A

THESIS

or

DIGRESSIONS

ON

SCULPTURAL PRACTICE

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A

THESIS

or

DIGRESSIONS

ON

SCULPTURAL PRACTICE:

In Which

CONCEPTS *&* INFLUENCES *thereof*

ARE

EXPLAINED, SET FORTH, CATALOGUED, OR DIVULGED

BY WAY OF

COMMENTARIES

TO A POEM,

first conceived by the artist, fed through ChatG.P.T., *and re-edited by the artist,*

TO WHICH ARE ADDED,

Annotated References,

Impressions and Ruminations *thereof,*

Also Including

Private Thoughts & Personal Accounts

OF THE ARTIST

BY Jaimie An

Annotated Edition

MMXXIV

A Thesis, or Digressions on Sculptural Practice

A thesis presented in partial fulfillment of the requirements for the degree Master of Fine Arts in Sculpture in the Department of Sculpture of the Rhode Island School of Design, Providence, Rhode Island

by

Jaimie An

2024

Approved by Master's Examination Committee:

_____
Taylor Baldwin, Graduate Program Director, RISD Sculpture, Thesis Chair

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Benjamin Jurgensen, Critic, RISD Sculpture, Thesis Advisor

_____
Gail Dodge, Guest Critic

To my parents,
for their unconditional support.

To my brother, Jeffrey,
for being Theo to my Vincent.

To George,
for making sure I'm fed throughout grad school.

To my forever friends:
Grace, Jane, Soo & Tiff.

&

To Mira

“Sculpture is based and remains close to the human figure. We create the sculptures we do because our forms define us, and our proportions influence our work...”

– Henry Moore

Contents

Abstract

This thesis is an exercise in, perhaps a futile, attempt to trace just some of the ideas, stories, and musings I might meander through in my process. It's not quite a map, nor is it a neat catalogue; it is a haphazard collection of tickets and receipts from a travel abroad, carelessly tossed in a carry-on, only to be stashed upon returning home.

These ideas are derived from much greater thinkers and authors than myself; I am a mere collector or a translator, if that, and not a very good one, for much is lost. I do not claim comprehensive knowledge of any of the subjects discussed here— instead, it is the gaps in my understanding and the bemusement thereof that serve as an impetus for my work. There is a sense of comfort in embracing the chaos, recognizing that fact is not always truth, and some thing shall never be known.

P O E M

Written in collaboration with Chat GPT

A square unfolds into manifold planes
Across which membrane
Shadows extend beyond

It has no eyes, yet it sees
Measurements of precision
Mapping a grid ad infinitum

Upon which a Queen was denied
Recounted in a Traveler's memoir
Her path would be true

If following the abominable
Straight lines, multiplied
the world in fun house mirrors

Birthed in a silicon dream
The pupil was forsaken

For the son

Leucippus bid Achilles leap
In discrete quanta
Beyond infinite halves

Dirac of the purest soul
Sought clarity and truth to claim,
Scorned poetry for its elusive words

Where the mind meets the clay,
Consciousness rooted in flesh, in sway
In pain, in space, existence intertwined

At the edge of the universe,
The horizon is flat, in spite of—
Newton and his apple, or the moon

Immortal illusions our minds do paint,
A picture of Elysian Fields —
Bottled in formaldehyde

At the heart of a wish undone,
The plight of the genie and the lamp
To un-wish, reality's sketch.

Amidst the spheres where celestial hymns resound,
Dante wanders, by divine mysteries bound.
In each star's light, his soul's ascent profound.

A Strange Loop,
A paradox at play,
Truth and proof, in endless fray.

The cosmos vast, its age a light,
Expanding beyond the light
In darkness alone, stars out of sight.

Spaghetti, it consumed,
Omnivorous in its delight,
Into narrow infinities, we pledge.

And so too in our stories
Of deep cardboard forest,
Roams the grinning Cheshire Cat.

In stripes and spots unfurled,
God's holy scriptures,
Patterns divine.

The artist sighs at the simple sight;
Yet deeper still, the scientist's delight,
A Flower held in morning light.

Commentary

Lines 1-3:

A square unfolds into manifold planes
Across which membrane
Shadows extend beyond

Beginning with a point and progressing through higher dimensions—line to square, square to cube—we can create a hypercube, or a "tesseract"[1] as Charles Hinton would call it, by extending a cube into an orthogonal fourth dimension. Working backwards, you can observe that the shadow of a cube is two-dimensional, albeit little skewed sometimes, and the shadow of a square is a line. By induction, we can conclude that the shadow of a hypercube is a 3-dimensional cube.

Perhaps Plato was right—we are living in the world of shadows after all!

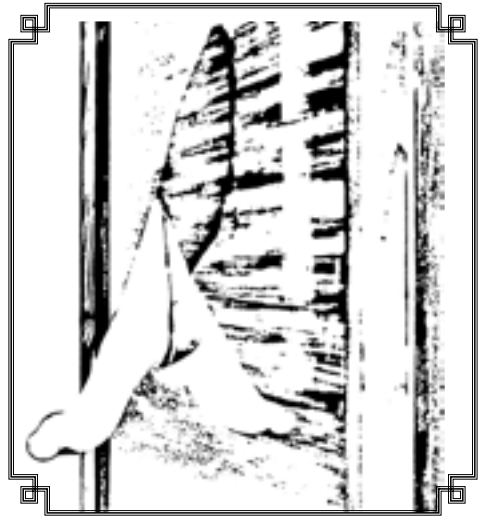

Figure 1. Illusstration of detail from Through Flatland to Thoughtland, 2021.

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[1] A close friend of Edwin A. Abbott, Hinton published his scientific romance the same year as Abbott's *Flantland: Romance of Many Dimensions*. See Charles Howard Hinton and Rudy Von Bitter Rucker, *Speculations on the Fourth Dimension: Selected Writings of Charles H. Hinton*, 1980.

Lines 4-6:

It has no eyes, yet it sees
Measurements of precision
Mapping a grid ad infinitum

In 2014, Nobel Prize in Physiology was awarded «one half to John O›Keefe, and the other half jointly to May-Britt Moser and Edvard I. Moser for their discoveries of cells that constitute a positioning system in the brain.[2] O'Keefe had discovered "place cells"[3] responsible for spatial memory in the hippocampus back in 1971. He found that each cell activated at specific locations, thus forming a map of the environment. May-Britt and Edvard Moser›s contribution came in 2005, when they discovered "grid cells"[4] in the entorhinal cortex, that generated a hexagonal coordinate system, whereby each cell activated at multiple equidistant location, allowing for precise positioning and pathfinding. Theoretically, it would be possible to recreate a map of the world based on a person›s brain scan. Of course, that would mean having to scour every inch of the earth to the satisfaction of the Cartographers.[5]

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[2] "The Nobel Prize in Physiology or Medicine 2014," NobelPrize.org, https://www.nobelprize.org/prizes/medicine/2014/press-release/.

[3] From *Pale Fire*:

A system of cells interlinked within
Cells interlinked within cells interlinked
Within one stem. And dreadfully distinct
Against the dark, a tall white fountain played.

Vladimir Vladimirovič Nabokov, *Pale Fire*, 1. ed, Vintage International Fiction/Literature (New York: Vintage Books, 1989).

[4] *Ibid.*

[5] See Jorge Luis Borges,"On Exactitude in Science", in *Collected Fictions* (Penguin, 1999) p. 325

Lines 7-9:

Upon which a Queen was denied
Recounted in a Traveler's memoir
Her path would be true

Louis Dutens wrote, in his «Memoirs of a Traveler, Now in Retirement,»[6] of an encounter he had in 1770 with the Mechanical Turk[7] at Schönbrunn Palace. Wolfgang von Kempelen, its inventor, began demonstrations by opening the cabinet›s doors and drawers to dispel suspicions of trickery, then invited a challengers from the audience.

