# Monstrous Geometries in the Fiction of H.P. Lovecraft[1]

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**Abstract**

The scenarios invoked by H.P. Lovecraft derive their insidious horror from the nightmarish qualities of the unknown. His protagonists are haunted by unutterable incantations, dreams of a grossly deformed species of anthropoid monsters, and alien architectures of repugnant proportions that loom in inhospitable landscapes deep under the sea or in the arctic ice. In his stories, the boundary between reality and nightmare is deliberately blurred as grotesque artefacts and figures follow dreamers into their waking lives and betray all ratio-scientific attempts to determine their origin and material nature. In many cases it is specifically their inassimilable geometrical properties in the form of elusive angles and ambiguous symmetries that arouse an immediate sense of dread. While Lovecraft's tales incorporate many elements of classic Poe-esque gothic fiction, they testify to his persistent inspiration in the appalling insights of turn-of-the-century science such as Einsteinian physics and Non-Euclidean geometry.

Focussing on three short stories of Lovecraft's Cthulhu-Mythos, 'The Call of Cthulhu,' 'Through the Gates of the Silver Key' and 'The Dreams in the Witch House', I will illustrate the role of strange geometries in Lovecraft's evocation of the monstrous, with particular consideration of their foundations in mathematics and folklore science. Lovecraft's fiction serves as a prime example of how newly emerging concepts of curved space and unfathomable dimensions have naturally appealed to the artistic imagination of spatial horror. Whether in the form of 'iridescent congeries of spheroids' and a 'kaleidoscopic polyhedron of rapidly shifting surface angles' that lead the mathematically-versed protagonist of 'The Dreams in the Witch House' into the abysmal chaos of adjacent dimensions, or the revolting architecture of the 'nightmare corpse-city of R'lyeh' discovered by sailors in 'The Call of Cthulhu,' Lovecraft's imagery is redolent of the surreal spaces depicted in the artworks of early 20th century Cubism and the *Grotesque*. It is my aim to lay bare the artistic resonances and possible scientific origins of these recurrent motifs in Lovecraft's worlds as they contribute to what could be called the horror of geometry.

**Key Words:** Non-Euclidean Geometry, Fourth Dimension, Horror, H.P. Lovecraft, Grotesque, Cubism.

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In many ways the monstrous has always been a *mise-en-scène* of radical alterity, of something uncontainable, something abject, whose nature poses a serious challenge to established orders. According to this logic, the sensation of terror experienced in the face of the deformed, the infinite, or the supernatural, stems from an epistemological crisis, an incapacity to make sense. As H.P. Lovecraft famously expounds: 'The oldest and strongest emotion of mankind is fear, and the oldest and strongest kind of fear is fear of the unknown.'[2]

In my paper I want to provide an account of how the supreme horror in Lovecraft's tales is heavily inspired by the unknown and utterly alien qualities of early 20th century physics and mathematics,[3] and how his sensitivity toward a paradigm shift in the sciences resonates with similar artistic sentiments of his time, revisited in the form of cubist paintings and the *Grotesque*. While I could have picked almost any of Lovecraft's fictional pieces to illustrate this point, I will present passages from three short stories, where I feel the scientific allusions are made most explicit: 'The Call of Cthulhu' (1926) 'Through the Gates of the Silver Key' (1933), and 'The Dreams in the Witch House' (1932) whose protagonist experiences how hallucinatory dreams can lead to 'an insight into the mathematical depths perhaps beyond the utmost modern delvings of Planck, Heisenberg, Einstein, and de Sitter.'[4] To understand what Lovecraft is alluding to in passages like this one, it will be necessary to take a brief excursion into the history of science as it came to bear upon a creative mind enthralled by the appalling insights of modern physics in the 1920s.

