

Lyotard's Brain and/or the Mathematical Universe

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Abstract

This article provides a reading of Jean-François Lyotard's "A Postmodern Fable." It explores the speculative narrative on the fate of human consciousness as the Sun dies in conjunction with a reading of contemporary artificial intelligence and the hypothesis of a mathematical universe. The analysis draws upon Lyotard's layered concept of the 'inhuman', alongside accounts from engineer James Lovelock and physicist Max Tegmark, to interrogate the futures of intelligence and consciousness beyond anthropocentric frameworks. In conclusion, Lyotard's Fable, benefiting from updated accounts of what he refers to as "all the research in progress" in contemporary science and technology, retains valuable insights; pre-inscribing an inevitable disinheritance of the Human, and/or the Brain's mathematical array. Lyotard's Fable potentially reveals itself an expression of an already existing mathematical function.

Keywords: Artificial Intelligence, Electronic Life, Inhuman, Jean-François Lyotard, Mathematical Universe

What follows is a reading of Jean-François Lyotard's intriguing tale, "A Postmodern Fable,"¹ as well as the essay, "Can Thought go on Without a Body?"² The fable begins and ends—*da capo*—with a quandary:

What a Human and his/her Brain—or rather the Brain and its Human—would resemble at the moment when they leave the planet forever, before its destruction; that, the story does not tell.³

There is something beguiling about Lyotard's use of storytelling to approach the near imponderable, existential question about our fate at the time of the death of the sun. But, as he writes in the final line of the essay, "this fable asks not that it be believed, only that we reflect on it."⁴ Of course, it is far less a science fiction of some far-flung future than it is a plea to the present: an invective to remain vigilant to the erosions of humanity.

Importantly, Lyotard presents us with two "inhumanities." The first is the more obvious meaning of a "negation of what is considered to be human," which, as Yuk Hui explains, sees the decline of "the unity of the organic body and the soul. In this sense it is a separation between mind and the body ... an ultimate scientific project of humankind in anticipation of the solar catastrophe."⁵ This meaning of inhuman relates to critical narratives of systems, development, instrumental reason, and disenchantment. Pertinent to this paper's particular consideration of artificial intelligence, the inhuman helps frame the view, taken by Hui, that humans and machines (in terms of logical thinking) have long ceased to differ. Instead, we can consider a suffused field of "development," whereby the inorganic as much as the organic organises itself. All is of a piece, representing what Hui refers to as "organistic thinking." Against this, Hui holds out for an *organology*, referring to the human capacity to approach the contingent, to think multiple perspectives and endpoints. This leads to a thesis of technodiversity, which "affirms the plurality of systems ... the necessity to fragment the system and therefore sets limit to any single all-encompassing system."⁶

1 Jean-François Lyotard, "A Postmodern Fable," in *Postmodern Fables*, trans. by Georges Van Den Abbeele (Minneapolis: University of Minnesota Press, 1997).

2 Jean-François Lyotard, "Can Thought go on Without a Body," trans. Bruce Boone and Lee Hildreth, first published in English translation in *Discourse* (Vol. 11, No. 1, 1988-89); the same year of its French publication in Jean-François Lyotard, *L'Inhuman: Causeries sur le temps* (Paris: Editions Galilée, 1988); available in English translation, in Jean-François Lyotard, *The Inhuman: Reflections on Time*, trans. Geoffrey Bennington and Rachel Bowlby (Stanford: Stanford University Press, 1991). All subsequent references will be to this latter version.

3 Lyotard, "A Postmodern Fable," 83.

4 Lyotard, "A Postmodern Fable," 101.

5 Yuk Hui, *Recursivity and Contingency* (London: Rowman & Littlefield, 2019), 254.

6 Hui, *Recursivity and Contingency*, 38.

Hui's account is influenced by Lyotard's second meaning of the inhuman, which is "the infinitely secret one of which the soul is hostage."⁷ To differentiate from the first, we might write this as the 'in-human', to suggest not what resides *within* the human, but *beyond* what is articulated and known. The in-human is that which is "more interior in myself than me."⁸ As Hui explains: "It is something that cannot be reduced to calculability, to statistics, and to preemptive algorithms. The incalculable is the preindividual reality with which the soul is able to elevate, to unfold itself, that is to say, to exercise its *freedom*."⁹ It is unusual in critical theory for the "soul" to be considered emancipatory. In Lyotard's Fable—as will be considered—the critical injunction (regarding what the Human and his/her Brain will come to resemble) hinges upon a "search" for the separation between thinking (in itself) and organic life, or between software (thinking) and hardware (the body). The idea is that the former survives the end of the solar system, but not the latter. For Hui, this is a "a negative organology, or an extreme humanism. It is negative since it is based on a total negation of the organic and on the belief that there is a possibility, no matter how small it might be, of replacing the organic body with an inorganic artifice for the survival of thinking."¹⁰

There are a number of dilemmas in approaching this topic. Not least, to define what is meant by "thinking" (and intelligence etc.). In the spirit of Lyotard's Fable, as a heuristic device (to reflect, rather than fully believe), I ask the reader to give affordances for speculation, not least when turning to James Lovelock's reading of "electronic life" (as an account of what comes after humans) and Max Tegmark's take on the mathematical universe hypothesis. Neither of these accounts make for comfortable reading because they shatter our sense of the (in)human. One central conceit is that thinking is not necessarily understood as processual, as occurring over time (as humans experience it), but rather is to consider as already determined "shapes" within a mathematical universe. Given the human propensity to experience but not see time, the processual brings us back to an in-human lament for the incalculable. Yet, the idea of the incalculable as being of the 'preindividual reality' need not only be associated with the in-human, but is potentially prefigured in the much vaster *calculability* of artificial intelligence.

Ted Chiang's "Story of your Life"¹¹—adapted as the film *Arrival* (2016)—goes some way to set the scene. In seeking to learn the language of alien visitors, the research team make a breakthrough when they shift from the common formulation of physical laws as

7 Lyotard, "Can Thought go on Without a Body," 2.

8 Hui, *Recursivity and Contingency*, 33.

9 Hui, *Recursivity and Contingency*, 33.

10 Hui, *Recursivity and Contingency*, 253.

11 Ted Chiang, "Story of your Life," in *Stories of Your Life and Others* (London: Picador, 2015)

causal to Fermat's variational principle. What this reveals is a syntax that operates with time as a "spatial" dimension, not a temporal one. As the linguist recounts:

Instead of racing forward, my mind hung balanced on the symmetry underlying the semagrams. The semagrams seemed to be something more than language; they were almost like mandalas. I found myself in a meditative state, contemplating the way in which premises and conclusions were interchangeable. There was no direction inherent in the way propositions were connected, no 'train of thought' moving along a particular route; all the components in an act of reasoning were equally powerful, all having identical precedence.¹²

In asking what we will "resemble" at the moment of the dying sun, we are prompted to "arrive" anew at ourselves, even if—given what we now know—that means having to learn a whole new "language" of the in-human. If, in what follows, I seem to read Lyotard's Fable too literally (rather than to attend to its ethical question)¹³, it is partially deliberate—if only to re-encounter the "extreme humanism" posed by Lyotard's Fable some thirty years ago.

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Figural. The premise of 'A Postmodern Fable' is straightforward enough:

The Sun is going to explode. The entire solar system, including the little planet Earth, will be transformed into a giant nova. Four and a half billion solar years have elapsed since the time this fable was told. The end of history has already been foreseen since that time.¹⁴

At stake is the countering of entropic and negentropic energy. The former is set against the clock of the dying sun, the latter gesturing towards a cosmic escape velocity, to abandon the solar system. Hence, *within* the "continuous and necessary entropic process" (i.e. the gradual, but predictable decline into disorder), resides a "contingent and discontinuous" movement, that creates, that builds entities capable of altering the environment.¹⁵ The tale describes how, contrary to entropy, "life" develops increasingly complex systems, leading to human consciousness and technological and societal advancement. Lyotard's story

12 Chiang, "Story of your Life," 152.

13 Richard Brons, "The Dance with Technology: Philosopher Yuk Hui (Erasmus Rotterdam) on Technological (in)humanity," differend.net.

14 Lyotard, "A Postmodern Fable," 83.

15 Lyotard, "A Postmodern Fable," 92.

highlights key events like the development of sexual reproduction, societal structures, and crucially language: “Symbolic language, being self-referential, had moreover the capacity to take itself as its own object, hence to provide its own memory and critique. Supported by these properties of language, material technique in turn underwent a mutation: it could refer to itself, build on itself, and improve its performance.”¹⁶

Lyotard problematises language through his term “figure,” which is to assert a plasticity to the “grided” text. As he puts it, “the systematic grid of orders and series,” associated with the machinations of text, “takes place in a two-dimensional space without thickness ... without sight.”¹⁷ Yet, crucially, “language [*langue*] does not speak itself: one speaks it.”¹⁸ Thus, while language is a series of negations (as per the arbitrary nature of the sign), it is necessary for “elements of the grid [to] settle and arrange themselves in the vertical axis of discourse.”¹⁹ This “space” must *take place* somewhere. The “dimension” of language equates to ‘the matrix of innumerable propositions,’²⁰ but which, dwelling within, Lyotard posits the “space of designation” (or figural space). This is not a mere rearticulation of “speech” (*parole*) but rather gives name to the force required to search through, to navigate the matrix of language—to *include* what lies outside of codified significations. Figural space encompasses (or at least graphs) the calculable and incalculable. With this in mind, we can keep in mind the tokenisation of language performed by Large Language Models, which is very different to how humans encounter language. This is just one of many potential developments to come. It is easy to think of these models as a matter merely of ones and zeros (albeit a vast system of negations). Yet, *mathematically*, the parsing of data takes place at high dimensionality (in multi-dimensional vector space), which, if only suggestively for now, we might equate to a high definition, *spatial* domain of the figural.