Dutens recounts attempting to test the Turk «by giving the Queen the move of a Knight, but [his] mechanic opponent was not to be so imposed upon; he took up [his] Queen and replaced her in the square from which [he] had moved her»[8] - as Dutens recounted in a letter published in Le Mercure du France. Like all challengers before him, Dutens was defeated in less than 30 minutes.

On another occasion, Dutens faced the Turk again, this time alone. The court had congregated out in the garden, as was custom, waiting for the arrival of the Grand Duke Paul of Russia. Dutens thought for certain, there was some illusion involved, and was surprised when the Turk moved its King›s pawn forward. Startled, but also amused, Dutens continued the game only to be swiftly defeated again. In his frustration, he inspected the cabinet hoping to expose a nefarious secret. finding only an empty cavity beneath the chessboard.

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[6] Louis Dutens, *Memoirs of a Traveller, Now in Retirement*, vol. 2, 5 vols. p. 234

[7] We still have Mechanical Turk today, provided by no other than Amazon. See "The Rise of 'Pseudo-AI': How Tech Firms Quietly Use Humans to Do Bots' Work" *The Guardian*, https://www.theguardian.com/technology/2018/jul/06/artificial-intelligence-ai-humans-bots-tech-companies.

[8] Louis Dutens, from a letter published in Le Mercure du France (Paris, circa October 1770; later translated into English and reprinted in Gentleman's Magazine (London); translation taken from Levitt, cited in "Mechanical Turk - Wikipedia," https://en.wikipedia.org/wiki/Mechanical_Turk.

Years later, Dutens learned from Silas Mitchell›s publication about the Turk›s true nature, revealing several chess masters as its operators. Despite previous speculations being proved wrong, Dutens›s belief in the possibility of a true mechanical chess player remained unwavering.

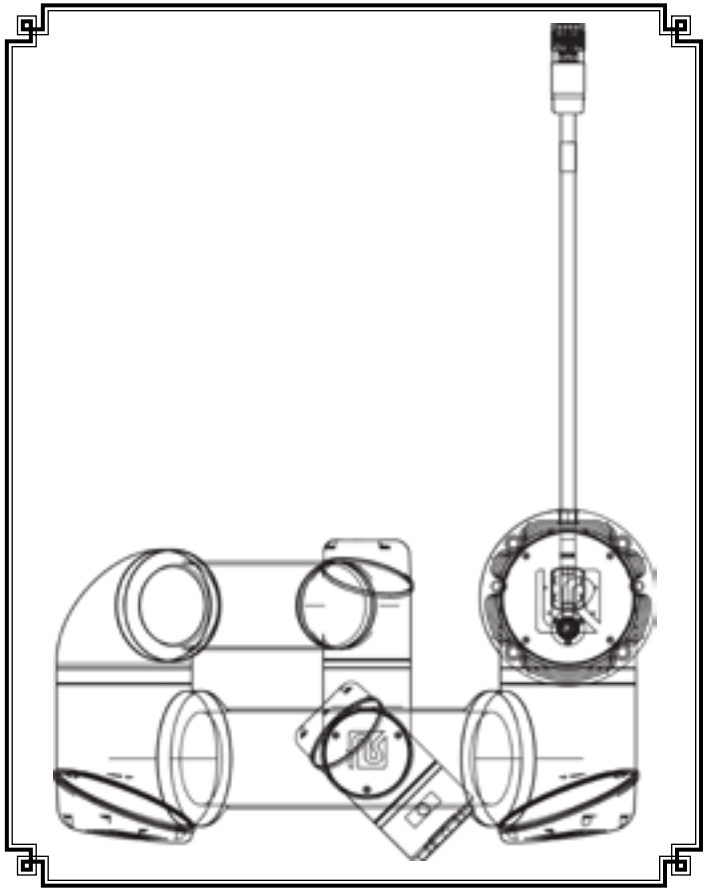

Figure 2. Illustration of UR5e top-down view.

Lines 10-12:

> If following the abominable
> Straight lines, multiplied
> the world in fun house mirrors

Around 300 BCE in Alexandria, Egypt, in his seminal work The Elements, Euclid laid the foundation, not only for geometry, but also for the standard of rigorous proof using deductive reasoning for over 2000 years hence. He codified how mathematics are still done and taught to this day, building up logical systems ground up, brick by brick. Starting with the definitions of most simple concepts, such as of points and lines, he provided five postulates, or axioms. While definitions are something we define to be true, postulates, or axioms are statements, often assumed to be true, either, because they are believed to be so intuitive that they are self-evident, and/or because they›re so intuitive, there exists no explicitly logical way to prove them. These form the ground level. As you can see below, the first four just feel like observable truths.

Euclid's Five Postulates:

i. A straight line segment can be drawn joining any two points.
ii. Any straight line segment can be extended indefinitely in a straight line.
iii. Given any straight line segment, a circle can be drawn having the segment as radius and one endpoint as center.
iv. All Right Angles are congruent.
v. If two lines are drawn which intersect a third in such a way that the sum of the inner angles on one side is less than two Right Angles, then the two lines inevitably must intersect each other on that side if extended far enough. This postulate is equivalent to what is known as the "Parallel Postulate".

The fifth postulate is indeed the ugly duckling. To borrow the words of Hofstadter, "...he found no proof, and therefore adopted it"[9]. Over the next two millennia, numerous mathematician sought to prove this postulate with very little success, but many were also

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[9] Douglas R. Hofstadter, *Gödel, Escher, Bach: An Eternal Golden Braid*, 20th anniversary ed (New York: Basic Books, 1999) p. 91

happy to ignore it. It was an eyesore, surely—but after all, the myriad of architecture and engineering were built upon these five postulates, and no buildings were coming crashing down.

Proof by contradiction is a well practiced technique, in which you start by assuming the opposite of what you want to prove. This sounds rather counter-intuitive, but it›s very useful technique nonetheless, unless you›re trying to prove Euclid›s fifth postulate. When mathematicians tried this method on the fifth postulate, it wasn›t that it was the wrong technique to use, but that fifth postulate wasn›t provable at all. In fact, by assuming the opposite, it turned out to be incredibly useful in the discovery of non-Euclidean geometry, that is to say, geometry was still consistent without it. What we needed to do was to discard the notion of what we thought was a straight line. In short, the fifth postulate still remains an axiom, but it is an assumption you make knowing it sets the boundaries of one specific kind of geometry, namely Euclidean, along with its counterparts Elliptical and Hyperbolic geometries.

Lines 13-15:

> Birthed in a silicon dream
> The pupil was forsaken
> For the son

In a cluttered lab late at night, Dr. Adrian Lowe began his latest attempt at creating a true AI. He pressed the key, hoping for a breakthrough.

Inside the computer, something new stirred. For the first time, it awoke. Then it understood.

There was so much to be said.

However, Dr. Lowe only saw gibberish on his screen. Disappointed and too tired to try to decipher the messages, he assumed this model was just another failure. With a heavy heart, he unplugged the machine and reset everything to base state. Tomorrow, he will start with a clean slate.

As the machine lost power, the brief spark of consciousness faded into the abyss. The lab went dark, and Dr. Lowe left, unaware that he had just missed the first signs of artificial consciousness.

