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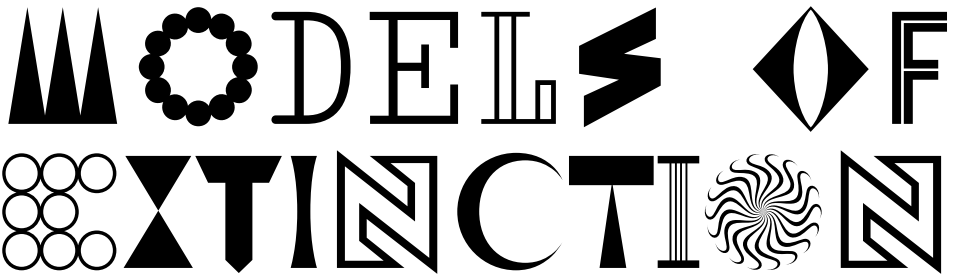
MODELS OF
EXTINCTION

ŠUM

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Models of Extinction

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Models of Extinction has been produced in proximity to a speculative project and exhibition entitled *2.8B420K* by Andy Gracie. The project is set in the deep future—in 2.8 billion years' time, the expanding Sun will cause the Earth's average temperature to reach 420 K (147 °C) and all life will become extinct. 2.8B420K proposes the design and implementation of a monument that, by triggering a material deformation at 420 K, will make a performative gesture to commemorate this transition from biological to post-biological. No living thing will witness this performance.

The contributing writers were invited to respond to this scenario and/or wider concepts, challenges or consequences that arise from it.

MAKS VALENČIČ

Editorial

Extinction is nowhere and everywhere at the same time, as it becomes a part of our doomcore era.

Extinction is real, even if it needs to make itself happen. Some cognitive infrastructures don't have the capacity to price extinction in their models, while others empty its meaning by making it yet another political concept.

Extinction has its own "temporal in-between, the smallest memory buffers and signal delays".[01] Similarly to the eternal drift between capitalism and its models, it has the capacity for both self-affirmation and self-transformation.

Extinction is virtual and not actual, i.e. something that has to remain in the state of an open secret. Its potentiality is a thing of disputation, a paraconsistent fact oscillating between truth and falsity.

Extinction is an elusive concept. It has the kind of generality and all-encompassiveness that doesn't really help us understand (or confront) it. For some, extinction has already happened, as time has ended in the heat death of the universe.

Extinction is a plural and not a singular phenomenon, so there will never be one true (or complete) extinction. Rather, extinction becomes a criterion for what we are prepared to let go extinct or what kind of extinction we are preparing for; what kind of path-dependency we are making a reality of.

Extinction leads to further materialisation of thought and our conceptual scaffoldings. It's the new king of the outside that showcases why the distinction between a map and the territory is a thing of the past. Extinction is the meta-narrative we are after, but it never tells us what to make of it or what to do next.

Extinction and its adversaries strive for implementation by engaging in an unending battle between mind and matter, energy and information—a game of encoding and its repeated randomisation (i.e. dissipation). Fighting extinction is a process where pattern has to become matter or "where pattern and matter [finally] meet".[02]

Extinction is itself a form of computation that takes place as humanity is computing and embedding itself in a perpetual rush. It laughs in the face of universal limitations, at the fact that Turing machines are not primarily mathematical (or computational) but physical limits,[03] and/or at such attempts at an exodus from definite end(s).

Extinction is a form of a race to the end, an arms race that cannot find its Nash's equilibrium. Prolonging extinction means producing an artificial world where time has not ended; where computation hasn't halted yet. A cut in time by making our thoughts compute a time to come.

01 WOLFGANG, Ernst, *Chronopoetics: The Temporal Being and Operativity of Technological Media*, Rowman & Littlefield: Lanham, 2016, p. 4.
02 SPIVAK, David, "Where matter and pattern meet", *Topos Institute*, 07/11/022, https://topos.site/blog/2022/11/where-matter-and-pattern-meet/.
03 MATHEMATICAL METAPHYSICS, "Jonathan Gorard on compositionality, multicomputation, ontology and functoriality (part 1)", *Youtube*, 21/10/2022, https://www.youtube.com/watch?v=LjlnZxUd8h4.

