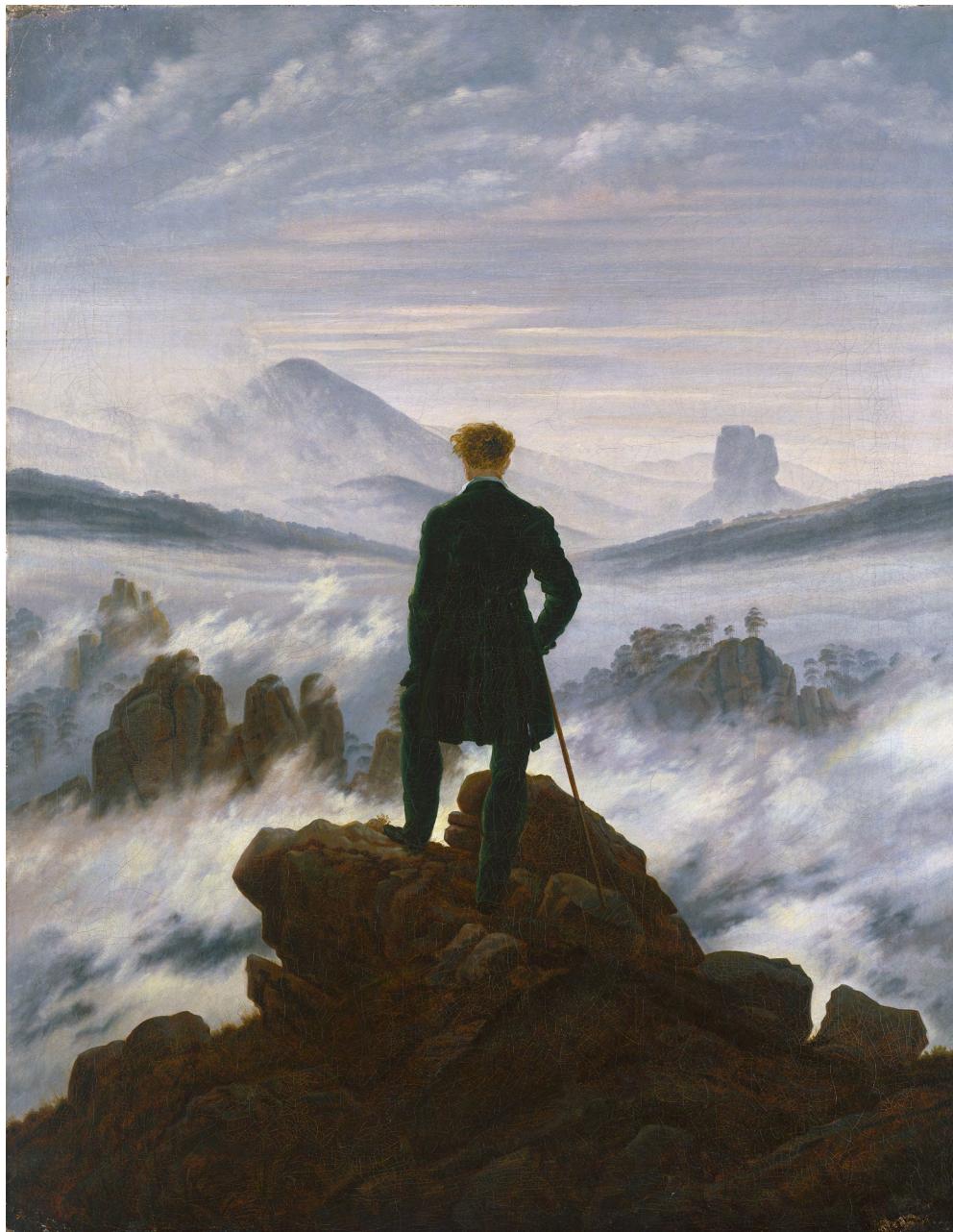
Figure 12.
Caspar David Friedrich, *Wanderer above the Sea of Fog,* 1818. Public domain, via Wikimedia Commons.

Figure 13.
Caspar David Friedrich, *The Monk by the Sea,* 1808-10. Public domain, via Wikimedia Commons.

Friedrich's version of the sublime is transformed into a site-specific sculpture in Antony Gormley's installation, *Another Place* (fig. 14), which stages one hundred iron figures cast from the artist's own body, on the tidal plane of Crosby Beach near Liverpool, England.