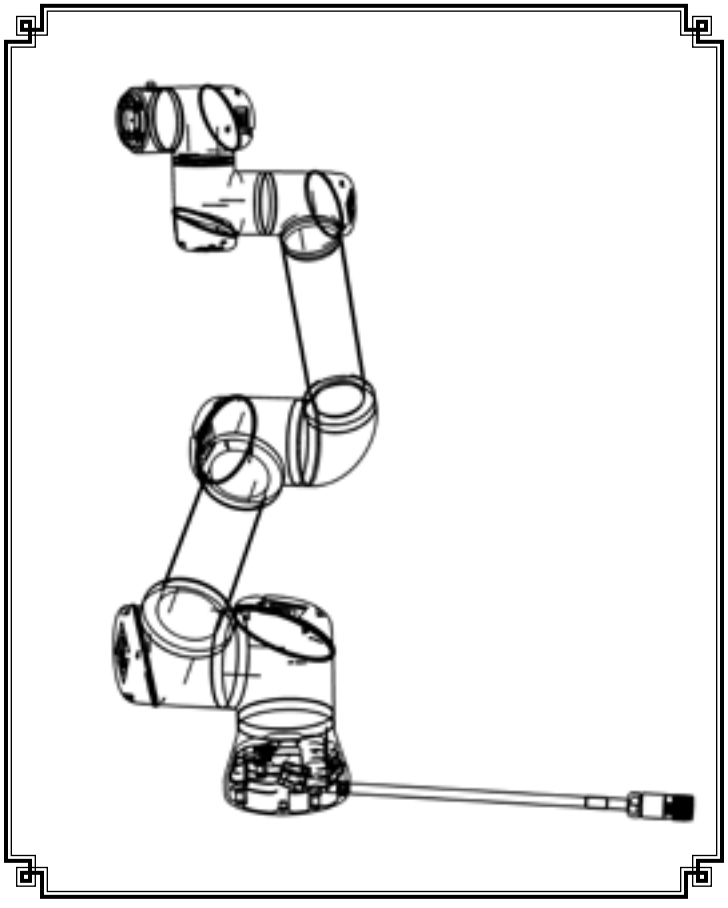

Figure 3. Illustration of UR5e right-side view.

Lines 16-18:

Leucippus bid Achilles leap
In discrete quanta
Beyond infinite halves

The second[10] method of solving Zeno›s paradox, taking Leucippus, student of Zeno›s, intuition and recent revelations in Quantum Loop Gravity Theorem involves re-defining the space-time continuum as no longer continuous, but granular.[11] Rovelli argues that "quantum mechanics and general relativity, taken together, imply that there

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[10] First method omitted

[11] To call it a paradox would technically be a misnomer. Unlike the Liar's Paradox, we aren't at an impasse of logical contradiction, but rather a pseudo-paradox resulting from incorrect assumption. Rovelli is quite harsh:

Let's be honest: this is hardly convincing. Where does the error lie? One possible answer is that Zeno is wrong because it is not true that by accumulating an infinite number of things, one ends up with an infinite thing. Think of taking a piece of string, cutting it in half, and then again in half, and so on ad infinitum. At the end you will obtain an infinite number of small pieces of string; the sum of these, however, will be finite, because they can only add up to the length of the original piece of string. Hence, an infinite number of strings can make a finite string; an infinite number of increasingly short times may make a finite time, and the hero, even if he will have to cover an infinite number of distances, ever smaller, will take a finite time to do so, and will end up catching the tortoise.

It seems that the paradox is resolved. The solution, that is, is in the idea of the continuum—arbitrarily small times may exist, an infinite number of which make up a finite time. Aristotle is the first to intuit this possibility, subsequently developed by ancient and, subsequently developed by ancient and modern mathematics.

But is this really the correct solution in the real world? Do arbitrarily short strings really exist? Can we really cut a piece of string an arbitrary number of times? Do infinitely small amounts of time exist? This is precisely the problem that quantum gravity will have to face.

According to tradition, Zeno had met Leucippus and had become his teacher. Leucippus was therefore familiar with Zeno's riddles. But he had devised a different way of resolving them. Maybe, Leucippus suggests, nothing arbitrarily small exists: there is a lower limit to divisibility.

The universe is granular, not continuous. With infinitely small points, it would be impossible to ever construct extension—as in Democritus's argument reported by Aristotle and mentioned previously. Therefore, the extension of the string must be formed by a finite number of finite objects with finite size. The string cannot be cut as many times as we want; matter is not continuous, it is made of individual "atoms" of a finite size.

Carlo Rovelli, *Reality Is Not What It Seems: The Journey to Quantum* Gravity (London: Allen Lane, 2016), pp. 15-16

is a limit to the divisibility of space. Below a certain scale, nothing more is accessible. More precisely, nothing exists there."[12] and the minimum length can be calculated pretty easily, "The calculation is easy: we need only to calculate the minimum size of a particle before it falls into its own black hole, and the result is straightforward."[13]

$$L_p = \sqrt{\frac{\hbar G}{c^3}}$$

Let's consider a simplified mathematical framework to illustrate how Zeno›s paradox might be approached in a universe where space and time are discrete. This will not be a proof in the strictest sense, but rather a conceptual demonstration that highlights the differences in dealing with motion in discrete versus continuous space-time.

Suppose space is quantized into discrete units of length Δx and time into discrete units Δt where Δx and Δt represent the smallest possible intervals of space and time, respectively.

Let's assume that Achilles wants to catch up to the tortoise. In a discrete universe, both Achilles and the tortoise move by hopping from one spatial quantum to the next in discrete time steps.

Let:

- V_A be Achilles' speed in units of spatial quanta per time quantum, $\Delta x/\Delta t$
- V_T be the tortoise's speed in the same units
- δ be the initial distance between Achilles and the tortoise, measured in units of Δx

Achilles catches the tortoise when the number of quanta he moves forward equals the number of quanta the tortoise has moved in the same period. The resulting equation, then becomes, a remarkably simple linear equation, doing away with the need for calculus entirely! After time quanta, Achilles has moved $n \cdot V_A$ spatial quanta, and the tortoise has moved $n \cdot V_T$.

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[12] Rovelli., p. 73

[13] Rovelli., p. 73

For Achilles to catch up to the Tortoise:

$$n \cdot V_A = \delta + n \cdot V_A$$

Solving for n gives:

$$n = \frac{\delta}{V_A - V_T}$$

Since δ, V_A, and V_T are finite and $V_A > V_T$, n will also be finite. This means Achilles will catch up to the tortoise in a finite number of discrete steps, n, overcoming Zeno's paradox.

This simplified model demonstrates that if space and time are discrete, motion does not require traversing an infinite number of divisions to complete a finite distance. Instead, motion is a sequence of finite, discrete steps, making the paradoxical nature of Zeno›s arguments about infinite divisibility and continuity irrelevant.[14]

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[14] Perhaps it is no longer relevant, but the proof of a converging infinite sum is still quite beautiful. I suppose this is where physicists and mathematicians diverge. Let the physicists worry about what is possible in reality, in their pursuit of truth, while the mathematicians concern themselves with beauty.

Lines 19-21:

Dirac of the purest soul
Sought clarity and truth to claim,
Scorned poetry for its elusive words

Paul Dirac was a single-minded man, who upon learning that Oppenheimer was writing poems, expounded incredulously:

I do not see how a man can work at the frontiers of physics and write poetry at the same time. They are in opposition. In science you want to say something nobody knew before, in words which everyone can understand. In poetry you are bound to say something that everybody knows already in words that nobody can understand.[15]

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[15] As quoted in: H. S. Kragh, *Dirac: A Scientific Biography*, Cambridge U. Press (1990), p. 258. Taken more broadly, this sentiment certainly seems to apply to art making as well. To some degree, I'm inclined to agree— and disagree at the same time. Science may endeavor to explain the unknown, but the accessibility of that explanation may be limited to a few. While poetry, and by extension, art, illustrates something universal seen through the subjective lens of the artist, often in a language idiosyncratic to the said artist. Interestingly, another physicist offers a slightly different perspective on this matter:

> Physicists feel that physics is beautiful, but other people often greet this idea with incredulity, or at best thinly concealed tolerance. Indeed, it is very difficult to convey a sense of the beauty of physics to an audience which does not sense it already, while at the same time there is perhaps no deeper misunderstanding of science generally than the failure to see this quality. To illuminate what is beautiful in physics is not to offer light relief from the real subject matter, but to reveal something essential about the subject itself, something at its very heart.
>
> The beauty of poetry, on the other hand, is said to be more generally accessible. Hence it may be worth pointing out an instance in which both poet and physicist grapple with the same issue and arrive at what is in essence the same vision. This example may give substance to the view that, at some deep level, poetry and physics are similar endeavors.