At the turn of the 20th century Lord Kelvin could not have been more off when he allegedly claimed that '[t]here is nothing new to be discovered in physics now.'[5] Quite to the contrary, the years of Lovecraft's lifetime (1890-1937) witnessed some of the most radical turning points in the history of science. Arguably, the greatest divergence from traditional concepts regards the nature of space itself. With the popularization of Einstein's special and general relativity theory, space was whipped away from the steady grasp of Cartesian intuition and was suddenly claimed to exhibit properties utterly bizarre and alien. According to the mathematical framework underlying Einstein's introduction of a four-dimensional 'spacetime' (the fourth dimension being time), the geometry of the universe was not only warped, but moreover, allowed for the existence of even more than three spatial dimensions. Ground-breaking as they were, however, some of the geometrical notions in Einstein's relativity theories had already been around for several decades. His discovery of spacetime curvature fundamentally relies on a radical break with the schoolbook geometry of Euclid. In the late 1820s the Hungarian János Bolyai and the Russian Nicolai Lobachevsky simultaneously arrived at a mathematically consistent alternative to Euclidean geometry, which later received the label 'hyperbolic geometry' and centred around the debunking of

Euclid's notorious parallel postulate. Until then, geometers, for over 2000 years, had failed to verify or disprove Euclid's axiomatic claim that at any given distance a line can have exactly one parallel and that, as a result of this, the interior angles of a triangle always add up to 180 degrees. It was Bolyai and Lobachevsky's ingenious feat to prove that a consistent conceptualization of space was possible in which the angle sum of a triangle is always less than 180 degrees, and where a single line will have, at any given distance, an infinite number of parallels that all bend away from one another. These findings inaugurated a novel geometry, that seemed utterly incompatible with the phenomenological experience of space. If only theoretically, space suddenly acquired an alienating quality that was further solidified when the German mathematician Bernhard Riemann theorized the familiar Euclidean 3-dimensional geometry as merely a special case of the study of *n-dimensional manifolds*. While Bolyai and Lobachevsky brought on the spectre of a bizarrely distorted space, the mathematics of Riemann's differential geometry allowed for an infinite number of higher spatial dimensions.[6]

Where Euclid's *Elements* has dominated the world's scientific discourse for over 2000 years, Lovecraft presents the mythological history of his universe in the fictional 'Necronomicon.' The distorted geometrical heritage of Lovecraft's world becomes apparent as he chooses to include the real-life 16th century astronomer and first English editor of Euclid, John Dee, as the first English translator of the occult paranormal science detailed in the 'Necronomicon'.[7] Thus, one is prompted to envision Lovecraft's universe as an alter-reality whose mathematical history relies on the Necronomicon's 'unknown, inverse geometry',[8] where ours is based on Euclidean parallels.

Unlike other authors of the time who also drew influence from the new geometries, Lovecraft's writings did not feature abstract romances with a cast of flat triangles, 3-dimensional spheres and four-dimensional hypercubes, like for instance Edwin A. Abbott's 1880 novel *Flatland* or Charles Hinton's even earlier scientific tales of the fourth dimension.[9] Instead, Lovecraft's universe spawns an incomparably wilder and even more bizarre genealogy of truly monstrous characters. According to the mythology underpinning most of Lovecraft's fiction, Earth, millions of years before the evolution of life as we know it, was populated by a species of sentient beings of grotesque amphibious physiology often identified as 'The Elder Things' or the 'Old Ones' – cosmic travellers who arrived on the planet from interstellar abysses unfathomable by the human mind. Ruins of their cyclopean cities have survived across aeons submerged in the Pacific Ocean, hidden in deep chasms of unexplored mountains or secluded in the vast plains of the Antarctic ice. While their degree of civilization and craftsmanship was purportedly highly advanced, their culture was dominated by sinister rites and the worship of cosmic deities of such utterly alien sounding appellations as 'Yog Sothoth', 'Nyarlathotep', or 'Shub-Niggurath'. Since the Archean eras, some of

these ancient races still lie dormant in inaccessible ocean depths, waiting to be awakened by the incantations of pagan cults who have kept the memory of the Old Ones alive through abhorrent rituals and the ancient lore collected in Abdul Al Hazred's 'Necronomicon.'