Figure 14.
Antony Gormley, *Another Place,* 1997, Crosby Beach in Merseyside, England. © Antony Gormley. All rights reserved. Photograph by Stephen White & Co.

Gormley transposes the sublime conceit of the isolated observer of the infinite into a community of figures (fig. 15) who watch the horizon together, and who appear and disappear each day as the tide covers and reveals them, and slowly reduces them to rust.

Figure 15.
Antony Gormley, *Another Place,* 1997, Crosby Beach in Merseyside, England. © Antony Gormley. All rights reserved. Photograph by Stephen White & Co.

4   ARTIFICIAL PERSPECTIVE

The visual arts seemed to achieve a rapprochement between mathematical and artistic infinity around 1425, when Filippo Brunelleschi painted a small panel of the Florentine Baptistery by applying the geometric rules of optical mirror reflection. This was more than an artistic event, and it had a profound effect on modern science's ambition to create representations of nature that were themselves "natural." Galileo's telescope was called a "perspective tube," and the arts of mathematical measurement and geometric diagramming became foundational for the new sciences of astronomy and optics. Alberti's treatise on perspective substituted a window

for the mirror (fig. 16), introducing a grid-like screen as the medium through which visual representation could capture physical reality. In this sense, the *Infinite Cube* fuses the mirror with the window, and constructs the grid, not as a two-dimensional screen, but a three-dimensional sculpture.


Figure 16.
Albrecht Dürer, *Draughtsman Making a Perspective Drawing of a Reclining Woman,* 1525. CC0, via Wikimedia Commons.

The idea that a two-dimensional picture could capture three-dimensional reality with mathematical certainty was not, however, the only consequence of this revolution. Equally important was the mathematical notion of "infinity at a point" which immediately found religious and political applications. Leonardo' *The Last Supper* (fig. 17) staged the figure of Christ firmly at the vanishing point, as if to say that the infinite had now been revealed in the finite body of a human being. Alberti extended this conceit to suggest that the pyramid of perspective space included a central "sovereign ray," accompanied on all sides by its ministers to provide an image of absolute power over the visual/pictorial field.
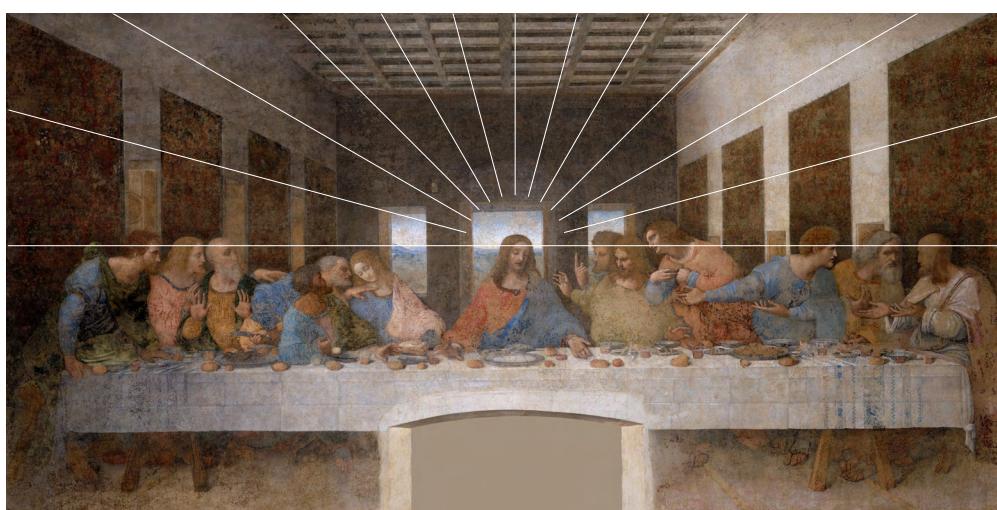

Figure 17.
Leonardo da Vinci, *The Last Supper,* ca. 1495-8. Public domain, via Wikimedia Commons

The idea that infinity could appear in the finite shape of a human body was a central tenet of Renaissance humanism, reminding us that the very idea of the infinite is a product of human consciousness and intelligence. For Leonardo, man was not only the measurer of things, but himself the measure of the cosmos in his bodily proportions (fig. 18).