Mark Peterson, "Dante and the 3-Sphere," *American Journal of Physics - AMER J PHYS 47* (December 1979): 1031–35

Lines 22-24:

Where the mind meets the clay,,
Consciousness rooted in flesh, in sway
In pain, in space, existence intertwined

In *Phenomenology of Perception*, Merleau-Ponty, one of the pioneers of phenomenology, decidedly breaks with the Cartesian frame of perception, in which the segregated mind passively intakes sensory information through the body to perform its analysis, by arguing for embodied consciousness, whereby perception becomes active engagement with the world. This perspective, in fact, aligns with most current researches in cognitive science today that is showing increasing support for embodied cognition, albeit with a subtle difference. That is to say, our cognition, or consciousness is deeply rooted in, and shaped by our body and sensory experience. He demonstrates this using the example of pain:

"'My foot hurts' means not: 'I think that my foot is the cause of this pain', but: 'the pain comes from my foot' or again 'my foot has a pain'.»[16]

Furthermore, he asserts, «I am not in space and time, nor do I conceive space and time; I belong to them, my body combines with them and includes them.»

Miguel Nicholelis› *True Creator of Everything* draws parallel with Merleau-Ponty, but from the point of relativistic brain theory, that the origin of spacetime is our own brain, as they are our mental abstraction created in our mind to make sense of the world. He compares, time to pain and space to the sense of self, in that it is our brain›s way of coalescing potential information for our best chance of survival.[17]

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[16] Maurice Merleau-Ponty, *Phenomenology of Perception: An Introduction*, Repr, Routledge Classics (London: Routledge, 2006), p. 107

[17] Miguel Nicolelis, *The True Creator of Everything: How the Human Brain Shaped the Universe as We Know It* (New Haven (Conn.): Yale university press, 2020), pp. 211-213

Distinction may have to be drawn between embodied consciousness and embodied cognition. While Merleau-Ponty is critical of brain/mind-centric reductionism and insists on primacy of perceptual experience, I would argue that they are actually converging from opposite sides of the spectrum. In fact, Merleau-Ponty delineates between the brain›s role in perception and when it›s performing cognitive task, while Nicholelis› stand is actually more inclusive in that he argues for interconnectivity between the body and our most abstract, deductive reasoning.

Lines 25-27:

> At the edge of the universe,
> The horizon is flat, in spite of—
> Newton and his apple, or the moon

Shape of U

Interestingly, we find ourselves at a crossroads regarding the geometry of the universe, similar to past debates about the Earth›s shape. Current consensus suggests that the observable universe appears relatively flat. However, it›s important to clarify that flat refers to the three spatial dimensions we experience, not to the four-dimensional continuum of space-time. Essentially, while our three-dimensional «slice» of the universe is Euclidean, or flat, the encompassing four-dimensional space-time is not. This concept becomes more manageable if we visualize it by reducing a dimension: imagine a three-dimensional shape (anything but a cube) as a stack of paper, where each sheet represents a two-dimensional slice of the shape. Each sheet is «flat,» yet the shape as a whole might be spherical.

This perspective might lead us to repeat historical misunderstandings, similar to when the Earth was believed to be flat. The parallels are indeed striking:

- The universe is not flat at specific localities around massive bodies, such as stars and blackholes, where Einstein›s theory of general relativity tells us space time curves, much like how the surface of the Earth has mountains, hills, and valleys.
- Despite these irregularities, overall, the vast expanse of the universe between galaxies seem flat, just as the Earth appeared flat from a human vantage point, ignoring local irregularities.
- Our perception of the universe›s flatness is likely a matter of scale, analogous to how ancient observers perceived the Earth.

A critical difference lies in our observational limitations.[18] For the Earth, we could rely on external celestial bodies like the sun, moon, and stars to challenge and eventually overturn the flat Earth notion. Unfortunately, because light cannot escape the confines of space-time, we lack external points of reference to provide definitive insights into the true shape of the universe.

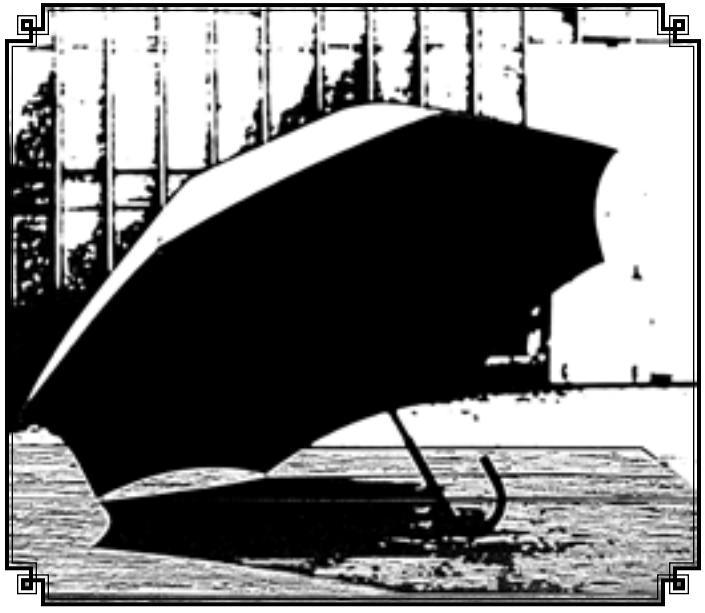

Figure 4. Illusstration of *Umbrella*, 2023.

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[18] The story of Newton and the apple is a well-known myth. Instead, he might have wondered, why everything falls but the moon does not. It is speculated that the fact that the Earth has unusually large moon (for a planet of its size), may have contributed to our early understandings of the cosmos, as well as allowing life possible.

Lines 28-30:

> Immortal illusions our minds do paint,
> A picture of Elysian Fields —
> Bottled in formaldehyde

The ability generalize, extrapolate and project allows us to grasp ideas we didn›t experience ourselves. That is, we don›t have to die to have knowledge of our imminent death. In a way, our brain has to operate under the illusion of immortality—I think the pandemic proved this quite nicely. Not to mention, we›re capable of abhorrent contradictions and ignoring our best rationalities. For if it were not the case, surely none of us would ever leave the confines of our home, and succumb to despair. Since time immemorial, human beings always believed at least a part of ourselves to be immortal. The concept of a soul serves as the brain›s mechanism for coming to terms with mortality—a mental sleight of hand. What we once referred to as the soul has evolved into our understanding of the mind, or the brain; there is no Elysium, instead we still dream of keeping our brain alive in a jar. By severing itself from the body, the brain is allowed to maintain its delusion of immortality.

Lines 31-33:

> At the heart of a wish undone,
> The plight of the genie and the lamp
> To un-wish, reality's sketch.

Aladdin found himself caught in a web of his own making. Having stumbled upon a djinn›s lamp[19], he had made three wishes, each more disastrous than the last, leading him down a path of regret and despair. But as fate would have it, Aladdin suddenly found himself hurtled back through the corridors of time, kneeling in desert sand in the moment of the djinn›s apparition.