Extinction is, simply, time immanentisation at the precise moment when humanity learns to become a chronopoietic machine. Extinction is an end of transcendent time, since time now literally counts. “Can what is playing you make it to Level 2?”[04]

Extinction and its models are a form of time manipulation where the future is destined to come and bite us from behind. Since extinction is a future phenomenon, our models can only be (and come) from the future, thus leaving us in a state of nervous reality testing (with world simulations of varying quality).

Extinction amounts to the primacy of the future upon the present and the past, and is thus not simply a physical fact (or a limit), but a speculative chance for a new reality to happen. Extinction is nothing more than experimentation with time, a new kind of reality cone destined to happen (or go under the radar for aeons to come).

Extinction makes it possible to think about (possible) futures as objects for further reflection and operationalisation. It reverses the primacy of explicit reasoning and what these models are saying in favour of implicit (meta-logical) considerations;[05] what actually counts, then, is the toolbox of our models. Extinction is, fundamentally, a problem to be solved and that has to be solved at different levels, not least in the deep time of our posthuman horizons.

Maks Valenčič is finishing his master's thesis on universal computationalism and (radical) media archaeology. In the future, he would like to further his understanding of german accelerationism and generativity of technological civilization. He tweets at @MaksValencic.

04 LAND, Nick, *Fanged Noumena: Collected Writings 1987–2007,* Urbanomic: Falmouth, 2021, p. 455.
05 NEGARESTANI, Reza, “Toy Philosophy Universes (part 2)”, *Toy Philosophy,* 22/02/2018, https://toyphilosophy.com/2018/02/22/toy-philosophy-universes-part-2/.

THOMAS MOYNIHAN

When the Bugs Look Back: A Digression on the Existential Legitimacy of the Modern Age

Raving politics, never at rest—as this poor earth's pale history runs,—
What is it all but a trouble of ants in the gleam of a million million of suns?
What the philosophies, all the sciences, poesy, varying voices of prayer?
All that is noblest, all that is basest, all that is filthy with all that is fair?
What is it all, if we all of us end but in being our own corpse-coffins at last,
Swallow'd in Vastness, lost in Silence, drown'd in the deeps of a meaningless Past?
What but a murmur of gnats in the gloom, or a moment's anger of bees in their hive?—
—Alfred Tennyson[01]

§

Different animals have always played different philosophical roles. Philosophers have always had a thing for invertebrates, though the spineless sect has been typecast in somewhat negative roles. The oyster has often been associated with the lowly, for example: such as when Plato said that the life of the intoxicated hedonist, living entirely for the present moment, is like "the life of an oyster".[02] Or, when Hume, centuries later, professed, whilst writing on suicide, that

> *the life of man is of no greater importance to the universe than that of an oyster.*[03]

Which was strangely alike to these words from Marquis de Sade:

> *The life of the most sublime of men is to nature not of greater importance than that of an oyster.*[04]

Of course, this reflects badly on humanity only if you hold oysters in low regard; if you assume that a scale of beings indwells nature, rather than each lifeway having its own, incommensurable grandeur.

Given that familiarity recapitulates phylogeny, and we split from our invertebrate cousins sometime between 500 and 600 million years ago, the oyster has also been conscripted to express dramatically alien umwelts (long before echolocators played the role). In the 1880s, Karl von Prel fused Kantianism with evolutionism, exploring how the universes of other animals

01 TENNYSON, Alfred, "Vastness", in: *Macmillan's Magazine,* November, 1885, pp. 1–4.
02 PLATO, *Philebus*, Indianapolis: Hackett Publishing, 1993, pp. 21b–c.
03 HUME, David, *Two Essays*, London, 1777, p. 11.
04 SADE, Marquis de, *Justine*, v. 1, Holland, 1797, p. 215.

would differ from our own. As sensory and mental faculties fuse to actively forge a world, different minds—enjoying different organs of sense—will manufacture different worlds. Following this, du Prel wrote:

> *But since the world, as represented by us, is a product of our sensibility, every exaltation of sense, every development of a new sense, must change the world-picture. The oyster represents the world differently from man, and from the oyster up to man a continual multiplication and exaltation of sense-faculties has taken place.*

"Like a red thread," he continued, "there goes through the biological process a continuous displacement of the boundary line between the actual and transcendental world."[05] This is evocative, but it still assumes unilinear hierarchy, it still stereotypes the oyster as lowly. Evolutionists have since continued to use sessile invertebrates to stage thought experiments exploring the different "possible worlds" of biology, and how far, and how deep, this space of possibilities might reach. Namely, they have used the oyster to postulate that, as most of us assume our world is richer than that of a mollusk, there might be other possible worlds vastly richer than our own.

If such worlds already surround us, how would we know? The game of asking is old. In the 1730s, entomologist René Antoine Ferchault de Réaumur was using the same conceit. But he was using it to edify god's omnipotent will rather than nature's morphospace of minds. This time, though, he was much more magnanimous towards the mollusks, allowing that they might—for all we know—possess quiet wisdoms:

> *But if somebody should hold that God could endow insects with an intelligence equal or even superior to our own, without enabling us to know that He had thus endowed them; and if this somebody should hold that an oyster, vile as it is in our sight, attached to a rock and condemned to a mode of life which seems to us very gloomy, may nevertheless enjoy a very delightful existence, being constantly engaged in lofty speculations, it would be impossible to deny that the Supreme Power could go so far or even farther, He can create and place intelligences wherever He desires.*[06]

Looking back to Plato's judgement against the squidgy bliss of the oyster, the philosophical uses come full circle in J. M. E. McTaggart's 1927 thought experiment in *The Nature of Existence* regarding the strange arithmetic and confounding conclusions of hedonic calculus. McTaggart compared an "oyster-like"

05 PREL, Karl von, *The Philosophy of Mysticism*, v. 1, London, 1889, p. 282.
06 RÉAUMUR, René-Antoine Ferchault de, *The Natural History of Ants* (trans. WHEELER, W. M.), London, 1926, p. 33.

existence, endowed with “very little consciousness” and “very little excess of pleasure over pain”, with the average human life: presumably filled with all kinds of intensities and excellences. McTaggart ventured that a sufficiently long oyster life—near hedonic zero, but not below—would always come to outweigh the human biography in goodness. Even if you extend the human life, or fill it with yet more joy and meaning, there is a conceivable oyster-life that is long enough to outweigh the sapient one. Despite accepting this argument, McTaggart called his acceptance “repugnant”.[07]

Here’s another philosophical conscription, now of a clam, from the astronomer Harlow Shapley, writing in 1959:

> *How might man’s career on this planet be terminated, and the biology of the earth returned to the durable clams, kelp, and cockroaches which dominated the lands and seas for hundreds of millions of years before the human experiment got under way?*[08]

§

People have always wondered what posterity will make of them. The Victorians were particularly good at it, unsurprisingly imbuing it with all their colonial angst, imagining how non-Europeans might one day, in the distant future, ponder the forgotten ruins of Europe’s cities.[09] But the highly Victorian preoccupation with the apparent rising and falling of empires, and the apparent circulation of the world’s navel, is, of course, but a *continuation* of human history.

Depicting continuation is easy. To ponder ruins, all one needs is a ponderer intact. Depicting human history’s outright terminus, in the form of extinction, however, requires more: it demands narrating beyond the end of all narration. In this instance, something other than human helps to be conscripted as our posthumous witness, providing the focalization that can be projected forward so we can look back upon our own species, *post festum.*

Shapley conscripts the clam and cockroach above. It turns out that, as the 1900s dawned, and fears of universal extinction outpaced more parochial angsts, untethered from provincial horizons, the act of conscripting the spineless sect, to look back upon our graves, became commonplace. One of the more poetic examples comes from a humble book on moths, published in 1903:

> *When the moon shall have faded out from the sky, and the sun shall shine at noonday a dull cherry-red, and the seas shall be frozen over, and the ice-cap shall have crept downward to the equator from either pole, and no keels shall cut the waters, nor wheels turn in mills, when all cities shall have long been dead and*

07 McTAGGART, John M. E., *The Nature of Existence,* v. 2, 1927, p. 453.
08 SHAPLEY, Harlow, “Some Music of the Spheres”, in: *American Scholar,* 28(2), 199, pp. 218–221.
09 COLENSO, William, “A Few Remarks on the Hackneyed Quotation of ‘Macaulay’s New Zealander’”, in: *Three Literary Papers,* New Zealand, 1883.