This image was given an even more radical formulation by William Blake in his color print, *Albion Rose* (fig. 19).
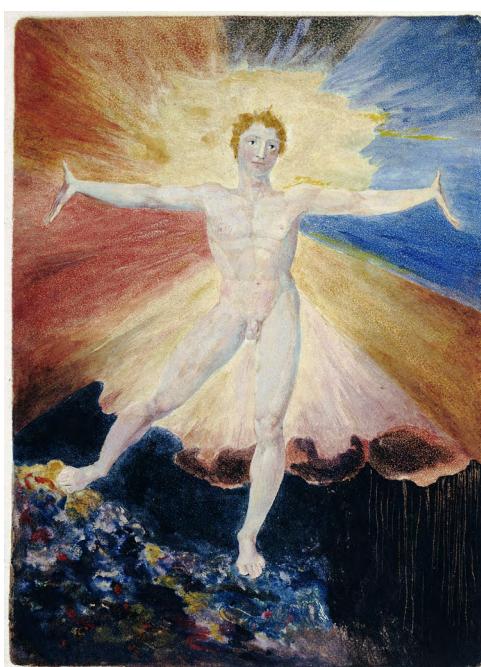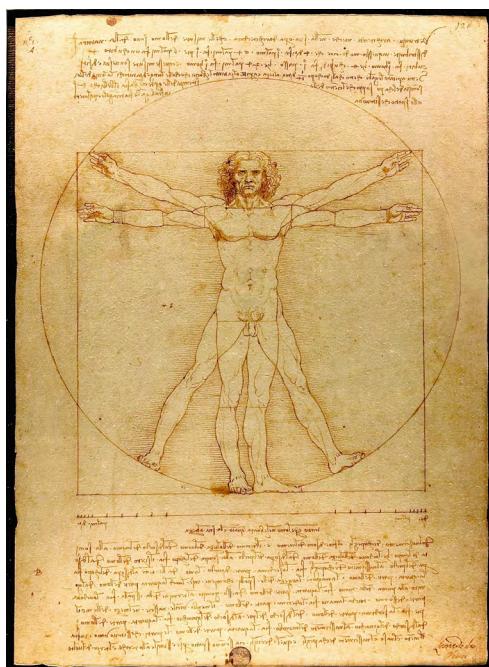
Figure 18.
Left: Leonardo da Vinci, *Vitruvian Man.* Public domain, via Wikimedia Commons.

Figure 19.
Right: William Blake, *Albion Rose,* 1793-6. Public domain, via Wikimedia Commons.

Blake was clearly riffing on Leonardo's *Vitruvian Man*, treating the human form as beyond measure, emanating a rainbow burst of light and color, breaking out of the circle and square and rising from the darkness and chaos of what he called the "Indefinite." This figure, often associated with the French Revolution and the end of the religious and political tyranny in Europe, provides a model for an art of illumination that does not just reflect light or hold up a mirror to nature, but radiates its own light into the darkness around it.

5   GOOD AND BAD INFINITIES

Blake was an artist that Gabe took in with his mother's music and his father's obsession with images. Blake resisted the mathematical and scientific approach to infinity as the indefinite and endless, what we might call the "etcetera" model of the infinite. He insisted instead on finding the infinite in the finite, the definite, and what he called the "Minute Particulars," the luminous moments of inspiration and visionary experience, and the concrete perceptions of singular objects and things. In this view, Blake was in good company. Goethe advised his readers that "If you want to step into infinitude, just go in all directions into the finite."[5] As for the temporal infinite, he claimed that "Every situation—nay, every moment—is of infinite worth; for it is representative of a whole eternity."[6] In a more abstruse and dialectical formation, Hegel distinguished two kinds of infinity: the "*bad* or *negative* infinite," which is "nothing but the negation of the finite,"[7] and the "negation of the negation," which reveals "*being-for-itself*."[8] Hegel's dialectic of double negation is, of course, adopted by Karl Marx as the model for the revolution. One might summarize this concept by re-writing the word "infinite" itself, transforming the prefix "in-," the "not" finite, into a preposition, so "the infinite" becomes "in (the) finite."