In this light, the most terrifying and visually enigmatic scenes of the monstrous in Lovecraft arrive when dewy-eyed worshippers or nightmare-plagued sleepers invoke a passage to the alter-dimensional world governed by the elder gods; and it is in these scenes that his inspiration in Riemannian geometry and his indebtedness to previous fiction writers like Abbott and Hinton becomes most apparent. Consider as an example the following passages from 'Through the Gates of the Silver Key' where the occultist Randolph Carter crosses the threshold of an ancient portal in a cave somewhere in New England: '[N]o mind of earth may grasp the extensions of shape which interweave in the oblique gulfs outside time and the dimensions we know.'[10]

> He was told how childish and limited is the notion of a tri-dimensional world, and what an infinity of directions there are besides the known directions of up-down, forward-backward, right-left. […] They told him that […] [t]he cube and sphere, of three dimensions, are […] cut from corresponding forms of four dimensions that men know only through guesses and dreams; and these in turn are cut from forms of five dimensions, and so on up to the dizzy and reachless heights of archetypal infinity.[11]

The idea to imagine well-known 3-dimensional shapes as merely the projection of much more complex higher-dimensional forms had been a common analogy in 19th century writings about the new geometries.[12] While he had never been formally trained in the natural sciences, Lovecraft was a prolific journalistic commentator on the scientific developments of his time, especially in the area of astronomy,[13] and it is safe to assume that he knew about earlier pop-scientific writings on visualizations of the fourth dimension. Although in a decidedly less didactic fashion, and in a more dark and ornamental manner than other writers of his time, Lovecraft also employs obscure geometrical shapes to convey an idea of the 'dimensions beyond those conceivable to the eye and brain of man.'[14] The most peculiar specimens of such geometrical shapes are a 'rather large congeries of iridescent, prolately spheroidal bubbles and a very much smaller polyhedron of unknown colours and rapidly shifting surface angles'.[15] They follow Walter Gilman, the protagonist of 'The Dreams in the Witch House', through feverish dreams of what he interprets as 'an adjacent but normally inaccessible dimension',[16] 'whose material and gravitational properties, and whose relation to his own entity he could not even begin to explain'.[17] Elsewhere identified as 'Yog Sothoth', gatekeeper between dimensions,[18] the strange bubble congeries could be

understood as Lovecraft's attempt to visualize a multi-dimensional hyper-sphere whose projection into the three-dimensional mind of Walter Gilman constitutes an incomprehensible and unsurprisingly disconcerting sight. The vividness of Lovecraft's imagination in this scene is amplified when we consider that in 2011 the mathematician Richard Elwes explicitly takes Lovecraft's 'exotic spheres', as he calls them, as an illustration of recent advances in differential topology to visualize the projections of higher dimensional shapes in 3-space.[19]

In 'The Dreams in the Witch House' Gilman's strange dreams begin after he moves into a garret room, one of whose previous tenants was Keziah Mason, a woman trialled for witchcraft 235 years earlier. Mirroring his geometrically absurd nightmares is the 'queerly irregular shape' of the room itself: 'the north wall [was] slanting perceptibly inward from the outer to the inner end, while the low ceiling slanted gently downward in the same direction'.[20] A student of 'Riemannian equations'[21] and 'Non-Euclidean calculus'[22] at Miskatonic University, Gilman is prone to 'read into the odd angles a mathematical significance'.[23] It seems, in fact, that it is only through his academic exposure to physics and mathematics that the spatiality of his grotesque visions unfolds its truly menacing significance. As much as geometry for Immanuel Kant established Euclidean space as *a priori* accessible through intuition,[24] Walter Gilman develops an 'intuitive knack'[25] for grasping the 'freakish curvatures of space'[26] that recur in his nightmares as much as in his academic studies. In his dreams, abstract geometrical forms intermingle with weirdly animated creatures, science interacts with occult folklore:

> The abysses were by no means vacant, being crowded with indescribably angled masses of alien-hued substance, some of which appeared to be organic while others seemed inorganic. A few of the organic objects tended to awake vague memories in the back of his mind, though he could form no conscious idea of what they mockingly resembled or suggested. […] All the objects – organic and inorganic alike – were totally beyond description or even comprehension. Gilman sometimes compared the inorganic masses to prisms, labyrinths, clusters of cubes and planes, and Cyclopean buildings; and the organic things struck him variously as groups of bubbles, octopi, centipedes, living Hindoo idols, and intricate Arabesques roused into a kind of ophidian animation. Everything he saw was unspeakably menacing and horrible […].[27]

Angled masses, prisms, cubes and planes here interweave in arabesque patterns with the bizarre organic forms of centipedes and octopi to arouse a sense of ultimate alienation. Not coincidentally, I argue, we are reminded of the visual aesthetics of *the grotesque* which experienced a reinvigoration in early 20th century literature and art. Conceptualizing the visuality of Lovecraft's images of the

horrific as analogous to the techniques of grotesque art allows us to understand the ways in which science, and geometry in particular, is turned into a signifier of the monstrous. Resonating with Lovecraft's scenes, '[t]he grotesque', as art critic Wolfgang Kayser notes, 'is a structure. […] THE GROTESQUE IS THE ESTRANGED WORLD'.[28] Like Picasso's 'Guernica' (1937) and Otto Dix's 'Self-Portrait as Mars' (1915) as archetypal specimens of modernist paintings of the *Grotesque*, Lovecraft's poetics also display an 'alienation of familiar forms […] which creates that mysterious and terrifying connection between the fantastic and the real world which is so essential for the grotesque'.[29] Indeed, the enmeshment of reality and dream, science and folklore, recurs as a backbone to many of Lovecraft's tales. Consider the following recollection about the voyages of a sailor who, in 'The Call of Cthulhu', inadvertently lands on the shore of the 'nightmare corpse-city of R'lyeh',[30] the grotesque architecture of which seems to confirm previous nightmares of other monstrous dimensions:[31]

> Without knowing what futurism is like, Johansen achieved something very close to it when he spoke of the city; for instead of describing any definite structure or building, he dwells only on broad impressions of vast angles and stone surfaces […]. I mention his talk about *angles* because it suggests something Wilcox had told me of his awful dreams. He had said that the *geometry* of the dream-place he saw was abnormal, non-Euclidean, and loathsomely redolent of spheres and dimensions apart from ours. Now an unlettered seaman felt the same thing whilst gazing at the terrible reality.[32]

When, shortly after, we read about Johansen and his men observing that '[o]ne could not be sure that the sea and the ground were horizontal [and that] the relative position of everything else seemed phantasmally variable',[33] it is difficult to ignore the resonances with Kayser's evaluation that in depictions of the grotesque '[w]e are so strongly affected and terrified because it is our world which ceases to be reliable, […] it presupposes that the categories which apply to our world view become inapplicable'.[34] Undoubtedly, a similar estrangement will have been felt by contemporary readers of Riemann and Einstein in whose writings the everyday grasp of geometry was so violently put at stake. As Linda Dalrymple Henderson, in her seminal study *The Fourth Dimension and Non-Euclidean Geometry in Modern Art*, has gone to great length to explore, this paradigm shift in mathematics independently evolved in the Cubist art movement spearheaded by Jean Metzinger, Georges Braque, and Pablo Picasso. It is in their paintings that we most vividly witness the synergy effects of a meeting between the grotesque and the new geometries. As Metzinger notes about cubism in 1912: 'If we wished to tie the painters' space to a particular geometry, we should have to refer it to the non-