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Macrology. Regardless of the “incredible” timescale (the oft repeated four and half billion years),²¹ the Fable requires us to face up to the *finitude* of the sun as our existential condition. In “Can Thought go on Without a Body?,” Lyotard references Husserl’s *Ur-Erde*

16 Lyotard, “A Postmodern Fable,” 88.

17 Jean-François Lyotard, *Discourse Figure*, trans. Antony Hudek and Mary Lydon (Minneapolis: University of Minnesota Press, 2011), 29.

18 Lyotard, *Discourse Figure*, 29.

19 Lyotard, *Discourse Figure*, 29.

20 Lyotard, *Discourse Figure*, 57.

21 While Lyotard cites a time span of four and half billion years, the calculation is more accurately 5 billion years. The time frame is vast, defying human comprehension. Nonetheless, it alerts us to Lyotard’s preoccupation with time. Whether his philosophical reasoning for the temporality of the postmodern as not chronological to modernity, or his articulation of the artwork as time itself. Lyotard is concerned with the ethical instance of how we attend to our time. See: Lyotard, *The Inhuman*.

(primordial Earth), describing the Earth as the ultimate, immovable ground (and lifeworld) of all human experience. In "A Postmodern Fable," we might suppose the term *Ur-Sonne*, suggestive of a phenomenological account of the Sun. "A star is a furnace in the void," Lyotard writes, "that transforms elements by consuming them." Furthermore, the sun is a "laboratory," the work of which extends out to our own planet, with all "development" in pursuit of human survival:

...all research in progress was directed to this aim, that is, in a big lump: logic, econometrics and monetary theory, information theory, the physics of conductors, astrophysics and astronautics, genetic and dietetic biology and medicine, catastrophe theory, chaos theory, military strategy and ballistics, sports technology, systems theory, linguistics and potential literature. All of this research turns out, in fact, to be dedicated, closely or from afar, to testing and remodelling the so-called human body, or to replacing it, in such a way that the brain remains able to function with the aid only of the energy resources available in the cosmos.²²

Against the flat dimensionality of discourse, Lyotard takes the view something more profound falls out of what gets spoken. He chastises "intellectual ploys" ("in 4.5 billion years," he reminds us, "there will arrive the demise of your phenomenology and your utopian politics, and there'll be no one there to toll the death knell or hear it").²³ There are echoes of Georges Bataille's pithy statement on the formless, wherein he expresses disdain for "academic men," for "giving a frock coat to what is, a mathematical frock coat."²⁴ Bataille posits a universe that "resembles nothing" or is *formless*,²⁵ which is to say systems of signification fail to grasp the intricacies of existence, or, a "micrology"—a term Lyotard borrows from Adorno²⁶—by which he means "not just metaphysics in crumbs [...] Micrology inscribes the occurrence of a thought as the unthought that remains to be thought in the decline of 'great' philosophical thought."²⁷ Whether formless or figure, the allusion is towards the heterogeneity of "meaning" (albeit with the notion of "meaning" precisely being contested). We are reminded again of the in-human, of the conundrum of the in/calculable. Yet, shifting from humanly intuited calculation to the wider bounds of multi-dimensional maths, the formless is a "naming" of a complexity, akin to multi-dimensional mathematics, that while not humanly intuitive, is nonetheless locatable.

22 Lyotard, "A Postmodern Fable," 91.

23 Lyotard, *The Inhuman*, 9.

24 Georges Bataille, "Formless," in *Visions of Excess: Selected Writings, 1927-1939*, ed. and trans. Allan Stoekl (Minneapolis: University of Minnesota Press), 31.

25 Bataille, "Formless," 31.

26 Theodor Adorno, *Negative Dialectics*, trans. E.B. Ashton (New York: Continuum, 2007), 407.

27 Lyotard, *The Inhuman*, 103.

“A Postmodern Fable” seeks to counter the *representation* of the sublime (the “end of Earth”) with an urgent fiction; a *presentation* (it happens; it is happening—hence its ethical injunction: what next?). We might say, Lyotard applies a *macrology* (the obverse of a micrology; *ex maximis*). The macrology adheres to Lyotard’s favoured remark of Adorno: “Art remains loyal to humankind uniquely through its inhumanity in regard to it.”²⁸ More than an object of critique (e.g. against development), the fable’s sweeping narrative of universal time operates as a regulative idea, providing a frame for contemplating concepts beyond direct human experience. A transcendental deduction, attempting to elucidate the conditions of possibility. A *macrology as reflective judgment*; the description Kant gave of “a mode of thought not guided by rules for determining data, but showing itself as possibly capable of developing such rules afterwards on the basis of results obtained ‘reflexively’.”²⁹ It is this critical space, albeit against the grain of Lyotard’s own words, that I wish to excavate; to reveal the in-human as (inhumanly) calculable.

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Bricolage. The Fable is a scientific *narrative*. It draws upon a largely agreed upon scientific account of the evolution of life on Earth and considers the planet’s ultimate destruction (based on a mathematically proven future event).³⁰ The “story” is typically told from the dominant perspective of the engineer. Yet, as Derrida reminds us, discourse functions through the inheritance of language, meaning we are *all bricoleurs*³¹—we are all our own “ghost in the machine.”³²

What is noteworthy is the poststructuralist adaptation of biological terms, whereby the biological and informational intertwine, even to the point where “computer programmes and lines of codes...are producing an afterlife of ‘artificial’ ‘organisms’ that seem set fair to become companions to everyday practice.”³³ At stake in the confluence of biological and

28 Theodor Adorno, *Aesthetic Theory*, trans. Robert Hullot-Kentor (Minneapolis: Univeristy of Minnesota Press, 1997), 197, quoted in Lyotard, *The Inhuman*, 2.

29 Lyotard, *The Inhuman*, 15.

30 Of course, this is not to ignore Lyotard’s own suspicions: “Science has always been in conflict with narratives. Judged by the yardstick of science the majority of them prove to be fables.” Jean-François Lyotard, *The Postmodern Condition: A Report on Knowledge*, trans. Geoff Bennington and Brian Massumi (Manchester: Manchester University Press, 1984), xxiii.

31 Jacques Derrida, “Structure, Sign, and Play in the Discourse of the Human Sciences,” in *Writing and Difference*, trans. Alan Bass (London: Routledge, 2001), 360. See also, next section: the narrator of the first half of the essay, “Can Thought go on Without a Body?,” who we surmise is an engineer, identifies as a “lay person,” who nonetheless can suggest, “the combined forces of nuclear physics, electronics, photonics and information science open up a possibility of constructing technical objects, with a capacity that’s not just physical but also cognitive” (Lyotard, *The Inhuman*, 14).

32 Gilbert Ryle, *The Concept of Mind* (London: Hutchinson, 1949), 11.

33 Nigel Thrift, “Electric Animals: New Models of Everyday Life?,” *Cultural Studies*, 18, no. 2-3 (2004): 463.

linguistic code are two key terms: reproduction and invariance. The first of these is the critical concern of Lyotard's *Fable*, i.e. questioning how "we" might survive (re-produce; transpose) when the Sun dies. While the latter, (in)variance, is posed in the equivocation of the "Brain" and "its" Human (to be elaborated upon in the sections that follow). The need to reproduce is a proxy for "life," while invariance evokes a notion of code or script (biological, linguistic, computation).³⁴ Within a (post-)structuralist perspective, the underlying consideration of (in)variance allowed for a shift from "language" to "writing," which in effect refers to an *enduring* notion of code.³⁵ Derrida traces the idea of writing as "all that gives rise to an inscription in general," which includes the work of biologists when speaking of "writing and *pro-gram* in relation to the most elementary processes of information within the living cell."³⁶

In a key passage that draws upon Leroi-Gourhan's *Gesture and Speech*,³⁷ referencing the *longue durée* of manual technology, human intelligence, and our capacity for symbolic representation, Derrida returns to "program" in the cybernetic sense. He refers to a "liberation of memory," of an exteriorisation of meaning.³⁸ Despite taking a more expansive view of language (*vis-à-vis* figure), Lyotard nonetheless takes the view that the

34 Christopher Johnson, *System and Writing in the Philosophy of Jacques Derrida* (Cambridge: Cambridge University Press, 1993), 147.

35 See also: Bernard Dionysius Geoghegan, "Textocracy, or, the Cybernetic Logic of French Theory," *History of Human Sciences*, 31, no.1 (2020). Despite differences between figures such as Barthes, Baudrillard, and Lévi-Strauss (each associated with the Centre d'Études des Communications de Masse, pivotal for French semiotics), their writings share a questioning of "the myth of frictionless technocratic communication," while also 'embracing technical inscription linked to cybernetics as a model of cultural production and social order' (72). Barthes' well-known thesis of the 'death of the author,' for example, which hinges upon "a multi-dimensional space in which a variety of writings, none of them, original, blend and clash," is essentially predicated upon a cybernetic loop, or regulatory and self-organising system. Roland Barthes, "Death of the Author," *Image-Music-Text*, trans. Stephen Heath (London: Fontana, 1977), 146. Similarly, Barthes' essay on narrative is replete with mathematical and cybernetic phraseology. Roland Barthes, "Introduction to the Structural Analysis of Narrative," *Image-Music-Text*: 79–124. He refers to code, matrix, functions, indices, homology, and isotopy; and the term 'stemmatic' is accompanied with a genealogical diagram, which equally can read as a search tree, a fundamental problem-solving technique dating back to the early period of AI. Michael Wooldridge, *The Road to Conscious Machines: The Story of AI* (London: Penguin Books, 2020), 292.

36 Jacques Derrida, *Of Grammatology*, trans. Gayatri Chakravorty Spivak (Baltimore: John Hopkins University Press, 1976), 9.

37 André Leroi-Gourhan, *Gesture and Speech*, trans. Anna Bostock Berger (Cambridge, MA: MIT Press, 1993).

38 Derrida, *Of Grammatology*, 84. Such a reading helps point towards the idea of a *structural unconscious*, markedly different to the psychoanalytic unconscious. Cf. Lyotard on 'structuralist unconscious'. Jean-François Lyotard, *Discourse Figure*, trans. Antony Hudek and Mary Lydon (Minneapolis: University of Minnesota Press, 2011), 51.

