

# Azimuth to Cypher: The Transformation of a Tiny (Virtual) Cosmogony

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**Abstract** — This paper discusses the transformation of a tiny three dimensional artwork created in the metaverse. The project takes its inspiration from Jorge Luis Borges’s story of ‘the Aleph,’ which revolves around a tiny artifact which is “one of the points in space that contains all other points.” [1]

The paper will investigate how the visualization of a thing that is as complex as ‘the Aleph’ became transformed into an investigation of ‘code’ as a basal, life-giving presence that is nevertheless abstract, enigmatic, hermetic, and complex in its essence - a thing to be pondered upon and deciphered, a system that does not reveal itself readily to the uninitiated.

**Keywords** - 3D; Art; the Aleph; Jorge Luis Borges, Metaverse; Process; Virtual Worlds; Visualization;

## I. The Aleph as Cyber Artifact

The project under discussion in this text revolves around the transformation process of a miniature, volumetric artwork created in the metaverse – a virtual construct that is so small that it easily fits onto the fingertip of an avatar; so small indeed that it cannot be seen with the naked avatar eye. As such, the object is one that can only be scrutinized by using a device that stands in lieu of a microscope, in this instance the metaverse viewer's camera, which can be used to zoom into the object at a micro level.

The work takes its inspiration from Jorge Luis Borges's story of ‘the Aleph’ which revolves around a wondrous artifact, “*a small iridescent sphere of almost unbearable brilliance*” that enables anyone who gazes into it (to) see everything in the universe from every angle simultaneously, without distortion, overlapping or confusion, “*the only place on earth where all places are seen from every angle, each standing clear, without any confusion or blending.*” [2]

Although the story of ‘the Aleph’ was written at a time well before developments in cyber technologies reached a level of fruition to let us say that Borges may have been inspired by computer technologies when he wrote his text; nevertheless ‘The Aleph’ has compelled many writers and theoreticians of cyber cultures to draw inspirations from, and point at analogies and similarities between the tiny shining sphere of Borges’s imagination and developments in cyberworlds that have transpired over the past few decades.

### A. Cyber Beings, Posthumanism and the Borgesian Flux

Ralph Dumain notes that ‘the Aleph’ replicates many of the themes found in Borges's stories, such as the one concerning infinity and infinite divisibility; the paradox of

the reduplication of the universe in a microcosm which results in cosmic destabilization as well as an anxiety of infinite regress; some liminal talismanic object of perfection representing the aforementioned destabilization (such as the Aleph); the impossibility of living with the consciousness of total flux; the instability underlying the illusion of permanence. Slippage of identity and memory (seen as illusory abstractions), especially manifesting through a dissolution of language and persona into extreme nominalism; chance encounters and the sense of breaking a taboo by encountering structures such as the Aleph; as well as shrinking back from such limit states to the ordinariness of the finite world are amongst the recurrent motifs of these texts. [3]

This listing of Borgesian themes and motifs seems to dovetail remarkably well with the enigmatic nature of virtual beings and constructs whose existence comes about through bits and not through atoms. This change of basal building material results in an environment in which virtual presences (objects as well as personas such as avatars) can infinitely be manipulated with no discernible loss, through processes in which even concrete objects can be created through abstract notation; can be copied, duplicated and re-combined to generate perpetually novel artifacts; varying ‘levels of detail’ which become apparent when zoomed in and out; resulting in conditions in which concepts such as scale, fixedness, stability and uniqueness, become irrelevancies.

This enigmatic, fluid state resides in the microstructure of the computational medium: Processes that move physical atoms around constitute the irreversible aspects of traditional work, in which most operations are beyond recall. By contrast, the microstructure of the digital medium is comprised of bits which are specified arrangements of symbols. Accordingly, in the microstructure of the computational medium, arrangements and values can always be reconstructed, their previous states can be stored and recalled, additional instances and versions can be replicated, resulting in a continuously workable medium. [4]

Alan Kay defines this state of being as follows:

“*The protean nature of the computer is such that it can act like a machine or like a language to be shaped and exploited. It is a medium that can dynamically simulate the details of any other medium, including media that cannot exist physically. It is not a tool, although it can act like many tools. It is the first metamedium, and as such it has degrees of freedom for representation and expression never before encountered and as yet barely investigated.*” [5]