Euclidean scholars; we should have to study, at some length, certain of Rieman's [sic] theorems.'[35] Considering Metzinger's 'L'Oiseau Bleu' (1913), Braque's 'Man With a Guitar' (1911) and Picasso's 'Ambroise Vollard' (1910), it is not difficult to agree with Graham Harman that in many instances Lovecraft 'echoes cubist paintings',[36] especially if we recall the previously noted scene of Gilman's interdimensional dreams. In fact, Gilman's recollection of his dream experience provides a strikingly fitting subtext to the variegated facets in Picasso's 'Ambroise Vollard': '[the] sight of his arms, legs, and torso seemed always cut off by some odd disarrangement of perspective; but he felt that his physical organisation and faculties were somehow marvellously transmuted and obliquely projected – though not without a certain grotesque relationship to his normal proportions and properties'.[37] Gilman's experience as much as Picasso's painting can be understood as a potent visualization of the multiperspectival vision in a four- or higher dimensional hyperspace. Let me reconsider, in this light, the previously introduced 'iridescent bubble congeries and […] kaleidoscopic polyhedron'[38] of shifting surface angles. When Dalrymple Henderson, without any reference to Lovecraft, notes that the term *iridescence* had not entered the vocabulary of art criticism until the 1950s to describe the ambiguity of form in Cubist paintings like 'Ambroise Vollard', where 'the shading of […] facets creates shifting relationships that contribute to a general shimmering quality of iridescence',[39] we get a sense of Lovecraft's extraordinary ability to produce literary images that are first and foremost intensely visual.

Although Lovecraft's, as much as the cubists', 'preoccupation with geometry'[40] sparked severe criticism at the time,[41] there is reason to acknowledge their striking success in rendering the highly abstract and oblique insights of modern mathematics artistically and poetically accessible. As a final note, I am tempted to concede that Lovecraft's use of scientific metaphors more often than not falls back into the category of a mere stylistic device, that the attribute 'Non-Euclidean' simply remains yet another grotesque ornament in his exalted efforts to evoke the horrors of the unknown,[42] but curiously enough I cannot help but shudder under the affect of what appear to me as some of the most potent literary attempts to cartograph geographies of the truly monstrous.

## Notes

[2] Howard P. Lovecraft, *The Supernatural Horror in Literature* (New York: Dover Publications, 1973), 12.

[3] In proposing an account of mathematics in Lovecraft's fiction I hope to expand on the ideas of previous commentators as, for instance, presented in Thomas Hull's

lucid yet brief article 'H.P. Lovecraft: A Horror in Higher Dimensions' (2006) and Robert Weinberg's 'H.P. Lovecraft and Pseudomathematics' (2001).

[4] Howard P. Lovecraft, 'The Dreams in the Witch House,' *At the Mountains of Madness and Other Tales of Terror* (New York: Del Rey Books, 2007), 141.

[5] William Thomson (Lord Kelvin) cited in Paul Davies, *Superstring: A Theory of Everything?* (Cambridge: Cambridge University Press, 1988), 4.

[6] For an introduction to Non-Euclidean geometry see for instance Roberto Bonola, *Non-Euclidean Geometry: A Critical and Historical Study of its Developments* (New York: Dover, 1955).

[7] Thomas Hull, 'H.P. Lovecraft: A Horror in Higher Dimensions', *Math Horizons* 13.3 (2006): 12.

[8] Howard. P. Lovecraft, 'Through The Gates of The Silver Key,' *Necronomicon: The Best Weird Tales of H.P. Lovecraft*, ed. Stephen Jones (London: Gollancz, 2008), 401.

[9] Edwin A. Abbott, *Flatland: A Romance of Many Dimensions* (Oxford: Oxford University Press, 2006) and Charles Hinton, 'What is the Fourth Dimension,' *Speculations on the Fourth Dimension, Selected Writings of Charles H. Hinton* (New York: Dover Publications, 1980).

[10] Lovecraft, 'Through The Gates of The Silver Key,' 401.