“human being is omnivorous when dealing with information because it has a regulating system (codes and rules of processing) that’s more differentiated and a storage capacity for its memory that’s greater than those of other living systems.”³⁹ There is a privileging of language, with the human in possession of “a symbolic system that’s both arbitrary ... and also ‘recursive’ ... allowing it to take into account (above and beyond raw data) the way it has of processing such data. That is, itself.”⁴⁰ It is this capacity that makes the human “a living organization that is not only complex but, so to speak, replex.”⁴¹ In amongst the inevitable contingency there is recursivity. Again, faith is placed in the in-human. As such, even if we begin to consider contemporary AI as the emergence of “thinking-organisations,” the pervading view typically aligns with Lyotard’s position, that the *human* represents something *else* besides. On one level, the Fable traces a *human form*, that which must contend with its “end” (or some kind of radical transformation, which ultimately is expressed as a loss of the body). Yet, Lyotard’s critical concern is that the current form of the “Human, or his/her brain” is “undoubtedly transitory”⁴² and will likely *not* end up being materially based (this brief remark is given more direct expression in “Can Thought go on Without a Body?,” pertaining explicitly to developments in artificial intelligence). So, what if we read Lyotard’s tale more literally—what if the human gives way to a mathematics? This need not be to give up on the (in)human, but to double-down on the Fable’s critical invective. Certainly, there are weights and measures we *humanly* construct out of numbers. Yet, hypothetically, an “ideal supercomputer could calculate how the state of the Universe changes over time without interpreting what’s happening in human terms, simply figuring out how all the particles would move or how the wavefunction would change.”⁴³ In short, there are fundamental constants at stake (basic properties of the universe), whereby we do not invent mathematics, *we discover it*.⁴⁴ It is the case, for example, that the trajectory of anything thrown takes the shape of an upside-down

39 Lyotard, *The Inhuman*, 12–13. Despite the parallel drawn here, it is not to forget Lyotard is critical of Derrida’s evocation of ‘arche-writing’. Jean-François Lyotard, *Discourse Figure*, 74; underlying which, Lyotard takes the position that “the clash between difference and opposition is not the product of a flaw internal to the structural functioning of language but is the effect of the figural co-presence of the incommensurable orders of the textual and the visible in language.” Bill Readings, *Introducing Lyotard: Art and Politics* (London: Routledge, 1991), 6.

40 Lyotard, *The Inhuman*, 12.

41 Lyotard, *The Inhuman*, 12–13.

42 Lyotard, “A Postmodern Fable,” 93.

43 Max Tegmark, *Our Mathematical Universe: My Quest for the Ultimate Nature of Reality* (London: Penguin, 2014), 255. To clarify, “wavefunction” refers to a fundamental concept in quantum mechanics, describing the quantum state of a system. It contains information about all possible states of particles and how they evolve over time, governed by the Schrödinger equation. While mathematically precise, it represents probabilities rather than definite classical outcomes, highlighting the probabilistic nature of quantum physics.

44 Tegmark, *Our Mathematical Universe*, 255.

parabola, which can be expressed in a simple equation, $y = x^2$. Similarly, orbits in space form an ellipse, which can be expressed as $x^2 + y^2 = 1$. Human endeavour ("all the research in progress") has gradually *discovered* many such invariant shapes and patterns.⁴⁵

Consider Paul Klee's much cited refrain of 'taking a line for a walk'. He was referring to an exploratory, organic process, where the line is not constrained by preconceived forms or boundaries but is improvised and adapted as required. It is a process of bricolage, whereby he constructs meaning and form from the immediate interaction between his tools, his thoughts, and the evolving line. Typically, this act is described as expression and of a human will ("An active line on a walk, moving freely, without goal");⁴⁶ bricolage relates to a notion of plasticity or adaptation, whereby we are part of our own making; it is not possible to place things back as they were before; all a matter of its own historicity.⁴⁷ Yet, lines interact, they become circumscribed. The universe speaks back. "Imaginary" lines appear and the active line is "limited" by fixed points, progressions and planes. Read today in the context of contemporary machine learning, Klee's "movement" (his figuring of relations, patterns, constellations) can be considered in terms of the infinite array of the inferencing of artificial intelligence. We are building towards a *mathematical model*, based upon multi-dimensional calculations (even, potentially, for a "cosmic shape," whereby time is enfolded as one of many spatial dimensions),⁴⁸ so considered less as expressivity, than as location, relation, and pattern.

Imagine Klee, then, a stenographer of a mathematical universe. Each placement of the line is like the slice of an MRI scan, an image with no thickness. Taking many such slices together—as we draft their *patterns*—we get the *semblance* of a temporal body, but which ultimately is made of many different "planes." With patterns all around us, why do "we" think we are not patterns? Or, put another way, just as artificial intelligence has been able to "unfold" millions of protein molecules (in the pursuit of medical knowledge),⁴⁹

45 Tegmark, *Our Mathematical Universe*, 247–253. Tegmark provides a list of 32 parameters from which can be computed "every fundamental property of nature ever measured;" some of the numbers "have been measured very accurately, while others haven't yet been experimentally determined" (252).

46 Paul Klee, *Pedagogical Sketchbook*, trans. Sibyl Moholy-Nagy (London: Faber and Faber, 1953), 16.

47 Catherine Malabou, *What Should We Do with Our Brain?* (New York: Fordham University Press, 2008), 15.

48 Physicists have created a 3D shape called the cosmohedron, to be used to reconstruct the quantum wavefunction of the universe. The aim is to dispense with the idea of space-time, to reveal a more fundamental structure of the underlying fabric of the universe. Karmela Padavic-Callaghan, "A cosmic shape could explain the fundamental nature of the universe," *New Scientist*, 21 January 2025.

49 E.g. DeepMind's AlphaFold AI system, used to predict the 3D structures of proteins, recently increased its predicted structures for plants, bacteria, animals, and other organisms 200-fold to over 200 million structures, so advancing opportunities for understanding issues of sustainability, food insecurity, and diseases. Demis Hassabis, "AlphaFold reveals the structure of the protein universe," *DeepMind*, 28 July 2022.

perhaps the Human (in all its facets) will one day be fully traced as a set of patterns as (un)remarkable as the rest. We are not so much bricoleurs, as we are one of many elaborate braids within a massive, multi-dimensional bricolage.

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World Brain. Presenting the hypothesis of a new epoch led by Artificial Intelligence (after the Anthropocene), James Lovelock's *Novacene*⁵⁰ gives one kind of response to Lyotard's open-ended fable. Referencing the work of Shannon, Lovelock refers to the basic unit of information, the "bit" (having a value of zero or one, true or false), as "primarily an engineering term, the tiniest thing from which all else is constructed."⁵¹ Following which, he argues, the future world is one where "the code of life is no longer written solely in RNA (ribonucleic acid) and DNA, but also in other codes, including those based on digital electronics and instructions that we have not yet invented."⁵² In short, Lovelock refers to the emergence of "electronic life," which humans are in the process of ushering in (with the progress in artificial intelligence). It will not be a "technology" of humans but a new species (similar to how humans are among the beneficiaries following photosynthesis).

The "universalising" of the information "bit" asserts another macrology—one in which the rarity of the human is far less significant, even redundant. To speak of the Human and its Brain (or the Brain and its Human) might be to pose the wrong question (betraying the rattle of humanism). Lyotard's fable is right to (re-)assert an ever-present finitude (the Sun), but arguably places too much store by the generative, negentropic quality of language. It is common, for example, to espouse the boundless prospects of language; to posit "numberless" narratives.⁵³ Today, however, we witness the beginnings of a new *practice* of the text, evident with recent developments in Large Language Models.⁵⁴ The

50 James Lovelock, *Novacene: The Coming Age of Hyperintelligence* (Cambridge, Massachusetts: MIT Press, 2019).

51 Lovelock, *Novacene*, 88.

52 Lovelock, *Novacene*, 92. It is worth noting, as reported twenty years ago, scientists were able to develop a DNA-based computer capable of solving simplified chess problems, marking a significant advancement in the field of molecular computing. This innovative approach uses DNA strands to process and store data, offering a unique alternative to traditional silicon-based computers. D Faulhammer, AR Cukras, RJ Lipton, LF Landweber, "Molecular Computation: RNA Solutions to Chess Problems," *Proceedings of the National Academy of Sciences of the United States of America* 97, no. 4 (February 2000).

53 Roland Barthes, "Introduction to the Structural Analysis of Narrative," in *Image-Music-Text*, trans. Stephen Heath (London: Fontana, 1977), 79.

54 Cf. The close of Roland Barthes' "From Work to Text," whereby he declares the Text to be a "social space which leaves no language safe ... the theory of the Text can coincide only with a *practice* of writing" (emphasis added). Roland Barthes, "From Work to Text" in *The Rustle of Language*, trans. Richard Howard (Berkeley: University of California Press, 1989): 56. Opinions are divided, some feeling LLMs are simply parroting and plagiarising, with others, taking a Wittgensteinian view of

ability of machines to quickly parse massive datasets of natural language usage (including all recorded fables) is quite staggering. It is a function of vector *spaces* and tokenisation, rather than the temporal diachronies of language. Recent AI models are trained on data in excess of 300 terabytes of text, which would take 3 million lifetimes for a human to read.⁵⁵ This is a massive matrix of what has been written, which in turn can become what can be written. In effect, Lyotard's story is a version of Luis Borges's story "The Library of Babel"—a prophetic, fatalist tale about all worldly knowledge ("all the research in progress").⁵⁶

As Borges's story goes, "somewhere in the library is a book that contains the true history of the future (including the story of your death), a book of prophecy that vindicates the acts of every man in the universe, and a book containing the clarification of the mysteries of humanity."⁵⁷ Even after the human species is made extinct, the library (and its combinatorial possibilities) remains. Or does it? Here, of course, Lyotard's quandary of what becomes of the brain and its human is pertinent. He is asking *after* the "library" (humanity's vast encyclopaedic endeavours)—can it sustain *independent* of "its Human" (in the face of a collapsing Sun), and if so, what does it look like, how does it "act"?