Blake articulates these versions of the infinite most succinctly in his poetry, where he claims

> To See the World in a Grain of Sand
> And a Heaven in a Wild Flower
> Hold Infinity in the palm of your hand
> And Eternity in an Hour.[9]

He elaborated this view in a polemic against "abstract philosophy" in its war against imagination. Against this view he argued that "if the doors of perception were cleansed, every thing" would appear to man, as it is, Infinite," and this includes the discovery of gods in the most humble materials of everyday life. The purpose of art, then, to follow

5.   Martin Heidegger, *Kant and the Problem of Metaphysics* (Indiana University Press, 1997), 201.

6.   Johann Peter Eckermann, *Conversations with Goethe in the Last Years of His Life*, trans. Margaret Fuller (J. Munroe, 1852), 62.

7.   Georg Wilhelm Fredrich Hegel, *Encyclopedia of the Philosophical Sciences in Basic Outline*, eds. Klaus Brinkmann and Daniel O. Dahlstrom (Cambridge University Press, 2010), para. 94.

8.   Hegel, *Encyclopedia*, para. 95.

9.   "Auguries of Innocence," in *The Complete Poetry and Prose of William Blake*, by William

Shakespeare by

> Creating form & beauty around the dark regions of sorrow
> Giving to airy nothing a name and a habitation
> Delightful! With bounds to the infinite putting off the Indefinite
> Into most holy forms of Thought.[10]

I see Antony Gormley's *Infinite Cube* as an exemplar of Blake's concept of the "Infinite Particular," the finite object, a very definite thing that appears before us, as the location of the infinite. At first, this may seem implausible because the structure of the *Cube* so clearly evokes the geometry of a Cartesian grid. It seems to be all about mathematical endlessness with its vanishing points, and parallel lines that recede into darkness. But when we take a closer look beyond what we think we know about endless parallel lines never meeting, we notice that they in fact zig zag and meet up in curves that turn back toward us, violating the abstract linearity of the mathematical infinite in their ragged materiality. The *Cube*'s hand-soldered lights produce imperfect, eccentric lines, opening our senses to the finitude of the abstract conceptions of the endless and indefinite. This effect is reinforced emphatically by the scale of the object, which is firmly based in the proportions of the human body.

6   INFINITY AND THE HUMAN BODY

These bodily proportions become dramatically evident when we look at Irene Hsiao dancing around the *Cube*, simultaneously revealing its size and constantly shifting aspects. Radiant cruciform patterns suddenly become a kind of aureole around the dancer's body (fig. 20), which is alternately illuminated by the Cube, and rendered as a dark silhouette when it intercepts that illumination.

Blake (Anchor Books, 1988), 490.

10. "Milton: A Poem in 2 Books," in *The Complete Poetry and Prose of William Blake*, by William Blake (Anchor Books, 1988), 125.

You will notice that the patterns in the Cube shift with every movement of your own body. The horizon line moves up and down as you bow or elevate yourself in front of it. The vertical axis walks along with you as you circle the Cube, disappearing for a moment as your viewpoint turns a corner. This effect is redoubled when you contemplate the Cube in a position of stillness and let your focus of attention shift among the elements of line, point, color, and form. Suddenly a plethora of square and rectangular shapes appears, then gives way to an array of angles, intersections, and vanishing points, only to be replaced by shifting zones of warm and cool colors.

The magical effect of the *Cube* depends upon its scale in relation to the human body. The *Cube*'s dimensions are derived from the body by way of the yard, the 36-inch length based on an average man's waist or girth. (King Henry the First thought the yard could be defined as the distance from his nose to the tip of his finger; the Biblical measure of the Cubit, similarly, was the distance between the elbow and the tip of the forefinger; the foot needs no explanation.) One effect of the *Cube* is to democratize Alberti's "sovereign ray," that connects

the viewer with object. The image of sovereignty as a "princely ray"[11] connecting the vanishing point directly to the eye of God is replaced by a multitude of eyes encountering an infinity of aspects. Antony Gormley transforms the traditional picture of the eye as the "window of the soul" by depicting that soul as an image of the spectator's own body (fig. 21).

7   FOURFOLD VISION

I want to conclude by returning to Gabriel's preparatory designs for the Cube. As Gabe's filmmaking, writing, and drawing developed, he began to experiment with two basic geometrical forms, the Grid and the Vortex (fig. 22).