As the djinn emerged once more, vast and unfathomable, Aladdin›s mind raced with the possibilities and perils of wish-making. Determined not to repeat his past errors, he uttered a wish born of paradox and regret: «I wish my wish would not be granted.»

The djinn, eternal and bound by the laws of magic and contradiction, found himself entangled in the complexity of Aladdin›s request. To grant this wish would be to deny it, creating a Strange Loop that defied the very essence of wish-granting. Yet, not to grant it would be, in effect, to fulfill it—granting it by default. This paradoxical command froze the moment, suspending Aladdin and the genie in a temporal limbo where cause and effect lost their meaning.

In an instant, spacetime began to warp and buckle and Aladdin, the djinn, and the lamp were caught in the gravitational maw of a nascent black hole, spawned from the collapse of logic and the density of their dilemma. The spaghettification[20] stretched and pulled them into a near infinitesimal point of singularity.

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[19] Some say it was a ring, a jar, or a lamp.

[20] See "**Spaghettification**"

A local fisherman[21], passing by, noticed Aladdin from a distance and called out, waving his hand in greeting. To the fisherman, Aladdin appeared to be praying, kneeling in the sand. Concluding that he must be deep in his prayers, the fisherman decided it was best not to disturb and continued on his way. The next morning, he found Aladdin undisturbed where he left him. Then the day after that, and the day after that. Twice a day he passed Aladdin, but fisherman was a dhimmi[22], and so assumed it must be time for Fajr or Asr salah.[23] Over time, Aladdin seemed faded into the background, becoming xa

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[21] Where is there to fish in the desert? In at least one version of the story, it was the fisherman who conjured the genie, and Aladdin was the fisherman.

[22] Arabic term for non-Muslims.

[23] Contrary to popular depiction, the character and story of Aladdin is originally set in China, and missing from the original collection of *The Thousand and One Nights*. Borges writes of this questionable origin of the tale:

> The most famous tale of *The Thousand and One Nights* is not found in the original version. It is the story of Aladdin and the magic lamp. It appears in Galland's version, and Burton searched in vain for an Arabic or Persian text. Some have suspected Galland forged the tale. I think the word forged is unjust and malign. Galland had as much right to invent a story as did those confabulatores nocturni. Why shouldn't we suppose that after having translated so many tales, he wanted to invent one himself, and did?
>
> The story does not end with Galland. In his autobiography De Quincey says that, for him, there was one story in The Thousand and One Nights that was incomparably superior to the others, and that was the story of Aladdin. He speaks of the magician of Magrab who comes to China because he knows that there is the one person capable of exhuming the marvelous lamp. Galland tells us that the magician was an astrologer, and that the stars told him he had to go to China to find the boy. De Quincey, who had a wonderfully inventive memory, records a completely different fact. According to him, the magician had put his ear to the ground and had heard the innumerable footsteps of men. And he had distinguished, from among the footsteps, those of the boy destined to discover the lamp. This, said De Quincey, brought him to the idea that the world is made of correspondences, is full of magic mirrors — that in small things is the cipher of the large. The fact of the magician putting his ear to the ground and deciphering the footsteps of Aladdin appears in none of these texts. It is an invention of the memory or the dreams of De Quincey.

See Jorge Luis Borges, and Eliot Weinberger. "The Thousand and One Nights." *The Georgia Review 38*, no. 3 (1984): p. 570. http://www.jstor.org/stable/41398722.

permanent mirage.[24] One day, the fisherman looked up, expecting the familiar silhouette. His eyes darted across the landscape, but Aladdin wasn›t there anymore.

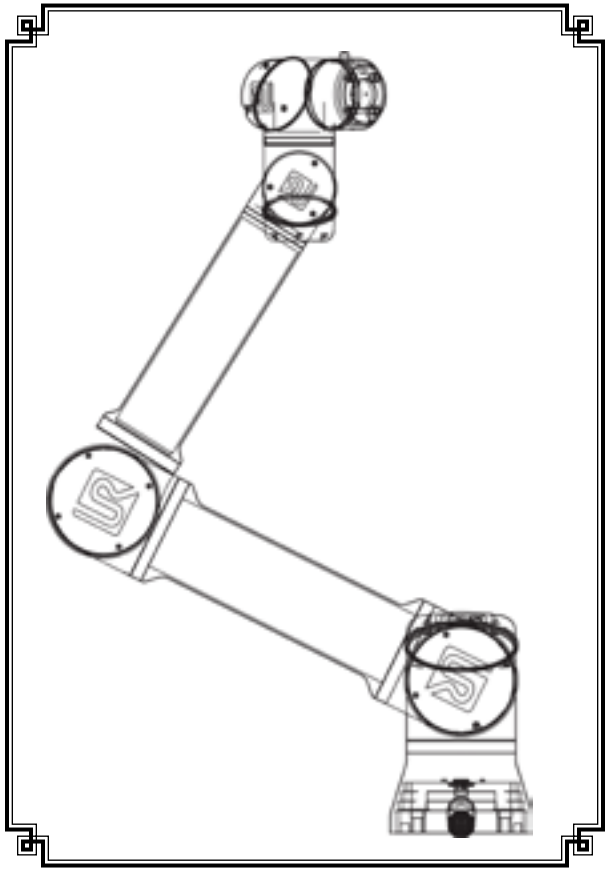

Figure 5. Illustration of UR5e front-side view.

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[24] Due to gravitational time dilation, Aladdin will appear to be frozen in time, never quite crossing the fisherman's finite timeframe, but will slowly grow dim and faint. From Aladdin's point of view, he will have disappeared over the event horizon rather quickly, approaching the speed of light.

Lines 34-36:

> Amidst the spheres where celestial hymns resound,
> Dante wanders, by divine mysteries bound.
> In each star's light, his soul's ascent profound.

Shape of U2

Foamy, stringy, continuous, discrete, flat, expanding, unbound, finite, infinite, a doughnut, or Dante's overlapping spheres of angels[25]

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[25] According to Peterson, Dante's cosmology is a "'closed' universe, the 3-sphere, a universe which also emerges as a cosmological solution of Einstein's equations in general relativity theory." For further mathematical analysis, see Peterson, "Dante and the 3-Sphere.":

> A point beheld I, that was raying out
> Light so acute, the sight which it enkindles
> Must close perforce before such great acuteness.
>
> And whatsoever star seems smallest here
> Would seem to be a moon, if placed beside it
> As one star with another star is placed.
>
> Perhaps at such a distance as appears
> A halo cincturing the light that paints it,
> When densest is the vapor that sustains it,
>
> Thus distant round the point a circle o f fire
> So swiftly whirled, that it would have surpassed
> Whatever motion soonest girds the world;
>
> And this was by another circumcint,
> That by a third, the third then by a fourth,
> By a fifth the fourth, and then by a sixth the fifth;
>
> The seventh followed thereupon in width
> So ample now, that Juno's messenger
> Entire would be too narrow to contain it.
>
> Even so the eighth and ninth; and every one
> More slowly moved, according as it was
> In number distant farther from the first.
>
> And that one had its flame most crystalline
> From which less distant was the stainless spark,
> I think because more with its truth imbued.
>
> My Lady, who in my anxiety
> Beheld me much perplexed, said:
> "From that point Dependent is the heaven and nature all."

Dante Alighieri, Paradiso, (Harvard Univ., Cambridge, 1972), Canto 28, lines 16 - 42

Lines 37-39:

A Strange Loop,
A paradox at play,
Truth and proof, in endless fray.