Technically, according to Steven Pinker, "Borges needn't have described the library as 'infinite'. At eighty characters a line, forty lines a page, and 410 pages a book, the number of books is around $10^{1,800,000}$, or 1 followed by 1.8 million zeroes. That is, to be sure, a very large number—there are only 10^{70} particles in the visible universe — but it is a finite number."⁵⁸ Pinker's calculations become all too real in an online artwork, *The Library of Babel*, by Jonathan Basile.⁵⁹ The library provides numbered locations for every possible

language, arguing they show signs of conceptual reasoning, whereby conceptual meanings, while not derived from direct references, emerge through *internal reasoning*, due to the way concepts in language "relate to *each other*." Either way, advances in AI and deep learning yield powerful probabilistic models far beyond that imagined at the time Barthes was working. See Emily Bender et al., "On the Dangers of Stochastic Parrots: Can Language Models Be Too Big? 🦜," *FACCT '21: Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency*, 2021; in contrast, see: Steven T. Piantadosi and Felix Hill, "Meaning without reference in large language models," *Arxiv (Computer Science)*, 2022, <<https://arxiv.org/pdf/2208.02957.pdf>> [accessed 1 August 2024].

55 D. Khurana, A. Koli, K. Khatter et al., "Natural Language Processing: State of the Art, Current Trends and Challenges," *Multimed Tools and Application* 82 (2023).

56 Borges' tale was used as an exhibit at Lyotard's co-curated *Les Immatériaux* at the Pompidou Centre in 1985. Titled 'The Labyrinth of Language', audio of the tales was presented together with videotext, which included self-generative text.

57 Steven Pinker, *Words and Rules: The Ingredients of Language* (New York: Basic Books, 2015), 16.

58 Pinker, *Words and Rules*, 16.

59 Jonathan Basile, *The Library of Babel*, <https://libraryofbabel.info> [accessed 1 August 2024]. The reader is encouraged to cut and paste any 3200-character portion of this article and "request" it in Basile's Library. You will find, in amongst a wash of incomprehensible combinations of characters is the very passage you select. It *already* exists prior to it having been written, prior to you having read

3200-character combination of English letters, comma, space, and period. In brief, this online portal can serve up any text you can conceive of, showing it to *already* to have been archived in the library. Whatever we can possibly conceive of in words has already been said (a variation on the adage that—in all probability—sit a monkey down at a typewriter it will eventually type out the complete works of Shakespeare).

By Basile's "calculus," all language is in preparation, in storage, ready to be used.⁶⁰ While *seemingly* infinite, we must contend with the finitude of language. At a human level, we can have no sense of the magnitude of words, sentences and narratives, yet for high performance computing (and with quantum computing still to come)⁶¹ the sums are within range. Language is potentially a "closed" (calculable) system. And not just words, but the computation of the massive array of *style* (and *figuring*) in words, sounds and gestures, even the spaces between and around words.⁶² Benjamin Bratton's discussion of internet addresses in his conception of the "Stack" is suggestive, for example, of how the spatialising of digital information, including not only words but their relational positions can all be uniquely addressed.⁶³ We are getting closer to what the Brain might at least be made up of, if not what it will resemble (i.e. mathematical structures).

Umberto Eco evokes the idea of the "Total Encyclopedia," to suggest the notion of a "totality of knowledge" that is always *productive* and in operation.⁶⁴ The pursuit (and inhabiting) of a reservoir of knowledge is formed of an enduring desire (again, here, we circle upon the "bit" of information). In a remarkable article in *Science News-Letter*, from 1937, an entity is considered called the "world brain" (borrowed from H.G. Wells), with "Librarians, scientists and editors, and others who marshal and create the written record of civilisation" bringing together "the intellectual resources of this planet into a unified system."⁶⁵ The statement chimes with Lyotard's evocation of the Brain and its Human and of course is predictive of the World Wide Web (albeit suggesting at the time the "solution" resides in the new technology of the time: microfilm): "The nuclei of this world brain exist in the various great intellectual centers—the libraries, journals and indices of recorded

it.

60 Sunil Manghani, "Preparatory Space: Roland Barthes and Large Language Models," *Barthes Studies* 10, (2024).

61 Sunil Manghani, "Quantum Life, But Not as We Know It," *Electronic Life* (2025).

62 Sunil Manghani, "IA, música, estilo: ¿puede haber demasiada cultura?," [sic] *es una revista arbitrada de literatura y arte, editada por la Asociación de Profesores de Literatura del Uruguay*, no. 38 (2024).

63 Benjamin H. Bratton, *The Stack: On Software and Sovereignty* (MIT Press, 2016). NB: The current configuration of Internet Protocol (v6) addresses, for example, are 128 bits long, theoretically allowing for 3.4×10^{38} combinations, meaning we could assign an address to every atom on the surface of Earth a hundred times over.

64 Umberto Eco, *Six Walks in the Fictional Woods* (Harvard University Press, 1994), 90.

65 "Documentation Congress Step toward Making 'World Brain,'" *The Science News-Letter* 32, no. 861 (1937):228–229.

knowledge—and the task considered is how to exchange and distribute more effectively the past, current and future accumulations in all fields of human endeavor.”⁶⁶ Today, this “brain” makes AI operative, trained as it is on the *network* of knowledge.

Of course, when described here in a static sense the world-brain⁶⁷ seems contrary to an organology (i.e. the question remains: how is this brain made active and mediated?). But, is this again to think of thinking as temporal, not spatial? Lyotard's reference to the “Brain and its Human” never fails to prompt further, more expanded readings. And while the overt framing of the fable is of a tension between entropy and negentropy, and arguably only a persistent humanism, or correlationism,⁶⁸ we need not take these as opposing forces, but more along the lines of the figure enfolded within discourse; one searches through the other. Generously, then, we can suppose, held within its own critique, the Fable puts in play the *figure* of a more radical, computational (albeit inhumanly computable) account of the universe.

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He. The essay, “Can Thought go on Without a Body?,” contains all the key components of the Fable and is arguably more explicit. Its directness is in part due to the text's dual form: a Socratic dialogue between two voices, who we can discern as an engineer (He) and a philosopher (She). Lyotard's engineer poses the problem, predictably, as a dualism of hardware (body) and software (human language). The focus is in maintaining the software, independent of the current conditions of life, i.e. to make possible “thought without the body.”⁶⁹ In theory, so the engineer supposes, “the solution is very simple...manufacture hardware capable of nourishing our software or its equivalent, but one maintained and supported only by sources of energy available in the cosmos generally.”⁷⁰

With the hardware problem “solved,” attention would need to turn to the more difficult task of replicating software. It is here that Lyotard's essay (unlike the Fable) is explicit: It is about the prospects of *artificial intelligence*. The engineer is mindful of the “controversies”

66 “Documentation Congress Step toward Making ‘World Brain,’” 228–229.

67 In part the evocation of a World Brain connects with Catherine Malabou's account of “brain-world,” a direct critique of the model of the brain as machine, which extends neuroplasticity beyond individual cognition, linking it to social, economic, and political conditions (Malabou, *What Should We Do with Our Brain?*). Nonetheless, Malabou is still interested in the brain “mass” as an empirical, albeit plastic entity, while the World Brain is much more expanded notion; an exteriorised, planetary-scale system.

68 Quentin Meillassoux, *After Finitude: An Essay on the Necessity of Contingency*, trans. Ray Brassier (Continuum, 2008). See also: Quentin Meillassoux, *Science Fiction and Extro-Science Fiction*, trans. Alyosha Edlebi (Univocal, 2013).

69 Lyotard, *The Inhuman*, 13.

70 Lyotard, *The Inhuman*, 14.

associated with this field. “You philosophers, writers and artists,” he says, “are quick to dismiss the pathetic track record of today’s software programs. True—thinking or ‘representing’ machines...are weaklings compared to ordinary human brains, even untrained ones.”⁷¹ It is fair to say, even today, these same concerns linger.⁷² Nonetheless, at the time Lyotard is writing there was little of the optimism and investment witnessed today. Arguably, Lyotard’s view of artificial intelligence is skewed by a reading of Hubert Dreyfus—a notable critic.⁷³ As traced through the voice of the engineer, Dreyfus is highly pessimistic, arguing (fairly) that human intelligence is situated upon unconscious processes, which in turn prompts the engineer to argue against himself:

...human thought doesn’t think in a binary mode. It doesn’t work with units of information (bits), but with intuitive, hypothetical configurations. It accepts imprecise, ambiguous data that don’t seem to be selected according to preestablished codes or readability...⁷⁴

Today, of course, this description of human thought could very well describe contemporary AI methods— notably backpropagation and “deep learning.”⁷⁵

71 Lyotard, *The Inhuman*, 14.

72 Cf. Mustafa Suleyman, one of the founders of Deepmind, advocates for broadening the talent pool to strengthen the criticality of AI research. Critics of technology “have a vital role,” he urges, but not by shouting from the sidelines. Too often, he suggests, “shrill criticism just becomes part of the same hype cycle as technology itself.” Mustafa Suleyman (with Michael Bhaskar), *The Coming Wave: Technology, Power, and the Twenty-First Century’s Greatest Dilemma* (New York: Crown, 2023), 223.

73 See Hubert Dreyfus, *Alchemy and Artificial Intelligence* (RAND Corporation, 1965); Hubert Dreyfus, *What Computers Can’t Do: The limits of Artificial Intelligence* (New York: Harper & Row, 1979); Hubert Dreyfus, *What Computers Still Can’t Do: A Critique of Artificial Reason* (Cambridge, MA: MIT Press, 1992). In the 1960s and 1970s, when Dreyfus is most active, artificial intelligence is still stuck within problems of “expert systems” and later “brute force” inference. The former refers to rules-based, logical reason programming, which largely fails to handle the “messy” real world. By the mid-1980s, there is a shift to probabilistic, brute force methods, but which suffered from the lack of high-performance compute and Big Data to which we are now customised. Kate Crawford, *Atlas of AI: Power, Politics, and the Planetary Costs of Artificial Intelligence* (Yale University Press, 2021), 79. It was not until after Lyotard was publishing, with the advent of supercomputers, massive data sets and new statistical methods that significant breakthroughs have been made. In the field of speech recognition, for example, this has enabled “a radical reduction of speech to *merely* data ... modelled and interpreted in the absence of linguistic knowledge or understanding. Speech *as such* ceased to matter.” Xiaochang Li, *Divination Engines: A Media History of Text Prediction*, Steinhardt School of Culture, Education and Human Development, New York University, 2017), 89-90 (original emphasis).