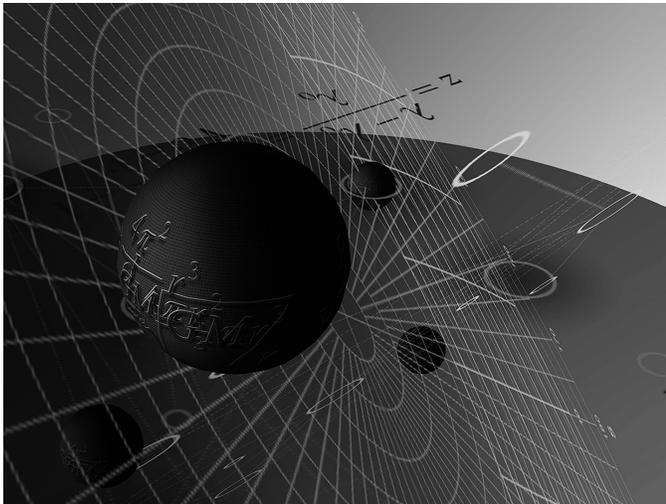


Figure 1. 'Azimuth.' (left) Elif Ayiter, aka. Alpha Auer, Second Life, 2013

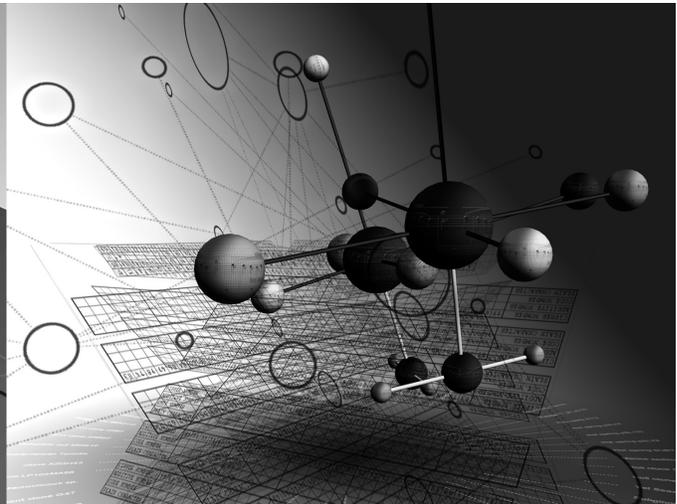


Figure 2. 'Cypher' (right) Elif Ayiter, aka. Alpha Auer, Second life, 2013

I am certainly not alone in my fascination with 'the Aleph' as a talismanic object of perfection that affects cyber states of being. I rest my query on a large body of Cyberpunk literature in which Borgesian themes and motifs, and especially 'the Aleph,' have been a central concern and a source of inspiration:

*"Personal cosmologies, or the development of technological microcosms of the larger world, have been a major theme in cyberpunk... [and] ...'the Aleph,' as a symbol of united infinity- a single glance within which all visible reality is manifest simultaneously, is extensively covered in cyberpunk literature in which the question as to whether technology can reproduce Borges's idea of the aleph, 'the microcosm of the alchemists and Cabbalists, our true proverbial friend, the multum in parvo' is often asked.*

*That is only a part of the question this research needs to ask, as the real question for cyberpunk is why would someone desire a microcosm, an aleph?"* [6]

A compelling answer to this question may come from William Gibson who writes about an Aleph which is a huge biochip that can store vast amounts of data, a neuralgic centre in consciousness, or a self-terminal where our most intimate memories are projected. Thus one of his protagonists enters the novel 'Mona Lisa Overdrive' in a highly unusual state – his body is in a medical coma of sorts, and a black box is attached to his head. The box is later revealed to be something called an 'Aleph' which essentially exists as a form of AI, a whole virtual universe wired directly into the hero's nervous system. While his body lies in an inert state, his consciousness roams freely throughout the Aleph which is a virtual recreation of the whole universe.

However, Gibson is not the only cyberpunk author who is fascinated by Borgesian concepts. In their 2009 book chapter Stefan Herbrechter and Ivan Callus state that much of this fascination has to do with the way in which many of

Borges's writings can be read as unsurpassable experiments in how to make thinkable the impossible and the unrepresentable. According to Herbrechter and Callus obsession with the posthuman, as that which reconfigures the actual and the possible once technology re-engineers human potential, is overwhelmingly present throughout Borges's oeuvre. [7] The authors set up a special correlation between Borges and post-humanist theorist Katherine Hayles, who in her book 'How We Became Posthuman' named Borges as one of the precursors to the cybernetic notion of reflexivity, *"the system generating a reality [that] is shown to be part of the reality it makes."* [8]

Hayles examines Borges, and in particular 'The Aleph,' in relation to the mathematical notion of 'field concept,' on the basis of interconnectivity and self-referentiality. Borges, according to Hayles, is attracted to the field concept, *"because its discontinuities reveal that everything, including itself, is no more than a game"* and this leads *"to the discovery of paradoxes of self-referentiality,"* indefinite expansion and the possibility for creating *"new kinds of Strange Loops"* in his writings. *"Where Borges's fiction differs from scientific models of the field concept, however, is in using the concept to suggest that everything, including reality, is a fiction."* Borges, Hayles says, uses these paradoxes to exploit rather than to suppress any inconsistencies, *"because he hopes to use them to reveal the essential fictionality of the model. His intent is thus subversive."* [9]