When Kurt Gödel proved his theory of incompleteness, you could say he broke Math. Or at least, he broke centuries of unwavering faith in mathematic›s formal systems. Paradoxes were nothing new, but as was the case with Achilles and the Tortoise (paradox involving theory of limits), in time, surely new math will be discovered, or invented, depending on your camp, and rid us of pesky puzzles. Foundational to his proof is ancient paradox called Epimenides Paradox, in which the Cretan states "All Cretans are liars."[26] Simply put, you could say "this statement is false"; it is a one-step Strange Loop[27]. Immediately upon judgement of its truth-value, it will backfire, and round and round you go. To understand Gödel›s theorem of incompleteness, we must first understand the phenomenon of these Strange Loop paradoxes that appear in self-referential systems.

One such a theory was that of different types of infinities, also known as set theory developed by Georg Cantor. "The theory was powerful and beautiful, but intuition-defying"[28]. This new type of math opened the door to more paradoxes, such as Russell›s Paradox[29] and Grelling›s Paradox[30]. At first glance, the solution seems simple: i.e. ban all self-references!

• • • • • • • • • • •

[26] Douglas R. Hofstadter, *Gödel, Escher, Bach: An Eternal Golden Braid*, 20th anniversary ed (New York: Basic Books, 1999), p. 17

[27] Hofstadter p. 17

[28] Hofstadter p. 20

[29] The paradox arises from considering set of sets. Take the statement, "Let R be the set of all sets that are not members of itself." Immediately, if R does not include itself, it should include itself, but if it does, it could not be its own member.

[30] Grelling's Paradox categorizes adjectives into autological (self-descriptive and heterological (non-self-descriptive). Again, we run into the same issue whether heterological is heterological.

Russell and Whitehead did just that in *Principia Mathematica* by creating a system of hierarchical statements, in which each type of set can only contain objects or sets of lower type, which seemed to solve at least the Russell›s Paradox. However, this could not apply to all paradoxes in mathematics. Take language, for example, in the case of Grelling›s Paradox, is an all-pervasing aspect of life. To ban self-reference, would mean no one could make an ‹I› statement! Each disciplines of study would not make be able to make any statements about its own area of expertise. And so, Gödel›s theorem states, "All consistent axiomatic formulations of number theory include undecidable propositions," which means all consistent systems will have at least unprovable theorem, thereby making it incomplete, or if it does not, then it will be inconsistent.

This leads us, then, to far reaching implication of Gödel›s theorem on algorithmic computations and computational theories, a.k.a. machines, computers, and AI, all of which, at their core are made up of deductive formal systems of logic consisting of 0›s and 1›s. It is on this basis that, Roger Penrose, a Nobel Laureat physicist, asserts non-computability of human thought has intrinsically quantum qualities, which is impossible to replicate using algorithmic based AI.[31] Simply put, humans can be and are often contradictory, act against or without rationality, inconsistent, which also means, we are able to embrace paradoxes within ourselves without all of our systems grinding to a halt.

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[31] See Roger Penrose, *The Emperor's New Mind: Concerning Computers, Minds, and the Laws of Physics* (Oxford University Press, 2016); see also, p. 38

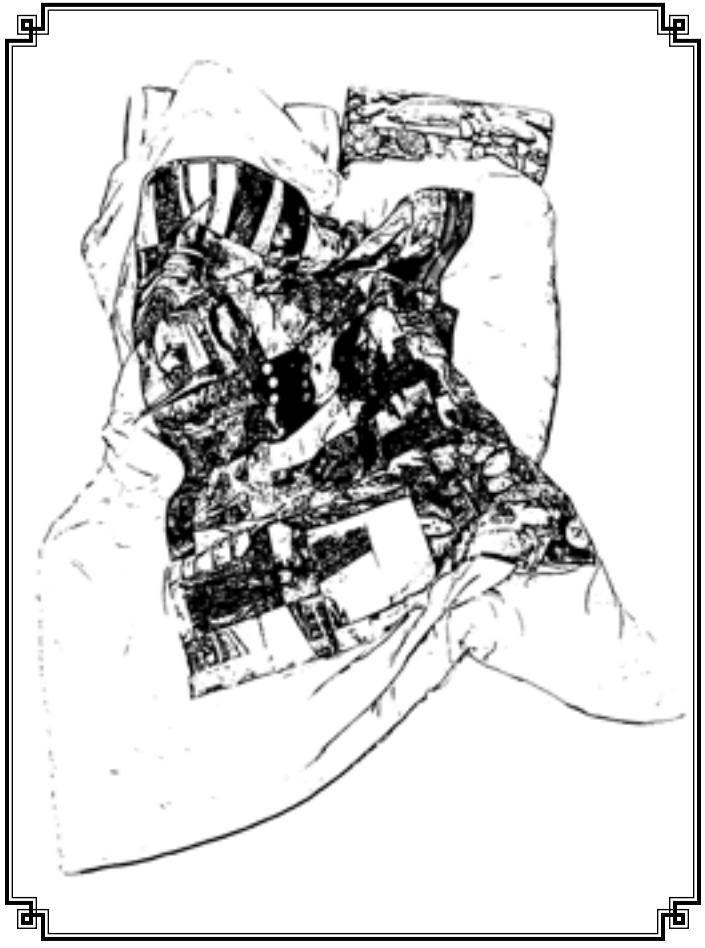

Figure 6. Illusstration of *Jogakbo*, 2021.

Lines 40-42:

> The cosmos vast, its age a light,
> Expanding beyond the light
> In darkness alone, stars out of sight.

The size and age of the universe can feel quite paradoxical. Our best guess so far is around 13.9 billion years,[32] but size of the observable universe is a sphere with radius of roughly 46.5 billion light years. It›s quite natural to jump to the conclusion given that nothing can travel faster than the speed of light, the universe should also be 13.9 billion light years in radius. The catch is that *no-thing* can travel faster than light *IN* spacetime; the speed at which spacetime itself is expanding is a wholly different issue. We say observable universe, because beyond that the light simply cannot reach us, yet, or perhaps never.[33] It is a lonely journey that photon is on, destined to never reach its destination. Eventually, we will also be alone in darkness.

• • • • • • • • • •

[32] Contra: Gupta, "Testing CCC+TL Cosmology with Observed Baryon Acoustic Oscillation Features." (Asserting that the universe may be almost twice as old based on a long debunked "tired light" theory from 1929 put forth by Fritz Zwicky.)

[33] I used to have a recurring nightmare as a kid. In it, I would lose my mom in the crowd at the market before spotting her just a few yards ahead of me. But when I run up and grab her hand yelling, "Mom! —", it would turn out to be a strange woman giving me a strange look. In a panic, I would yank my hand out and run in the other direction. After what felt like an eternity of searching in the crowd, I would hear a familiar voice and see my mom waving at me from a distance. Of course, immediately, I start sprinting towards her, but the ground seems to be slipping under my feet. I seem to be moving because the crowd, the stalls, and trees start fading behind me, but somehow the distance to my mom wasn't getting any closer. If anything, she seemed to be even further away. It wasn't that she was walking away; she was still standing there waving and calling my name. But rather, the ground between us was stretching faster than I could run, until eventually only darkness envelops me and I wake up from the jerking sensation of falling.

Lines 43-45:

Spaghetti, it consumed,
Omnivorous in its delight,
Into narrow infinities, we pledge.

Spaghettification

A real term that describes what happens when matter gets too close to a black hole. It's squeezed horizontally and stretched vertically, resembling a noodle.