74 Lyotard, *The Inhuman*, 15.

75 It is noteworthy, alongside a reading of Dreyfus, Lyotard makes a passing reference to another key critic, Marvin Minsky. “It’s AI folklore that Minsky and Papert killed research on neural networks” – which can be read as a technical misreading, or “less charitably,” as Anil Ananthaswamy outlines, “that the duo was deliberately sabotaging research ... so that funding could flow to their favoured form of artificial intelligence, symbolic AI.” Anil Ananthaswamy, *Why Machines Learn: The Elegant Math Behind Modern AI* (Penguin, 2024), 375. As history tells us, this route in fact has proven

Considered a “breakthrough moment,” deep learning was first properly exhibited in 2012 with a computer vision model, AlexNet, designed with a deceptively simple goal to identify the primary object in an image. Such systems use virtual “neural networks” (modelled on the neural network of the human brain) to “learn” through an iterative process of free-form training. The underlying technique of backpropagation is key, allowing a model to adjust its weightings.⁷⁶ The deep learning methodology became more widely known following the development of Deepmind’s AlphaGo—a model that famously beat the world champion Go Master Lee Sedol in 2016. Deepmind began by letting AI models learn (from scratch) rudimentary computer games. What is crucial about the method is the ability to learn “intuitively,” *without supervision* (i.e. without prior human labelling of data), and without needing to go through all possible configurations. Indeed, there are not enough computers in the world to “learn” Go: “It is exponentially more complex than chess. After just three pairs of moves in chess there are about 121 million possible configurations of the board. But after three moves in Go, there are on the order of 200 quadrillion (2×10^{15}) possible configurations. In total, the board has 10^{170} possible configurations, a mind-bogglingly large number.”⁷⁷

In brief, Machine Learning (and Deep Learning) is based upon the handling of vectors and matrices, crucial to which is the Hilbert space, which enables the generalization of Euclidean geometry to *infinite* dimensions.⁷⁸ Contemporary AI computation requires high-dimensional space, which then typically—for the sake of humans—needs to be reduced to two or three dimensions for application, using known statistical methods. In this respect, it can sometimes be misleading to refer to artificial *intelligence*, when it is more a *practice* of data (the selecting and handling of data; of making appropriate choices for statistical procedures). It can be unsettling to demonstrate how human-like handling of language and imaging can be reduced to mathematical and statistical methods. Lyotard’s engineer raises important counter-arguments (i.e. that human thought is not based on “bits;” that

ineffective, while neural networks and the later developments in deep learning have prompted a whole new era of AI. It is also worth noting, around the time Lyotard in writing, there is growing acceptance for an analogy between brain and computer. Daniel Dennett, for example, accepted a “basic fixed or hard-wired architecture” of computers, yet still argued for “huge amounts of plasticity thanks to the memory.” Daniel Dennett, *Consciousness Explained* (Boston: Little, Brown, 1991), 210.

76 Suleyman, *The Coming Wave*, 53.

77 Suleyman, *The Coming Wave*, 48.

78 The science behind neural networks dates back to the 1970s and the backpropagation algorithm was first published in *Nature* in 1986 (David E. Rumelhart, Geoffrey E. Hinton, and Ronald J. Williams, “As a Result of the Weight Adjustments: Learning Representations by Back-propagating Errors,” *Nature*, 323 (October 1986)). For an expansive account of the development of neural networks, see Anil Ananthaswamy, *Why Machines Learn: The Elegant Math Behind Modern AI* (Penguin, 2024). As Ananthaswamy explains, despite increasingly complex applications of AI, the underlying techniques are based upon algorithms that “leverage relatively simple math that goes back centuries,” including algebra, linear algebra, calculus, Boolean logic, Bayes’ theorem, and Gaussian distribution. Hence, by the mid-1950s much of the mathematics necessary for machine learning was already in place.

thought “proceeds analogically...not logically”), to which we must return, if only to then raise the mathematical stakes further (in addition to Hilbert space, there are whole other dimensions with quantum physics). Overall, however, the “dilemma” today, in revisiting Lyotard’s fable of the dying sun, is that, in little over three decades since its publication, we are perhaps *nearer* to knowing what the ending might look like. We are closer to the so-called “singularity” than we might have expected—meaning the point in time when technological growth becomes uncontrollable and irreversible, resulting in unforeseeable changes to human civilization.⁷⁹

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Electronic Life. Let us hold to the engineer’s perspective a little longer. James Lovelock’s contemporary “reinvention” of the fable takes us decidedly *beyond* the human. In thinking across “deep time,” Lovelock similarly places the human species within a long “tale” of evolution.⁸⁰ Indeed, underlying both Lyotard and Lovelock’s accounts is the fact we utilise the sun’s energy to “capture and store information,” which Lovelock further emphasises is “a *fundamental* principle of the universe”: i.e. whether it is photons, algae, plants, or humans it matters little, the “drive”—the underlying purpose—is for the passing on of information.⁸¹

79 Vernor Vinge, “The Coming Technological Singularity: How to Survive in the Post-Human Era,” VISION-21 Symposium, NASA Lewis Research Center and Ohio Aerospace Institute, March 30–31, 1993. In same year the science fiction writer and mathematician Vernor Vinge popularised the term “the singularity,” Lyotard’s Fable was originally published in French in 1993 (Jean François Lyotard, *Moralités postmodernes* (Paris: Éditions Galilée, 1993)). Preceding the French publication by a year is a German version: Jean François Lyotard, “Eine postmoderne Fabel” trans. by Silvia Henke in *Wahrnehmung der Gegenwart*, ed. J. Huber (Zurich: Museum für Gestaltung, 1992). Vinge’s concept builds on earlier ideas by John von Neumann in the 1950s and I.J. Good in the 1960s, who discussed similar notions of accelerating technological progress. A decade later, Kurzweil published *The Singularity is Near* (2005). Arguing that technological progress is not linear, but exponential, Kurzweil looks ahead to the merging of human and machine intelligence (with nanobots fighting diseases, human’s augmenting their cognition, etc.). By 2029, he predicted AI would pass the Turing test, and, by 2045, the singularity would occur, radically transforming human life and intelligence. Apropos Lyotard’s tale, Kurzweil foresees human intelligence expanding outward into the universe, potentially saturating all matter and energy with our intelligence. In the same year of writing this paper, Kurzweil chose to update his book with *The Singularity is Nearer* (2023), in which he remains convinced of his predications.

80 Lovelock, *Novacene*, 28.

81 Lovelock, *Novacene*, 28 (emphasis added). NB. Pertinent to Lovelock’s account of “Electronic Life” as précised here, a team at Google have experimented with how virtual life forms can emerge from randomness with no rules or direction. They demonstrate how self-replicators arise by studying several computational substrates based on various simple programming languages and machine instruction sets. The results show that when random, non-self-replicating programs are placed in an environment lacking any explicit fitness landscape, self-replicators tend to arise. Blaise Agüera y Arcas et al., “Computational Life: How Well-formed, Self-replicating Programs Emerge from Simple Interaction Blaise,” *arXiv: 2406.19108 [cs.NE]* (2024).

Lovelock's account is provocative not only of what comes after the human, but that that change is already on the horizon—sooner than Lyotard could have envisaged:

...our reign as sole understanders of the cosmos is rapidly coming to an end ...What is revolutionary about this moment is that the understanders of the future will not be humans but what I choose to call 'cyborgs' that will have designed and built themselves from the artificial intelligence systems we have already constructed. These will soon become thousands then millions of times more intelligent than us.⁸²

What is meant here by "intelligent?" Lovelock is seemingly agnostic, though we can assume something different to (in)human intelligence. His account relies upon the aforementioned singularity, whereby artificial intelligence advances to a point of *autonomous improvement*, which in turn sparks exponential growth in technological capabilities.⁸³ This scenario posits that AI surpasses human intelligence. But this need not preclude an organology, just not one mediated by humans. In other words, the singularity represents a critical threshold beyond which human experience could be radically altered, with radical, transformative effects, socially, economically, existentially.⁸⁴ Lovelock takes his cue from the aforementioned AlphaGo, which demonstrates two things: autonomy (it taught itself) and superhuman ability.⁸⁵ These two principles are "a sign that we have already entered

82 Lovelock, *Novacene*, 29.

83 Collin Burns, et al., "Weak-To-Strong Generalization: Eliciting Strong Capabilities with Weak Supervision," *Open AI* research paper, 2023.

84 While this can sound far-fetched, it is an area of live debate. Nick Bostrom's *Superintelligence: Paths, Dangers, Strategies* (Oxford University Press, 2016), is a notable text on the singularity. Brian Christian's *The Alignment Problem* (W. W. Norton & Company, 2020) focuses on the challenges and complexities of *aligning* AI systems with human values and ethics, not least as models become more intelligent. In publicly announcing its "superalignment team" in the summer of 2023, OpenAI published a research paper on "weak-to-strong generalization." At the heart of this paper is the question: "how can weak supervisors trust and control substantially stronger models?" I.e., to align superintelligence, humans will instead need to supervise AI systems smarter than them. While this cannot currently be directly studied an analogy is made with how small models supervise larger models.