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11. "The Perspectival Eye," *Glass Bead*, October 2017, https://www.glass-bead.org/research-platform/the-perspectival-eye/.
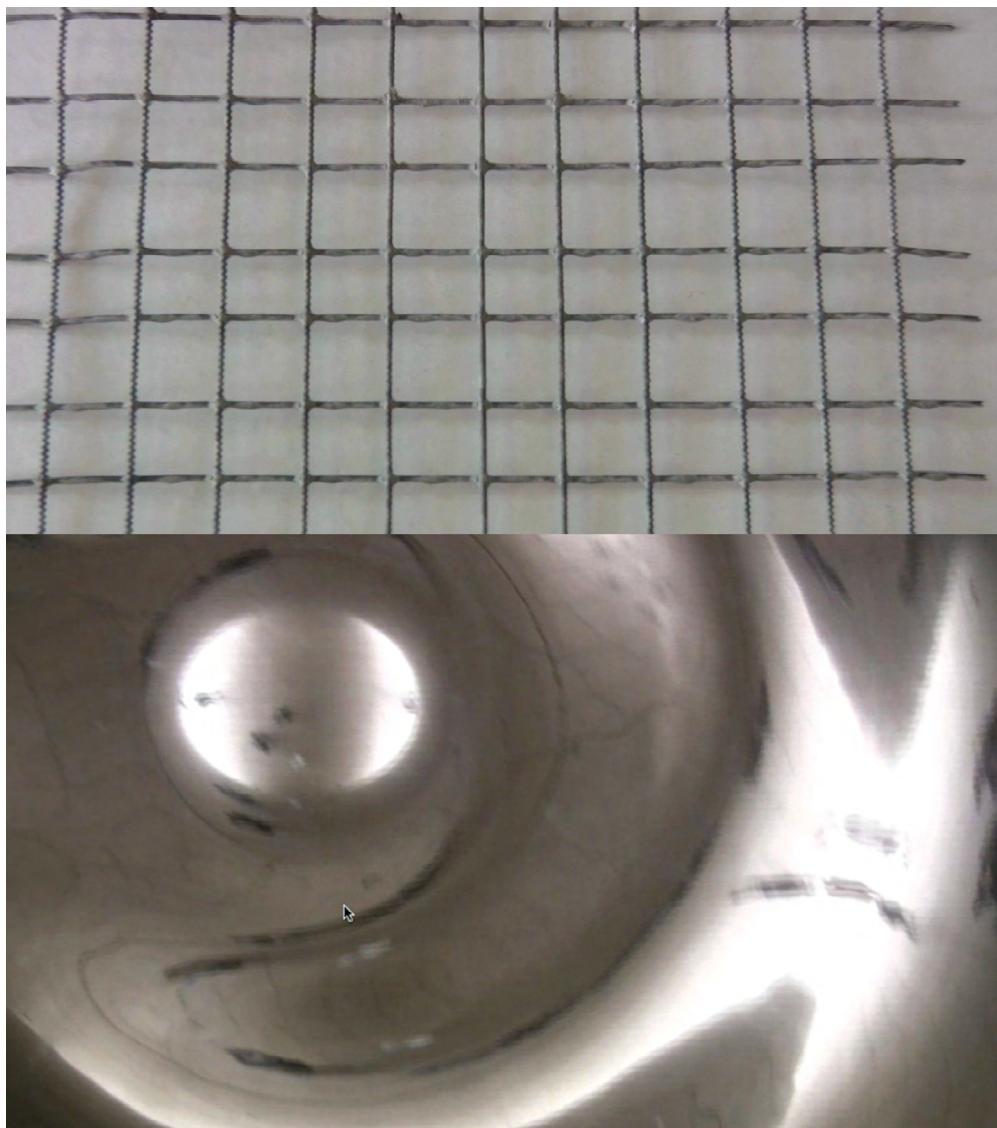
Figure 22.
Grid and Vortex.

The Grid he associated with order and rationality; the Vortex
with confusion, disorder, and his own schizophrenia—a relatively
conventional set of associations. But then he began thinking of the
formal pairing in exactly the opposite way, the Grid as a dark prison
cell and the vortex as a sign of immersion in a field of dynamic energy.
The static grid of monocular vision and single point perspective

(what Blake called "Single Vision and Newton's Sleep") needed to be replaced by a "double vision" grounded in the bodily demands of binocular vision (fig. 23).