Returning to Herbrechter and Callus, we come across the notion that Borges's 'Aleph' might be more powerful in its self-referentiality than Hayles states. Although there is a circular structure that seems to try to recapture an infinite series, it nevertheless never manages to do so with a 'twist' – a 'Strange Loop' rather in the manner of a Moebius strip,

which does more than just turn itself into a simple cybernetic feedback structure. [10]

## II. BUILDING THE ALEPH

My personal journey with ‘the Aleph’ started out as a tiny solar system that was created in a virtual world (Figure 1). The idea was to turn something that we automatically tend to think of as infinitely large into something that is very small, and thereby establish the contradiction that lies at the heart of ‘the Aleph.’ The inspirations for building something very small that would hold something very large, however, came from physical, real-life, historic sources such as Chinese ivory miniatures and the entire Koran written on a grain of rice.

This tiny architecture was named ‘Azimuth,’ in accordance with a number of Cartesian typographic elements that I deconstructed to build a decentralized planetary system that nevertheless revolved around a centralized solar chart. Although the solar system was meant to be contradictory and confusing when considered in a Cartesian sense, I also wanted reminders of Cartesian signifiers, to which end I used astronomical formulas that were wrapped around spheres that were meant to represent the planets of this idiosyncratic solar system. These spheres moved randomly around a tilted diagram that showed the altitude and azimuth of the Sun for a range of local solar times from sunrise to sunset at specific latitude. My many suns could not possibly be measured by such means, of course. And yet, there they would be – bounded by, and indeed held ransom to the inflexible, logical, centralized beauty of this diagram.

However, as my building progressed, I soon began to realize that this strategy was far too literal, that it failed to address what was at the core of ‘the Aleph,’ as I had now begun to understand it through an extended journey of reading that took its trajectory from the story itself and that led me to places such as cyberpunk literature, the Kabala, numerology and its relation to the concept of ‘code’ as a basal life force that stretched from intangible abstractions such as mysticism and music to the tangibly concrete such as biology and the workings of computers. This reading material, as well as a fundamental dissatisfaction with what I was in the process of building, began to lead me away from an attempt at re-creating Borges’s complex description of the wondrous object that allowed him to see “*millions of acts both delightful and awful; not one of them occupied the same point in space, without overlapping or transparency*” [11] as something as immediately identifiable and as obvious as a solar system.

A grasp of ‘the Aleph’ now seemed to me to be best possible through an acknowledgement of it as an ‘Enigma,’ as a presence that defies definition and description – indeed a non-presence or a non-entity that may be grasped through a visual conglomeration of ‘code’ as an identifier of enigma. This resulted in a novel stage of my visual journey with ‘the Aleph’: The project began to take shape as an evolving, three dimensional link-and-node structure built out of many different (and seemingly unrelated) visualizations of code.

At this stage I re-named the construct ‘Cypher,’ (Figure 2) a name that took its inspiration from the Renaissance

school of the Cistercian Monks who appeared to have developed an occult system based upon Pythagorean Numerology and the philosophy of Agrippa that revolved around ‘Cipher.’ Yet another reason for giving this name to what I was about to build resided in my fascination with the double meaning of the term, since ‘cipher’ also means ‘zero,’ which as the smallest transfinite cardinal number is also called ‘aleph-zero.’

Taking my investigation of the word ‘Cipher’ even further I found that in cryptography, a cipher denotes an algorithm for performing encryption or decryption, consisting of a series of well-defined steps that can be followed as a procedure. Thus, the next step in my travels that helped shape my second rendition of ‘the Aleph’ brought me to Alan Turing who is so said to have said that “*you could use, in effect, a theorem in logic which sounds to the untrained ear rather absurd; namely that from a contradiction, you can deduce everything*” [12] – a statement which resounded strongly with what my idea of ‘the Aleph’ was, of how it should be visualized.