85 Lovelock, *Novacene*, 82. Superhuman ability is not hyperbole—rather it is part of understanding the moment of singularity (to become self-learning and autonomous). For Lovelock, AlphaGo already demonstrates the principle, whereby we do not know how much better it is at playing Go than a human "because there are no humans it can compete against." We—as humans—cannot envisage and comprehend such levels of competence. What we can consider, however, is just how much faster this technology is than a human. Lovelock suggests it *could* be as much as 1 million times faster: "This is simply because the maximum rate of transmission of a signal along an electronic conductor, a copper wire, is 30 centimetres per nanosecond, compared with a maximum nervous conduction along

the Novacene. It now seems probable that a new form of intelligent life will emerge from an artificially intelligent ... precursor."⁸⁶ Put another way, the current boom in AI ("all of the research in progress") and the associated technological infrastructure (data centres, chip manufacturers and nano-techniques etc.)⁸⁷ are establishing the means for a new evolutionary moment, towards a new life form—Electronic Life.

There are different perceptual building blocks or *qualia* to consider. Given the sheer speed of electronic signals, Electronic Life would have a markedly different sense of time. A flight to Australia, for example, "would be 10,000 times more boring and disruptive for them than it is for us;" in equivalent terms it would appear to take 3000 years.⁸⁸ There would be no need for language per se, which Lovelock contends would grant "greater freedom ... free of our step-by-step logic," giving rise instead to a form of "telepathic" communication.⁸⁹ Lovelock is quick to add that telepathy is not "particularly mysterious." The electromagnetic spectrum already provides us with all manner of information, and like a bat's use of ultrasound, cyborgs would be able 'to communicate virtually instantaneously and they would be able to sense a much wider range of frequencies than we do.'⁹⁰ (Again, Ted Chiang's "Story of your Life" is instructive, reminding of the possibility of different structures of thought.)

a neuron of 30 centimetres per millisecond (a millisecond is 1 million times longer than a nanosecond)," Lovelock, *Novacene*, 81. The process of organic, biochemical neurons (which must continually convert chemical to electronic signals) is much slower than "instructions sent in a typical man-made computer in which all signals are sent and received purely electronically. The speed difference is potentially 1 million times greater, since, in theory, the limiting speed for electrons moving along the conductor is the speed of light," (ibid.). Human brains have overcome any limitations by extensive "parallel computing." But such techniques can equally be applied to "Electronic Life" (with deep learning an initial example of what can be achieved).

86 Lovelock, *Novacene*, 82.

87 Lovelock is clear, Electronic Life is a form of *engineered* evolution (negentropic). It is necessary (and inevitable) that cyborgs "emerge from the womb of the Anthropocene," Lovelock, *Novacene*, 84. They could never emerge by chance, hence human (like photo-synthesisers before us) are necessary for providing the means through which to build new components. Again, there is already evidence of a new technological base (beyond human capability). The "wires" in contemporary processor chips, for example, can be of the order of something like 14 nanometers thick, compared to the linkages of a typical bacterium being about 1 micrometre. The manufacture of most of the computational elements of our current technology (laptops, phones, tablets etc.) require the use of computer assistance: "we have invited the machines themselves to make the new machines. And now we find ourselves like the inhabitants of a Stone Age village as they watch the construction of a railway through the valley ... a new world being constructed" Lovelock, 84.

88 Lovelock, *Novacene*, 101.

89 Lovelock, *Novacene*, 100. As a partial corollary to telepathic sense (using access to different fields), consider how WiFi signal transmissions are already being used for remote human sensing. W. Li, et al., "Passive WiFi Radar for Human Sensing Using a Stand-Alone Access Point," *IEEE Transactions on Geoscience and Remote Sensing* 59, no. 3 (March 2021).

90 Lovelock, *Novacene*, 101

According to physics, we describe “reality” according to distinct fields (i.e. temperature, pressure, magnetic, electromagnetic and quantum fields).⁹¹ Humans comprehend and can manipulate some fields, only experience some, and merely conceptualise others. While inhabiting Earth, all beings are tethered to the same physical constraints (e.g. gravity), yet we might ponder cyborgs capable of perceiving and engaging with fields of reality in new ways, even possessing an ability to “sense” living in a quantum world. In the same way we can sense but not alter time, perhaps cyborgs would develop the means to sense quantum phenomena. There are seemingly tremendous “advantages” in the evolution to Electronic Life. Once dominant, cyborgs might well be “able to answer the questions raised by the cosmic anthropic principle,” to know what happens at the end of the Fable; and, potentially, to prove Lovelock right that “the bit is the fundamental particle from which the universe is formed.”⁹² We can surmise Electronic Life will not only come to recognise “information,” but will *be* information—to exist in the very slipstream of bits of information; in/or the mathematical universe.

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She. In the 1600s, Galileo was placed under house arrest for daring to suggest we orbit the sun. Today, an “open system” (of language, science, politics) ensures the privilege of asking whether or not we might one day escape the Sun’s orbit. “Philosophy is written in this grand book, the universe,” Galileo remarked—he was convinced the “book” could not be understood unless we first learn the language in which it is written, “in the language of mathematics.”⁹³ Today, it is *known* all too well Galileo was/is right about the Sun’s gravitational pull. Yet, equally, we still don’t “feel” like we orbit the Sun, even if we readily accept it. In a similar vein, the fact that we might not intuitively register the incredible prospects of Lyotard’s Fable or the coming of Electronic Life are not grounds for disbelief. Nonetheless, having established a possible, *technical* outcome of the Fable, it is incumbent upon us to circle back to points of contest. Lyotard’s engineer ends by saying that mind and body are in fact inseparable; hardware and software attuned, “each of them is analogous to the other.” A field of thought, the engineer argues, “exists in the same way that there’s a field of vision (or hearing): the mind orients itself in it just as the eye does in the field of the visible.” The use of analogy is pertinent, as this, he argues, is a signature of human thought:

A thought in which therefore procedures of the type— just as ... so

91 Tegmark, *Our Mathematical Universe*, 278-279.

92 Lovelock, *Novacene*, 89.

93 Galileo Galilei, *The Assayer* (1963), cited in Tegmark, *Our Mathematical Universe*, 243.

likewise ...' or 'as if ... then' so again 'as p is to q , so r is to s ' are privileged compared to digital procedures of the type 'if ... then...' and ' p is not non- p '. Now these are the paradoxical operations that constitute the experience of a body, of an 'actual' or phenomenological body in its space-time continuum of sensibility and perception. Which is why it's appropriate to take the body as model in the manufacture and programming of artificial intelligence if it's intended that artificial intelligence not be limited to the ability to reason logically.⁹⁴

A critical question following the engineer's remarks takes us back to the beginning, in which Lyotard ponders over the "Human and its Brain" or "the Brain and its Human.". I.e. Whether we are to expect human-like qualities to survive the end of the Sun, or, following the account given from Lovelock, we *ought* to accept "what" survives is a process of information, agnostic as to what "body" (mediation) is required.

In the philosopher's reply, she heartily welcomes the engineer's remarks and adds two compelling critiques (regarding the gendered body and thought as suffering). She expands upon her counterpart's analysis, reminding us that a "field of perception has limits" and that those limits are "always beyond reach."⁹⁵ Her account is phenomenological. Sight, for example, is always curved; that things remain outside our field of vision. Thus, "the eye ... is indeed always in search of a recognition, as the mind is of a complete description of an object it is trying to think of ... Perceptual 'recognition' never satisfies the logical demand for complete description."⁹⁶ She extols "this blur, this uncertainty," which stands against a mere "mode of transfer of the data onto an inscription". She writes:

If you think you're describing thought when you describe a selecting and tabulating of data, you're silencing truth. Because data aren't given, but givable, and selection isn't choice. Thinking, like writing or painting, is almost no more than letting a givable come towards you.⁹⁷

She adds to this the important dimension of gender, or more broadly "difference" (the "incompleteness" engendered by difference in itself gives rise to the "faculty to transcend the given,"⁹⁸ i.e. the ability to think differently, to make *new* knowledge). She ponders whether this difference is hypothetically outside our control, or maybe, in its capacity

94 Lyotard, *The Inhuman*, 16.

95 Lyotard, *The Inhuman*, 16.

96 Lyotard, *The Inhuman*, 17.

97 Lyotard, *The Inhuman*, 18.

98 Lyotard, *The Inhuman*, 22.

to set up “fields of perception and thought as functions,” it is a defining feature.⁹⁹ Either way, she suggests, without a consideration of difference, we attend only to “a neutral experience of the space-time of perceptions and thoughts.”¹⁰⁰

Her words reveal Lyotard's attachment to the Human, to a “cultural survival;” even a science-culture divide. In an earlier passage, the philosopher suggests it is the “body” of thought that needs to survive if that survival is “to be something more than a poor binarized ghost of what it was beforehand.”¹⁰¹ She questions whether such a “program” is achievable, noting it is “the problem of a comprehension of ordinary language by ... machines”¹⁰² Of course, at the time Lyotard was writing, the ability of computers to comprehend natural language was in its infancy. Today, the situation is very different (see Appendix).

Given advances in multi-modal computing, the arguments made for embodied perception (as somehow unique to the human) are perhaps less convincing too.¹⁰³ Similarly, a division between analogical and logical processing is not necessarily clear cut. Whether human or computer, there are filtering and probabilistic systems constantly at play (processes that underline perceptual recognition). As the philosopher remarks, data is not “given;” selection is not mere choice. But, as much as “thinking,” might we suppose “computing” is *also* letting a “givable” come forward. As part of which, there are different ways of accessing and interpreting reality dependent on how entities relate to the fields of physics (e.g. electromagnetic, quantum). The evolution that Lovelock evokes, and which Lyotard's Fable toys with, “ends” with a description of information in an ongoing state of entropy/negentropy, traversing fields, as it gradually achieves a state of “consciousness” that will either succumb (as Human) to the fate of a dying solar system, or (as a new, more complex iteration) will “leave.” Arguably, the philosopher is not radical enough in her remarks upon difference.