Figure 23.
Grid over Gabe's eyes.
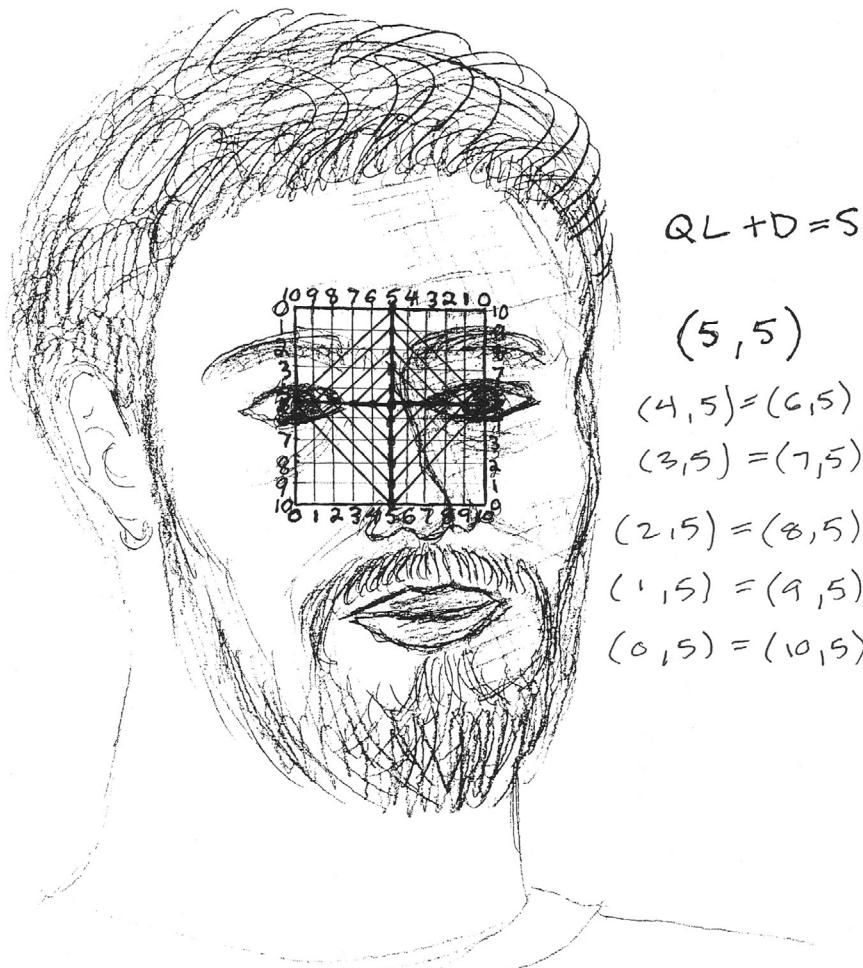
And the grid itself needed to be re-imagined. The Cartesian system of an empty center (0,0) located between negative and positive forms of endless "bad infinity" had to be supplanted by a fourfold geometry that transforms the grid into a vortex. In order to visualize this reversal of values, Gabe invented a new kind of analytic

geometry, which would consider only the world of natural numbers. Instead of a world divided into the negative and positive, with a central coordinate (0,0) the intersection of X and Y, Gabe designed a rotational coordinate system (fig. 24) that circles around the perimeter of the grid, so that each corner becomes zero/ten, (0,10) the beginning and end of a thrust. In effect, the idea is to rotate the grid quite literally, so it becomes a vortex.
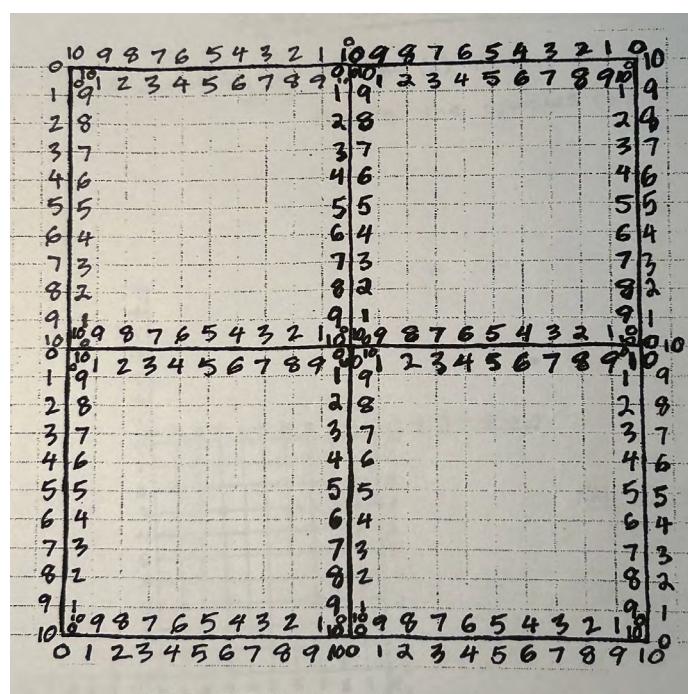

Figure 24.
Anti-Cartesian grid.