[11] Lovecraft, 'Through The Gates of The Silver Key,' 408.

[12] Abbott, *Flatland: A Romance of Many* and Hinton, 'What is the Fourth Dimension.'

[13] Howard. P. Lovecraft, *Collected Essays Volume 3: Science* (New York: Hippocampus Press, 2005).

[14] Lovecraft, 'Through The Gates of The Silver Key,' 408.

[15] Lovecraft, 'The Dreams in the Witch House,' 150-151.

[16] Ibid., 163.

[17] Ibid., 144.

[18] Howard P. Lovecraft, 'The Dunwich Horror,' *Necronomicon: The Best Weird Tales of H.P. Lovecraft*, ed. Stephen Jones (London: Gollancz, 2008), 276.

[19] Richard Elwes, 'Exotic spheres, or why 4-dimensional space is a crazy place,' *Plus Magazine* (2011). Viewed on 20 March 2013, http://plus.maths.org/content/richard-elwes.

[20] Lovecraft, 'The Dreams in the Witch House,' 142.

[21] Ibid., 146.

[22] Ibid., 140.

[23] Ibid., 142.

[24] Michael Friedman, 'Kant's Theory of Geometry,' *The Philosophical Review* 94.4 (1985), 458.

[25] Lovecraft, 'The Dreams in the Witch House,' 146.

[26] Ibid.

[27] Ibid., 144.

[28] Wolfgang Kayser, *The Grotesque in Art and Literature*, trans. Ulrich Weisstein (New York: Columbia University Press, 1963), 184.

[29] Ibid., 122.

[30] Howard P. Lovecraft, 'The Call of Cthulhu,' *The Call of Cthulhu and Other Weird Stories*, ed. S.T. Joshi (London: Penguin Books, 1999), 165.

[31] Interestingly, one of the most insightful analyses of the 'The Call of Cthulhu' comes from a theoretical physicist, Benjamin Tippett, who treats Lovecraft's story as an account of real events and proposes a mathematical explanation for the characters' absurd geometrical experiences in terms of 'possible bubbles of spacetime curvature in the South Pacific.' See Benjamin Tippett, 'Possible Bubbles of Spacetime Curvature in the South Pacific' (2012), viewed on 20 March 2013, http://arxiv.org/pdf/1210.8144v1.pdf.

[32] Lovecraft, 'The Call of Cthulhu,' 165-166.

[33] Ibid., 166

[34] Kayser, *The Grotesque in Art and Literature*, 184-185.

[35] Jean Metzinger cited in Linda Dalrymple-Henderson, *The Fourth Dimension and Non-Euclidean Geometry in Modern Art* (Princeton: Princeton University Press, 1983), 44.

[36] Graham Harman, *Weird Realism: Lovecraft and Philosophy* (Alresford: Zero Books, 2012), 3.

[37] Lovecraft, 'The Dreams in the Witch House', 144.

[38] Ibid., 154.

[39] Dalrymple Henderson, *The Fourth Dimension and Non-Euclidean Geometry in Modern Art*, 58.

[40] Guillaume Appolinaire about cubism, cited in Dalrymple Henderson, *The Fourth Dimension and Non-Euclidean Geometry in Modern Art*, 100.

[41] See Ibid., on criticism of cubism. See Howard P. Lovecraft, *Selected Letters IV* (Sauk City: Arkham House, 1976) 70-71: 'I have had many severe criticisms because of the *concrete and tangible* nature of some of my "cosmic horrors." Variants of the general theme include defeats of the visible laws of time […] and transcensions of the boundary-lines of Euclidean space.'

[42] A variant of this assessment can also be found in Hull, 'H.P. Lovecraft: A Horror in a Higher Dimension,' 12: 'The instances where Lovecraft refers to formulas, geometry, or higher dimensional space are peppered throughout his Cthulhu Mythos stories and offer an unmistakable literary device to create an intimidating atmosphere of the unknown.'

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