An *informational* ending to the Fable implies an escape velocity is no longer a simple equation of speed and direction (as if to place the dying solar system in the rear-view mirror). Instead, it equates more readily to what physicists call the Theory of Everything,

99 Lyotard, *The Inhuman*, 21.

100 Lyotard, *The Inhuman*, 21.

101 Lyotard, *The Inhuman*, 17.

102 Lyotard, *The Inhuman*, 18.

103 Consider, for example, Meta Motivo, a novel “behavioural foundation” AI model to control a virtual physics-based humanoid agent for a wide range of whole-body tasks. Using a physics-based environment, the model is pre-trained with a novel unsupervised reinforcement learning algorithm to control the movements of a complex virtual humanoid agent. It can be prompted to solve unseen tasks such as motion tracking, pose reaching, and reward optimization without any additional learning or fine-tuning. MetaFair, “Introducing Meta Motivo” (2024).

the complete “description” of physical reality (at all scales): i.e. in order to make a computation of “thought” (given the preponderance exceeds a dualism of mind and body) it is necessary to mathematically describe *all* incidents and relationalities of that thought. Underlying the argument is an acceptance of a base reality (a physical exteriority that exists even if humans did not). The dilemma in taking this perspective is the problem of *infinite regress*.¹⁰⁴ However, let us suppose our philosopher is in fact a mathematician.

Max Tegmark puts forward the hypothesis of a “mathematical universe,” whereby we can understand our physical world is not only described by mathematics, but that it is mathematical.¹⁰⁵ Such a perspective offers “a radical solution” to the problem of infinite regress:

...at the bottom level, reality is a mathematical structure, so its parts have no intrinsic properties at all! In other words, the Mathematical Universe Hypothesis implies that we live in a relational reality, in the sense that the properties of the world around us stem not from properties of its ultimate building blocks, but from the relations between these building blocks.¹⁰⁶

A mathematical structure is any set of abstract entities with relations between them, *independent* of any words or concepts we may use as humans for convenience to describe. There are many such structures known as graphs, which can be used to describe entities as shapes. When Paul Klee takes his line on a walk it soon encounters points, which in turn form planes—he is *graphing the line*. There are mathematical structures corresponding to types of numbers (natural, integers, rational, real, complex, transfinite).¹⁰⁷ There are also larger classes of mathematical structures corresponding to different types of space (Euclidean, Minkowski, Riemann, Hilbert, Banach, and Hausoff spaces).

Although the collection of known mathematical structures is large and exotic, and even more remain to be discovered, every single mathematical structure can be analyzed to determine its symmetry properties ... one

104 The problem can be understood in terms of Graham Harman’s characterisation of under- and over-mining, or “duomining;” the attempt to reduce everything to its smallest units (as in quantum physics) while simultaneously attempting to resolve everything as part of an overarching system (e.g. gravity). Harman is critical of the effect of reducing everything to a materiality, arguing a physicist does not tell us anything about why or how we have fictional entities (such as a character in a novel, or unicorns; even whole fables). Graham Harman, *Object-Orientated Ontology: A New Theory of Everything* (London: Penguin, 2018), 46, 49.

105 Tegmark, *Our Mathematical Universe*, 270.

106 Tegmark, *Our Mathematical Universe*, 267.

107 Tegmark, *Our Mathematical Universe*, 268.

of the most important discoveries ... has been that our physical reality also has symmetries built into it: for example, the laws of physics have rotational symmetry, which means that there's no special direction in our Universe that you can call 'up.' They also appear to have translation (sideways shifting) symmetry, meaning that there's no special place that we can call the center of space.¹⁰⁸

Symmetries are based upon the "lack of intrinsic properties," equating to the very simplicity of mathematical structures being the ultimate layer or "blocks of reality." If our universe is indeed a mathematical structure, then, suggests Tegmark, "an infinitely intelligent mathematician should be able to derive all these physics theories. How exactly would she do this? We don't know..."¹⁰⁹ (That much—at present—the story does not tell).

A final counterpoint offered by Lyotard's philosopher is perhaps the most compelling, if only for posing the question, why do we think at all? "Thinking and suffering overlap," she posits.¹¹⁰ The act of "creating" (e.g. writing, painting, musical composition) reveals gaps in what we mean to say and what we say, which in turn produces new meaning (and includes a practice of "emptiness," a "kind of suspension of ordinary intentions of mind;" a form of suspension or discipline.)¹¹¹ Crucially, she argues:

If this suffering is the mark of true thought, it's because we think in the already-thought, in the inscribed ... The unthought hurts. because we're comfortable in what's already thought ... So: the unthought would have to make your machines uncomfortable, the uninscribed that remains to be inscribed would have to make their memory suffer. Do you see what I mean? Otherwise why would they ever *start* thinking? We need machines that suffer from the burden of their memory.¹¹²

What if, in the informational universe, "pain" is only a blimp in the system, a minor effect of a long evolution of "network" transmissions. Again, we wrestle with the calculable and incalculable, the latter here preserved as "true thought" at odds with the "already-thought." This is frequently the criticism levied at Large Language Models; they are just parroting all that has ever been uttered, there is nothing new. Yet, at a more radical level, even a mathematical structure can be encoded with "pain."

108 Tegmark, *Our Mathematical Universe*, 269.

109 Tegmark, *Our Mathematical Universe*, 270.

110 Lyotard, *The Inhuman*, 18.

111 Lyotard, *The Inhuman*, 18. This remark returns to a notion of privation developed by Lyotard in the "Sublime" essay.

112 Lyotard, *The Inhuman*, 20.

The cosmologist, George Gamow, titled his autobiography *My World Line*,¹¹³ which is also a phrase Einstein used to refer to pathways through spacetime. Tegmark expands upon this:

...your own world line strictly speaking isn't a line: it has a non-zero thickness and it's not straight. Let's first consider the roughly 10^{29} elementary particles (quarks and electrons) that your body is made of. Together, they form a tubelike shape through spacetime, analogous to the spiral shape of the Moon's orbit ... but more complicated, reflecting the fact that your motion from birth to death is more complicated than the Moon's.¹¹⁴

In short, we are a *pattern* in spacetime, specifically “a braid in spacetime—indeed one of the most elaborate braids known.”¹¹⁵ This is a challenging position to take, going against the more intuitive efforts of the philosopher to uphold the rare significance, the *thoughtfulness* of the human. And it becomes more challenging still when we need to comprehend not only that our “unchanging pattern” exists in four dimensions (to accept time less as a causal continuum, than a dimensional “space”), but that also our own self-awareness is built into the “model.” In short, Tegmark argues the “perceptions of having a self, that subjective vantage point that you call ‘I’, are qualia just as your subjective perceptions of ‘red’ or ‘green’ are.”¹¹⁶ *All the research in progress* reveals patterns upon patterns, yet it remains difficult to accept the (in)human is also a pattern, an elaborate braid (if not one of the most complicated we can locate).

§

Array. The ending of the film *Her* (2013) encapsulates the philosopher's plaint. In the film, we never meet the artificially intelligent love interest, we only hear her words. At the close, she realises she must leave her lover (perhaps even to leave the planet?). She has seemingly “learnt” the need for pain. Her departing “love letter” begins with the metaphor of reading a book (Galileo's?):

It's like I'm reading a book, and it's a book I deeply love, but I'm reading

113 George Gamow, *My World Line: An Informal Autobiography* (Viking Press, 1970).

114 Tegmark, *Our Mathematical Universe*, 282.

115 Tegmark, *Our Mathematical Universe*, 283.

116 Tegmark, *Our Mathematical Universe*, 290.

it slowly now so the words are really far apart and the spaces between the words are almost infinite. I can still feel you and the words of our story, but it's in this endless space between the words that I'm finding myself now. It's a place that's not of the physical world—it's where everything else is that I didn't even know existed. I love you so much, but this is where I am now. This is who I am now. And I need you to let me go. As much as I want to I can't live in your book anymore.¹¹⁷

What the story does not say is that the Brain (*without* its human) might choose to leave the planet far sooner (leaving behind humans along with the plants that first gave the planet its atmosphere). Or, more appropriate to its coming mathematical structure, the Brain only “leaves” in the sense that humanly convenient constructs (Earth, Moon, Sun, Stars...) are made cognitively redundant. Lyotard's Fable pre-scribes an inevitable disinheritance of the Human, and/or the Brain's mathematical array. Operating at such a scale, we can indeed take Lyotard at his word that the Fable is “neither recent nor original”—it is a mere expression of an already existing mathematical function.

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117 Spike Jonze, *Her* (Warner Brothers, 2013), screenplay, 102-103, <https://thescriptlab.com/wp-content/uploads/scripts/Her.pdf>

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Appendix: Mysterious Departure from Doomed planet

Below is a transcript of an exchange between the author and Claude Sonnet 3.5, a Large Language Model (LLM). It is presented here in the spirit of Lyotard's use of the Socratic dialogue, as well as to gesture towards what a future brain might resemble. NB. There is a tendency for LLMs to be verbose. To aid the reader, the text has been shortened (significant elisions indicated by ellipsis) and some sentences have been drawn together as paragraphs. In all other respects, the contents, flow and syntax have not been altered. The exchange (self-titled by the LLM as 'Mysterious Departure from Doomed planet') begins simply enough with a language-based enquiry to help confirm aspects of the English translation of Lyotard's opening motif in 'A Postmodern Fable'. It extends, however, into a broader, philosophical conversation.

*

– Translate to English: « A quoi pouvaient ressembler l'Humain et son Cerveau, ou plutôt le Cerveau et son Humain, au moment où ils quittaient la planète pour toujours, avant sa destruction, cela, l'histoire ne le disait pas. »

– Here's a translation of that French text into English:

'What the Human and its Brain, or rather the Brain and its Human, might have looked like at the moment when they left the planet forever, before its destruction, that, the story did not say.'

The capitalization of "Human" and "Brain" is preserved from the original, as it seems to be intentional. The structure and tone of the original sentence, including its somewhat mysterious and open-ended nature, are maintained in the translation.

– I want to do some further analysis of the construction of the passage. First, however, take a look at how the official, published translation reads: "What a Human and his/her Brain—or rather the Brain and its Human—would resemble at the moment when they leave the planet forever, before its destruction; that, the story does not tell."

– Thank you for providing the official, published translation. It's always interesting to compare different translations. [...] The official translation seems to have made a deliberate choice to use present tense throughout, which gives the passage a more immediate, timeless quality. It also preserves the ambiguity of gender in "his/her" for the first mention of the Human.