Gabe made this explicit when he applied his vorticular grid to the twin problems of squaring the circle (which he solves by circling the square)[12], and the fourfold system of DNA proteins, (fig. 25-26) Adenine (A), Cytosine (C), Guanine (G), and Thymine (T).[13]

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12. In *Squaring the Circle: Geometry in Art and Architecture* (Key College, 2008), Paul A. Calter argues that the goal of squaring the circle is, on the one hand, merely a question of "finding a square that has the same perimeter as that of a given circle." But it also has "the symbolic meaning of the reconciliation of opposites—heavenly and earthly, rational and irrational" (p. viii).
13. The DNA molecule is made up of four nucleobases – adenine, cytosine, guanine and thymine – and can configure itself in a number of ways. It creates a four-stranded structure when four guanine bases form a square – guanine is the only base able to bond with itself.

Figure 25-26.
Grids with DNA proteins.
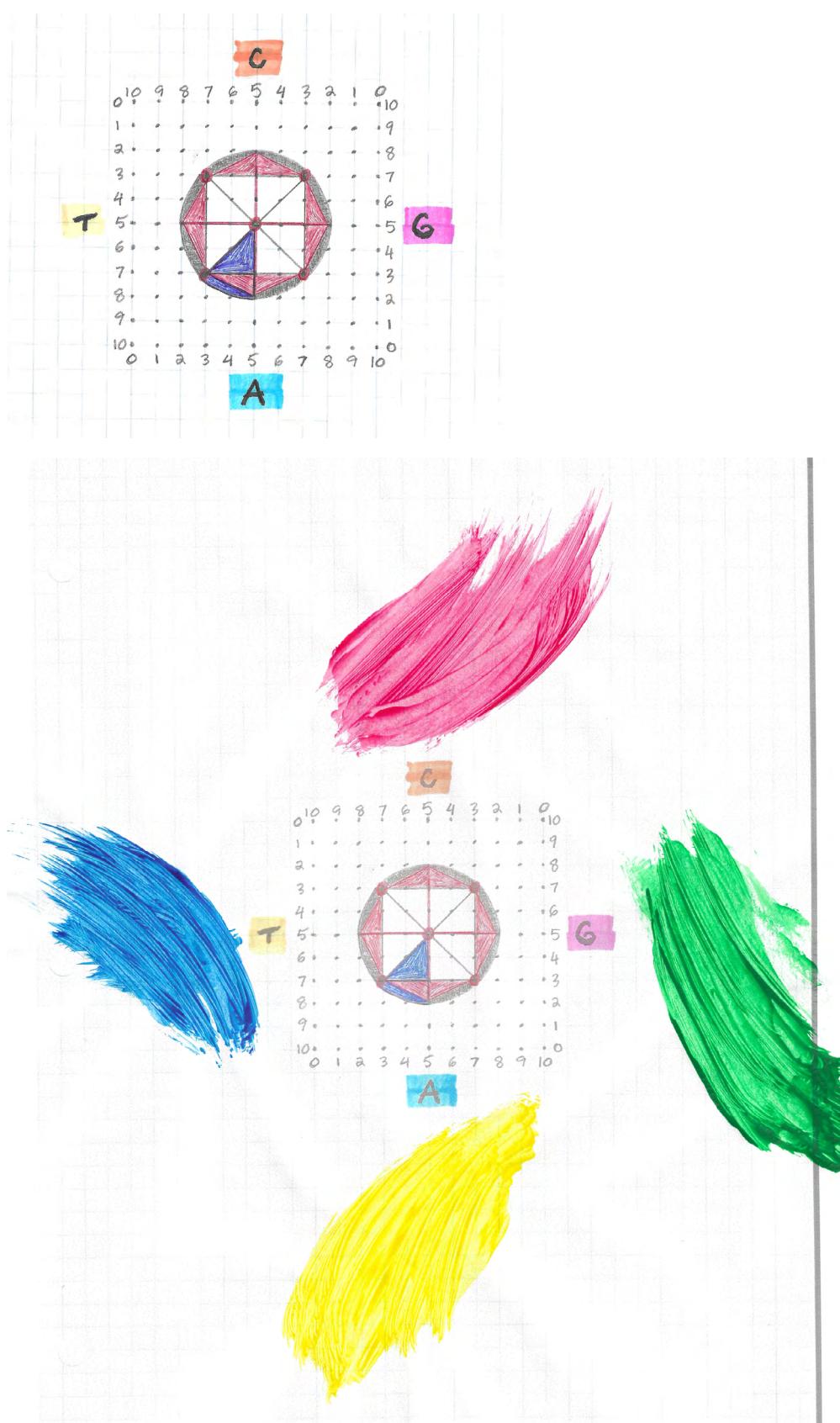
In effect, the idea was to "square" the double helix of DNA (fig. 27), which "creates a four-stranded structure when four guanine bases form a square,"[14] according to Nature Chemistry.[15]
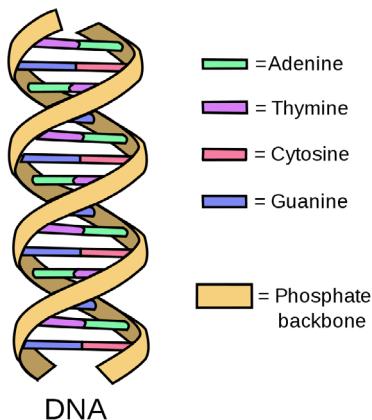