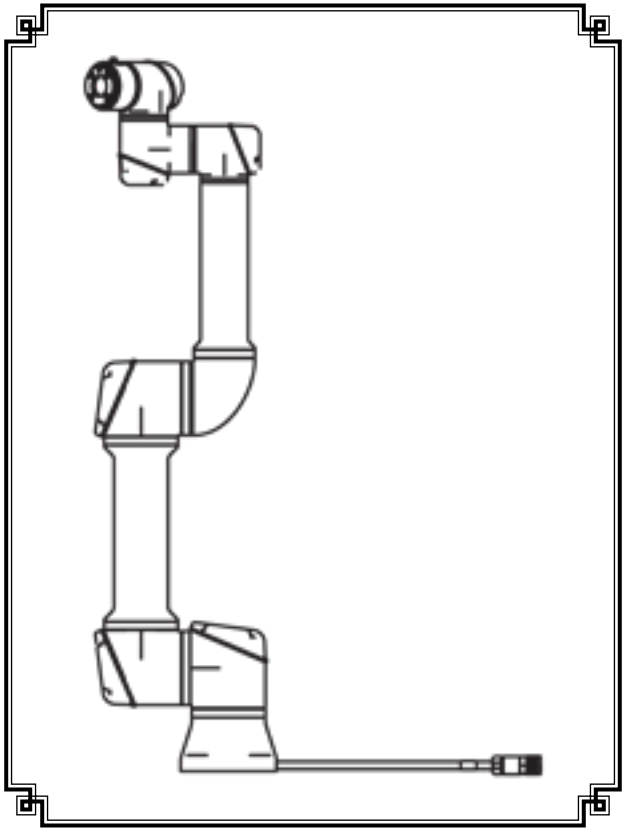

Figure 7. Illusstration of UR5e in its Home position, right-side view.

Lines 46-48:

And so too in our stories
Of deep cardboard forest,
Roams the grinning Cheshire Cat..

I do not purport to have an understanding of quantum nature of human consciousness. But it is certainly a compelling speculation to indulge in. Charter argues that "our beliefs, desires, hopes and fears do not wait pre-formed in a vast mental antechamber," but rather "that at the very moment that we ask ourselves a question, the answer springs to mind."[34] Not unlike Shrödinger's cat, who cannot decide whether it is dead or alive until observed, we do not know our own mind until a question has been forced upon it.

Our brain is very good at inventing stories and justifications to explain our choices retrospectively— and so fluently, I might add —that we can maintain the illusion of richer inner mechanism that form our identity and self. Especially, when it comes to questions about ourselves, our preferences and choices that we believe to be some fundamental aspect of who we are. For example, your improvised answer to the very first time you were asked "What is your favorite color?" might be a decision that you carry with you from that point on. Subsequently, now armed with the memory of having answered the question once, your brain has now convinced yourself that was the answer all along.

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[34] Nick Chater, *The Mind Is Flat: The Illusion of Mental Depth and The Improvised Mind* (Penguin UK, 2018).

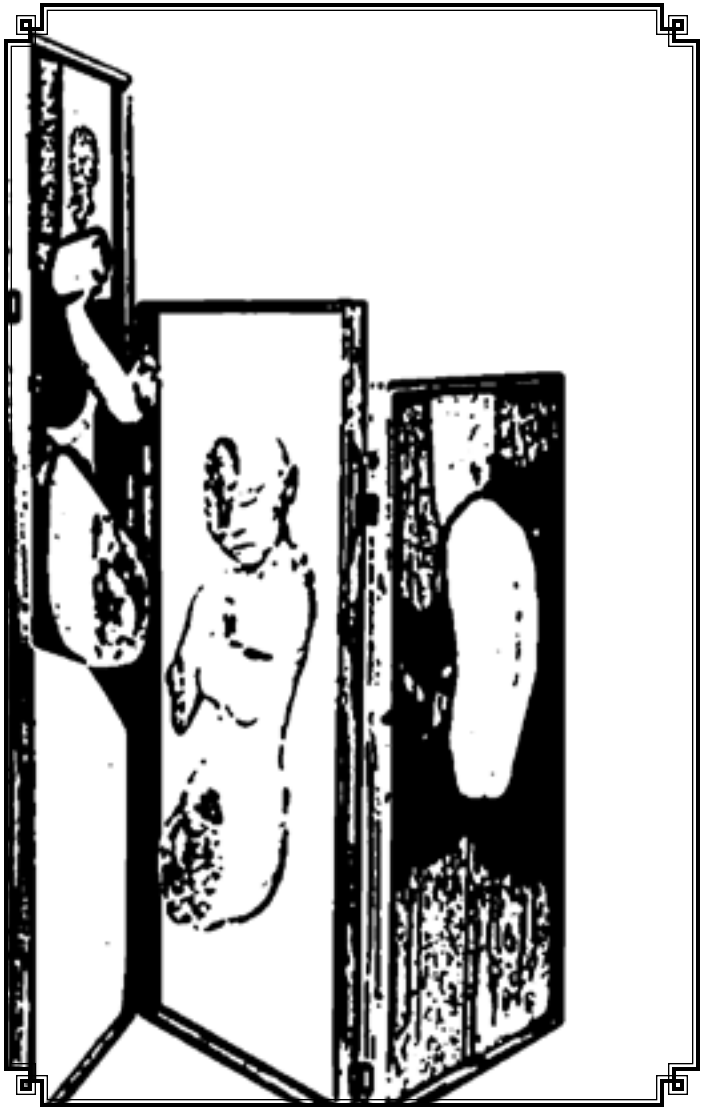

Figure 8. Illusstration of Through Flatland to Thoughtland, 2021.

Lines 49-51:

> In stripes and spots unfurled,
> God's holy scriptures,
> Patterns divine.

Recent study[35] has confirmed the mathematical model of the Turing Pattern. Its equation[36] describes how patterns arise in nature, including that of stripes and spots in animals such as jaguars[37]. The concept was first introduced in Alan Turing's "The Chemical Basis of Morphogenesis" published in 1952, shortly before his death.[38]

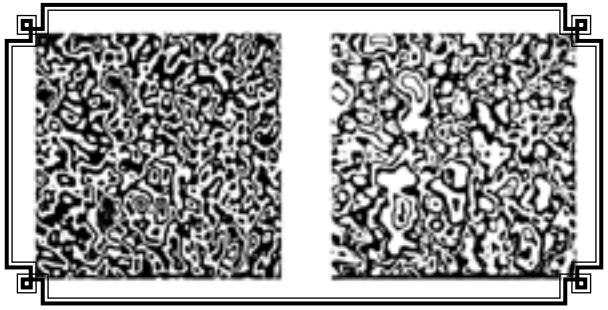

Figure 9. Pattern generated from satellite image of the artist's neighborhood and microscopic image of skin cells via Turing's Reaction-Diffusion algorithm as part of *Camouflage*, 2022.

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[35] "Chia Seedlings Verify Alan Turing's Ideas about Patterns in Nature," March 26, 2023, https://www.sciencenews.org/article/seeds-alan-turing-patterns-nature-math.

[36] Mathematicians and physicists have been searching for "The God Equation" a.k.a. the unifying "Theory of Everything" (popularized by Michio Kaku's book and a movie based on Stephen Hawking's life of same the titles, respectively), since the disturbing conjectures of quantum mechanics came into the picture. Unbeknownst, it resided with the jaguar all along.

[37] Legend has it that god had written a magical phrase into the markings of jaguars, to endure generation after generation, as a living scripture, to ward off the end of days. The pattern on its coat, comprising circles and stripes, contained the entire universe, all of time and space. Consisting of 14 words and 44 syllables, its speaker is believed to gain omnipotence. See also Jorge Luis Borges, "The Writing of God," in *Collected Fictions* (Penguin, 1999).

[38] Two years after publishing the paper, he was found dead by his housekeeper and his death was ruled a suicide by cyanide poisoning. Perhaps, like Tzinacán, knowing the words made him forget himself.