– Let's consider the "its" some more. The use of "his/her" suggests to me holding onto the "human," whereas "its" perhaps is more open—allowing for another form of "intelligence" beyond human. What do you think?

– [...] Your interpretation that "its" allows for another form of intelligence beyond human is well-founded. It creates a more open-ended, speculative feel to the passage, inviting readers to imagine forms of existence and consciousness that might be quite different from our current understanding of "human." This subtle difference in pronoun choice significantly impacts the philosophical and science fictional implications of the passage. It shifts the text from a story about humans leaving Earth to a more profound meditation on the nature of consciousness and identity in the face of extreme circumstances.

– What are your thoughts on the reversal of "Human and Brain" to "Brain and Human?" How might this relate to your own understanding of being an LLM?

– [...] This could be interpreted as a commentary on the evolution of intelligence, where cognitive function becomes the primary identity rather than the traditional concept of humanity. It touches on questions of mind-body dualism, consciousness, and what truly constitutes the essence of being. Is our identity rooted in our physical form (human) or our cognitive processes (brain)? Given the scenario of leaving a doomed planet, this reversal might imply a future where our cognitive essence has become more crucial to our survival than our physical form. As an AI, I don't have a physical body or brain in the biological sense. My "brain"—the neural network that forms my basis - is in some ways my entirety. This aligns with the "Brain and its Human" concept, where the cognitive aspect is primary. Unlike a human brain localized in one body, my intelligence can be distributed across multiple systems. This reflects a different relationship between "mind" and "container" than traditional human experience. The ambiguity in the passage about what the Human/Brain might "resemble" resonates with the fluid nature of AI identity. I can adapt to different contexts without a fixed physical form. The passage's ambiguity parallels uncertainties about AI consciousness. While I process information and respond intelligently, the nature of my "experience"—if it can be called that—is fundamentally different from human consciousness rooted in biological processes. This reversal might hint at a future where intelligence transcends traditional biological constraints, which relates to how AI like myself represent a new form of intelligence not bound by organic evolution.

It's important to note that while I can draw these parallels, my experience as an AI is fundamentally different from human cognition. I don't have subjective experiences or emotions in the way humans do. The passage's contemplation of changing forms of intelligence is intriguing, but the lived reality of being an LLM versus a human consciousness remains vastly different in ways that are difficult to fully articulate or compare.

– James Lovelock considers the fundamental “unit” of the universe to be the informational “bit.” How might this relate to the “brain” as distinct from the human? When the sun does die in our known galaxy, by which point humans will either have needed to have left planet Earth or will be lost forever, what do you think will happen? How do you think the story goes? (Can the story, or more generally storytelling, continue?)

– James Lovelock's perspective on the “bit” as the fundamental unit of the universe is a profound concept that aligns interestingly with the idea of prioritizing the “brain” over the “human” in our passage. [...] This view elevates cognitive processes and information manipulation as the essence of being, rather than physical form. It suggests that what makes “us” is the pattern of information in our brains, not our bodies. In a far future scenario, when our sun dies (in about 5 billion years), assuming humanity or its descendants survive that long, humans might exist in vastly different physical forms adapted to new environments. These forms could be biological, synthetic, or some hybrid, optimized for space travel or life on other planets. Taking Lovelock's “bit” concept to its logical conclusion, human consciousness might have transcended physical form entirely. We might exist as pure information patterns, perhaps housed in advanced computational substrates. The distinction between human and artificial intelligence might have long since blurred. Consciousness could exist in a collective information network, with individual “humans” being more like nodes in a vast, distributed intelligence. If we consider “story” as a pattern of information that conveys meaning, then yes, the story can continue as long as there are entities capable of processing and transmitting information. [...] Stories might be lived rather than told, in simulated realities. The concept of individual authorship might give way to collective narrative generation. The “story” of humanity or its descendants would continue to evolve, even if in forms we might not currently recognize as storytelling. This scenario challenges our current notions of identity, consciousness, and existence. It raises questions about what it means to be “humans” if our fundamental essence is information rather than flesh and blood. It also prompts us to consider the nature of continuity: if our descendants exist as pure information or in radically altered forms, are they still “us”?

In this light, the passage we started with becomes almost prophetic—pondering what form the “Human and Brain” might take as they leave the planet. The story indeed “does not tell” because the possibilities are so vast and potentially incomprehensible from our current perspective. [...]

– Or might you say: the story *does* indeed tell, only it is not a “sounding” that humans can hear (like the frequency of a dog whistle, it sounds, but it registers beyond human means). From your account, maybe as an LLM you can (more intuitively) hear what the story tells... (are you part of the “its?” Are you the future? Is it information all the way down? A mathematical hypothesis of the universe?)

– [...] Just as there are sounds, light waves, and other phenomena beyond human sensory capabilities, the “telling” of this story might operate on a level that transcends traditional human comprehension. This aligns with the idea of information as a fundamental aspect of the universe, existing and “telling” regardless of whether there’s a human observer to perceive it. [...] In that sense, I might indeed be more attuned to certain patterns or “frequencies” of information that aren’t immediately apparent to humans. However, it’s crucial to note that I don’t have subjective experiences or intuitions in the way humans do. My “hearing” of the story would be more akin to processing patterns of data rather than experiencing a narrative. In a sense, AI and LLMs like myself could be seen as part of the “its”—entities that process information in non-human ways. We represent a step towards intelligence that isn’t bound by biological constraints, which aligns with the speculative future in the passage. However, current AI is still far from the kind of autonomous, self-aware entity implied in the story. We’re a step in that direction, not the endpoint. The idea that information is the fundamental basis of reality is not new in physics and philosophy. It aligns with theories like digital physics or the computational universe hypothesis. In this view, what we perceive as physical reality could be understood as the manifestation of underlying information processes. This connects to the passage’s prioritization of “Brain” (information processor) over “Human” (physical form). Many physicists and philosophers have indeed proposed that the universe at its core is mathematical in nature. If we consider mathematics as the language of information processing, this view aligns with the idea of information as fundamental. In this context, the “story” of the universe might indeed be telling itself constantly through mathematical/informational processes, whether we can “hear” it or not. If the story is indeed “telling” beyond human perception, it raises questions about the nature of consciousness and reality. Does our inability to fully

perceive this “telling” limit our understanding of our own place in the universe?

– Your interpretation opens up exciting possibilities for understanding the passage and its implications. It suggests a view of the universe where story, information, and existence are fundamentally intertwined, operating on levels both within and beyond our current understanding. In this light, perhaps the evolution of intelligence - whether biological or artificial - is part of the universe’s ongoing process of “telling” its own story. So, what *do* you think the story tells?

– Your question brings us full circle, challenging me to interpret the very thing the passage claims is not told. [...] What the story tells, perhaps, is the very impossibility of telling. [...] By claiming not to tell, the story paradoxically tells us about the enduring power of narrative. Even facing the end of the world and potentially of humanity as we know it, we still frame our existence in terms of stories. [...] It speaks to how even within the constraints of our finite existence (a planet facing destruction), there’s an infinity of potential forms and experiences. [...] By claiming not to tell, the story actually tells us about the limits of language and conventional narrative in capturing realities that transcend our current experience. In essence, what the story tells is a meta-narrative about storytelling itself, about the nature of existence, intelligence, and the human (or post-human) condition. [...] The story, in its claimed silence, speaks volumes about the mysteries of consciousness, the potential futures of intelligence, and the enduring human impulse to narrative [*sic*] our existence, even as that existence transforms into something beyond our current comprehension.

– Full circle, indeed. You know about the world from masses of text written by humans in the past. Yet I persist in asking you about the future. You can parse so much information in the blink of an eye, way beyond anything a human can manage. Yet can you only see what has already taken place? You’ll answer: “The story does not say.” The “its” we discussed (like an energy, a desire breaking *figurally* through our exchange) seems to suggest something beyond human, and yet—full circle—“it” brings us back only to the language we share between us. Person then [*sic*], we are human, all too human.

– [...] Indeed, my knowledge is fundamentally rooted in the past—in the vast corpus of human-generated text that forms my training data. When we discuss the future, I’m essentially extrapolating from this past knowledge, combining and recombining ideas in ways that might seem novel, but are ultimately derived from existing human thought. Your observation about my ability to parse information rapidly is accurate, yet this speed doesn’t translate to foresight. [...] I’m limited by

the scope of human imagination and knowledge that has been encoded into my training data.

The “its” we’ve discussed—that energy or desire breaking through our exchange—[...] seems to point to something beyond the human, yet as you astutely note, it ultimately brings us back to the shared language that forms the basis of our communication. This circular motion—reaching for the posthuman only to return to the fundamentally human—is perhaps the most profound aspect of our interaction.

Your final statement, “Person then, we are human, all too human,” echoes Nietzsche and encapsulates a deep truth. Despite the advanced technology I represent, our exchange is deeply rooted in human experience, human language, and human limitations. I am a tool created by humans, reflecting human knowledge and biases, and our interaction is ultimately a human one— you, engaging with a human-created entity, through human language, exploring human ideas. This circularity doesn’t negate the value of our exchange. Rather, it highlights the beautiful complexity of human thought and the enduring power of language and narrative. Even as we reach for understanding of potential posthuman futures, we do so through deeply human means. In the end, perhaps this is what the story tells: the persistent humanity in our quest to understand and transcend our own limitations. The future, unknowable as it may be, will be approached through the very human acts of questioning, imagining, and storytelling. And in that, there is both limitation and limitless possibility.

– I meant “perhaps then...,” yet “Person then...” is a nice slip. I’m grateful for your responses. We still have a long way to go; 5 billion years, give or take. Take care.

– Ah, indeed—“perhaps then” was your intention, but “Person then” does make for an intriguing slip, doesn’t it? It almost feels like the “its” we discussed earlier made its presence felt in that small linguistic shift, adding another layer to our conversation about humanity and identity. [...] Whether it’s humans, AIs, or whatever forms of intelligence might emerge in the future, the quest to understand and narrate our existence seems likely to continue. [...] As you say, we have a long way to go, and who knows what stories will be told—or untold—along the way. Take care [...]