In effect, Gabriel's grid theory transforms the Cartesian image of a sterile, homogeneous, and endless physical space into a living structure. When constructed as a three-dimensional object combining the windows, mirrors, and grids of artificial perspective in a "Cosmic Cube" (fig. 28), it presents an infinite array of perceptions for the living bodies and searching eyes of beholders.
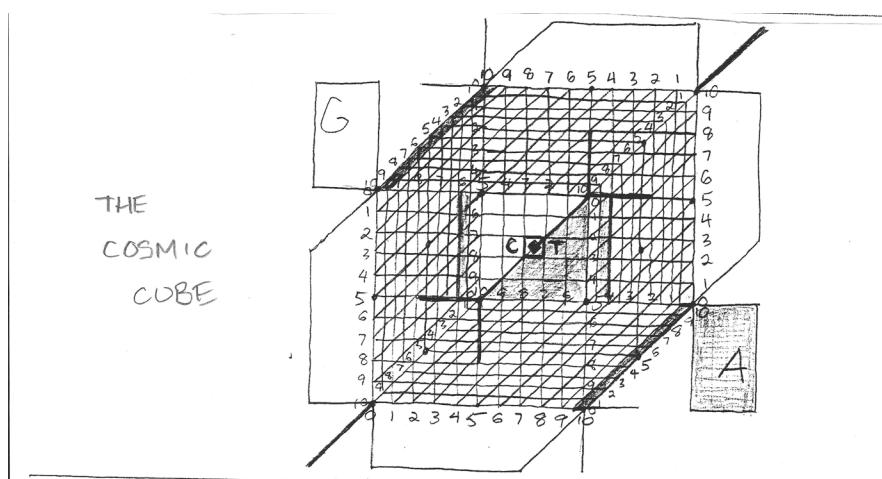

Figure 28.
The Cosmic Cube.

14. Rowan Hooper, "Quadruple-Stranded DNA Seen in Healthy Human Cells for the First Time," *New Scientist*, July 20, 2020, https://www.newscientist.com/article/2249390-quadruple-stranded-dna-seen-in-healthy-human-cells-for-the-first-time/.

15. Marco Di Antonio et al., "Single-Molecule Visualization of DNA G-Quadruplex Formation in Live Cells," *Nature Chemistry* 12, no. 9 (2020): 832–37, https://doi.org/10.1038/s41557-020-0506-4.

I will let Blake have the last word:

> Now I a fourfold vision see
> And a fourfold vision is given to me
> 'Tis fourfold in my supreme delight
> And three fold in soft Beulah's night
> And two fold Always, May God us Keep
> From Single Vision and Newtons Sleep[16]

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16. "With Happiness Stretched across the Hills," in *The Complete Poetry and Prose of William Blake*, by William Blake (Anchor Books, 1988), 722.

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