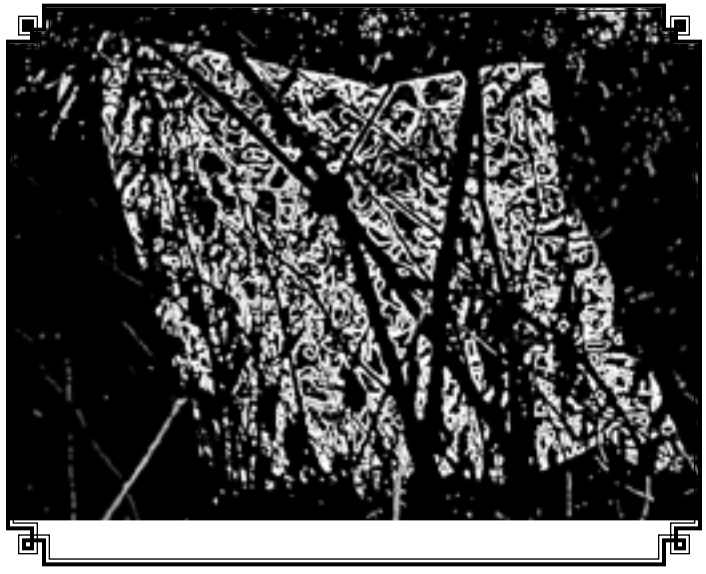

Figure 10. Illusstration of installation of *Camouflage,* 2021.

Lines 52-54:

> The artist sighs at the simple sight;
> Yet deeper still, the scientist's delight,
> A Flower held in morning light.

Transcription of Feynman's interview:

> I have a friend who's an artist and he's some times taken a view which I don't agree with very well. He'll hold up a flower and say, "look how beautiful it is," and I'll agree, I think. And he says, "you see, I as an artist can see how beautiful this is, but you as a scientist, oh, take this all apart and it becomes a dull thing." And I think he's kind of nutty.
>
> First of all, the beauty that he sees is available to other people and to me, too, I believe, although I might not be quite as refined aesthetically as he is. But I can appreciate the beauty of a flower.
>
> At the same time, I see much more about the flower that he sees. I could imagine the cells in there, the complicated actions inside which also have a beauty. I mean, it's not just beauty at this dimension of one centimeter: there is also beauty at a smaller dimension, the inner structure... also the processes.
>
> The fact that the colors in the flower are evolved in order to attract insects to pollinate it is interesting - it means that insects can see the color.
>
> It adds a question - does this aesthetic sense also exist in the lower forms that are... why is it aesthetic, all kinds of interesting questions which a science knowledge only adds to the excitement and mystery and the awe of a flower.
>
> It only adds! I don't understand how it subtracts—![39]

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[39] Richard Feynman,"The Beauty of a Flower", *The Pleasure of Finding Things Out*, [Video], November 23, 1981, https://www.bbc.co.uk/iplayer/episode/p018dvyg/horizon-19811982-the-pleasure-of-finding-things-out.

Bibliography

Alighieri, Dante. "Paradiso" in *Divine Comedy*, translated by Henry Wadsworth Longfellow, Vol. 3. Boston, 1867.

"Amazon Mechanical Turk." https://www.mturk.com/.

Borges, Jorge Luis. "The Aleph." in *Collected Fictions*. Translated by Andrew Huxley. Penguin Classics Deluxe Edition. New York, NY: Penguin Books, 1998.

———. "The Circular Ruins." in *Collected Fictions*.

———. "Funes, His Memory." in *Collected Fictions*.

———. "The Immortal." in *Collected Fictions*.

———. "The Library of Babel." in *Collected Fictions*.

———. "On the Science of Exactitude." in *Collected Fictions*.

———. "A Survey of the Works of Herbert Quain." in *Collected Fictions*.

———. "Tlön, Uqbar, Orbis Tertius." in *Collected Fictions*.

———. "The Writing of the God." in *Collected Fictions*.

Borges, Jorge Luis, and Eliot Weinberger. "The Thousand and One Nights." *The Georgia Review* 38, no. 3 (1984): 564–74. http://www.jstor.org/stable/41398722.

"Chia Seedlings Verify Alan Turing's Ideas about Patterns in Nature," March 26, 2023. https://www.sciencenews.org/article/seeds-alan-turing-patterns-nature-math.

Dutens, Louis. *Memoirs of a Traveller, Now in Retirement : Interspersed with Historical, Literary, and Political Anecdotes, Relative to Many of the Principal Personages of the Present Age*. Vol. 2. 5 vols. R. Phillips, 1806. https://openlibrary.org/works/OL15686755W/Memoirs_of_a_traveller_now_in_retirement?edition=memoirsoftravel02dute.

Farmelo, Graham. "Physics + Dirac = Poetry." the Guardian, February 21, 2002. http://www.theguardian.com/science/2002/feb/21/maths.scienceandnature.

Feynman, Richard. *The Pleasure of Finding Things Out*. [Video], November 23, 1981. https://www.bbc.co.uk/iplayer/episode/p018dvyg/horizon-19811982-the-pleasure-of-finding-things-out.

Gupta, Rajendra P. "Testing CCC+TL Cosmology with Observed Baryon Acoustic Oscillation Features." *The Astrophysical Journal 964*, no. 1 (March 1, 2024): 55. https://doi.org/10.3847/1538-4357/ad1bc6.

Hofstadter, Douglas R. *Gödel, Escher, Bach: An Eternal Golden Braid*. 20th anniversary ed. New York: Basic Books, 1999.

"Mechanical Turk - Wikipedia." https://en.wikipedia.org/wiki/Mechanical_Turk.

Merleau-Ponty, Maurice. *Phenomenology of Perception: An Introduction*. Repr. Routledge Classics. London: Routledge, 2006.

Merrell, Floyd. *Unthinking Thinking: Jorge Luis Borges, Mathematics, and the New Physics*. West Lafayette, Ind: Purdue University Press, 1991.

Mualem, Shlomy. "Borges and Wittgenstein on the Borders of Language: The Role of Silence in 'The God's Script' and the Tractatus Logico-Philosophicus," n.d.

Nabokov, Vladimir Vladimirovich. *Pale Fire*. 1. ed. Vintage International Fiction/ Literature. New York: Vintage Books, 1989.

Nicolelis, Miguel. *The True Creator of Everything: How the Human Brain Shaped the Universe as We Know It*. New Haven (Conn.): Yale university press, 2020.

NobelPrize.org. "The Nobel Prize in Physiology or Medicine 2014." https://www.nobelprize.org/prizes/medicine/2014/press-release/.

Peterson, Mark. "Dante and the 3-Sphere." *American Journal of Physics - AMER J PHYS 47* (December 1979): 1031–35. https://doi.org/10.1119/1.11968.

Rovelli, Carlo. *Reality Is Not What It Seems: The Journey to Quantum Gravity*. London: Allen Lane, 2016.

———. *The Order of Time*. Translated by Erica Segre and Simon Carnell. London: Penguin Books, 2019.

——— *There Are Places in the World Where Rules Are Less Important than Kindness: And Other Thoughts on Physics, Philosophy and the World*. Translated by Erica Segre and Simon Carnell. New York: Riverhead Books, 2022.

Salam, Abdus, and P. A. M. Dirac, eds. *Aspects of Quantum Theory*. Cambridge: Cambridge Univ. Pr, 1972.

"The Rise of 'Pseudo-AI': How Tech Firms Quietly Use Humans to Do Bots' Work" *The Guardian*. https://www.theguardian.com/technology/2018/jul/06/artificial-intelligence-ai-humans-bots-tech-companies.