Consequently, the central body of ‘Cypher’ was constructed out of scans of Turing’s Enigma codes which I placed upon a further body of code, in this case a phylogenetic tree diagram that showed the inferred evolutionary relationships among various biological species based upon similarities and differences in their physical and/or genetic characteristics. The third visual element that I brought into this conglomeration of code were the scores of Elgar’s Enigma variations about which their author said:

*“The Enigma I will not explain – its ‘dark saying’ must be left unguessed, and I warn you that the connection between the Variations and the Theme is often of the slightest texture; further, through and over the whole set another and larger theme ‘goes’, but is not played.... So the principal Theme never appears, even as in some late dramas ... the chief character is never on the stage.”* [13]

Just as the quote attributed to Turing above greatly inspired me, this quote of Elgar’s also became highly relevant to my transformation of ‘the Aleph’ from ‘Azimuth’ to ‘Cypher,’ since in the latter project ‘the chief character is never on stage,’ while in its forerunner the concept of the solar system as a symbol of something as mysterious and closed as ‘the Aleph’ is glaringly apparent and manifest: Code runs through everything – from biological beings to electronic entities to mystical systems related to numerology – and yet, at its most potent, code is non-apparent, lives as the silent life-force in the background of the beings and systems that it animates.

## III. THE VIRTUAL ALEPH AND THE AVATAR

While the fascination that Borges’s ‘Aleph’ holds for cyberpunk writers and new media theoreticians already justifies it being considered as a fully fledged virtual object in its own right, I hope to have added a modest twist to the discussion by building an ‘Aleph’ that is meant not for the scrutiny of human beings, as is the case in Borges’s story, but instead this is a virtual artifact that exists in a virtual world and is presented to the scrutiny of virtual beings – only through the eyes of our avatar can we see ‘the Aleph.’

As said at the onset of this text, the object is very small, easily fits on the fingertip of a virtual world avatar who emulates the size and proportions of a physical human being, cannot even be seen with the naked avatar eye, and requires devices such as metaverse viewer's camera to zoom in on it. And even then, the viewing of it is a precarious undertaking since at such infinitely close range the camera tends to shake and a clear view from a viewpoint that is external to the avatar can only be obtained by taking virtual screenshots of the object that freeze the screen while the shot is being taken to allow for a focused viewpoint. There is however another way of looking at the virtual 'Aleph' and that is through the eyes of the avatar, by going into what in virtual worlds is called 'the mouselook.'

A further question is connected to the question of scale that makes the viewing of the virtual 'Aleph' utterly reliant upon the eyes of the avatar: Given that in a virtual world what is small and what is big are rather relative conceptions, how would such a fluidity of scale affect the concept of 'the Aleph' as a tiny object that is yet big enough to be "*the only place on earth where all places are seen from every angle, each standing clear, without any confusion or blending?*"

How do we know how big the avatar is in relation to this wondrous miniscule object? Yes, virtual worlds give us measurements of 'virtual meters' – but what do these virtual meters mean exactly? In a metaverse not all avatars affect physical human sizes, instead oftentimes they can be extremely small, can even be invisible; or conversely they can be extremely large. Furthermore, body sizes are fluid and unfixed – the same avatar can be extremely small and extremely large almost simultaneously, or at such short intervals of change that it is almost a concurrent event.

Moreover, there seems to me to be a fascinating further relationship between 'the Aleph' and the avatar which I am presuming to connect to the Jewish myth of the Golem (a piece of clay that is given life through Kabbalistic rituals by the writing of a name, the first letter of which is the Hebrew letter 'aleph') on its forehead: Just like the Golem, virtual world avatars come into life through the initial creation of a

name. True, an avatar's name need not have the letter aleph as an initial in order for the virtual creature to come into being, but nevertheless the connections between the two naming processes that give life to a piece of clay and to a coded persona appears to me to be one to ponder upon further in future research and writings.

The relationship between the human behind the keyboard is riddled with complex ties that have been discussed at length by many researchers of the field, including Richard Bartle, for whom the final identification stage between handler and avatar is a fully fledged 'persona' stage in which the two entities have become seamlessly integrated to one another, to the point where an emotional separation is deemed to be inconceivable by the human behind the keyboard. [14]

But what would happen if these virtual creatures (that seem to already have become our integral extensions) were to also acquire autonomous behaviors of their own? What if our avatars continued to operate and, even more importantly, to observe and to emote in the virtual world in our absence? Although we are, of course, yet a ways removed from this state of posthuman being, there are already significant investigations by virtual artists and scientists regarding the creation of autonomous or semi-avatars, most recently reported upon by Jeremy Turner et al who expound upon the challenges related to the creation of a semi-autonomous, 'self-absorbed' avatar called Qiezli in Second Life. [15]

In conclusion, with all this in mind, I cannot help but wonder what the encounter between such an autonomous or semi-autonomous avatar and a miraculously coded virtual 'Aleph' (that enables any avatar who gazes into it to see everything in the universe from every angle simultaneously, without distortion, overlapping or confusion) be like? What would our virtual doppelganger see and how would such exchange between 'the Aleph' and our virtual counterparts be transmitted back to us? Would we then finally be able to gaze into every hidden corner of the universe through the coded eyes of our avatar?

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