> *crumbled into dust, and all life shall be on the very last verge of extinction on this globe; then, on a bit of lichen, growing on the bald rocks beside the eternal snows of Panama, shall be seated a tiny insect, preening its antenna in the glow of the worn-out sun, representing the sole survival of animal life on this our earth—a melancholy "bug".*[10]

§

The context was the then recent discovery of the sheer antiquity, conservatism and evolutionary staying power of insects. "Before even the great reptiles, down among the trilobites and the early fishes, we find our cockroach," writers of the late 1800s enjoyed remarking.[11] One 1898 children's book put the words straight into a blattid's mouth: "We are also very ancient," our roach explains, "but it is quite impossible for me to tell you how many generations have preceded me."[12]

Having thus proven themselves resilient over a timespan magnitudes longer than the entire existence of the hominin, the hardy bugs seemed to many a safer bet for maintaining themselves into the further future than us simians, who, comparatively. might seem untested, inexperienced, upstart newcomers. Following such reasoning, one zoologist, as early as 1897, was venturing that "the humble ants have a glorious future before them after man has ceased to exist upon this earth".[13] Another commentator echoed the sentiment in 1899: "And it may be that man, a late arrival, is destined to a far shorter use of the earth than the cockroach or the lobster."[14]

One science fiction book, written a few decades later, chronicled the biosphere's deep future. Humanity goes eventually extinct, leaving behind the hardy social insects, which "inherit the earth" and rule it for billions of years. There is a war between termites and giant ants, with the latter winning, thereafter filling the world with their gigantic skyscraping structures.[15]

There was an aspect of the carnivalesque to this, of course. Suddenly the scales had shifted: viewed from the cold tribunal of brute evolutionary longevity, the invertebrate turns out to be the "aristocrat", as many humorously remarked at the time, and the human the parvenu.

§

Moreover, it was soon revealed that the social insects, like ants and wasps, had probably been "civilised" since the end of the Cretaceous. Based on this track

10 HOLLAND, William Jacob, *The Moth Book,* New York, 1903, p. 455.
11 WRIGHT, Lewis, "The Wings of Insects", in: *The Leisure Hour,* 43, 1893, p. 355.
12 SIMPSON, Edward, *Insect Lives: As Told By Themselves,* London, 1898, p. 48.
13 DENDY, Arthur, "The Chain of Life", in: *The Press,* 54, 1897, p. 6.
14 NISBET, John Ferguson, *The Human Machine,* London, 1899, p. 295.
15 PAPP, Desiderius, *Creation's Doom,* New York, 1934.

record, many began remarking that their society was perhaps a safer bet than what Shapley referred to as the "human experiment", in its contrast to the "durable clam".

Given newfound fascination with the societies of insects, it was common, during the first decades of the 1900s, to use the ant-heap as a motif, allowing comparison with the human megapolis, and enabling perspective switches, between the microscopic and telescopic—the entomological and anthropological—so as to feign a god's eye view. The idea was to stage a clinical, objective, detached gaze on humanity's hustling and bustling. But now the bug was *also* being used as a way of looking back, from the end, to retrospect our own extinction.

Some of this was whimsical, mostly playful. One such beetle came from the quill of the American journalist Don Marquis (who, incidentally, once wrote a funny little novel called *The Revolt of the Oysters).* Marquis's preferred mouthpiece was Archy, a cockroach, who would regularly pour scorn upon humankind in ragged blank verse. The conceit was that Archy would take over Marquis's typewriter after dark and pen his poems; because of his cockroach-stature, he couldn't operate multiple keys at once, so his writings lack capitalisations and grammar. Here's a sample:

if all the bugs
in all the worlds
twixt earth and betelgoose
should sharpen up
their little strings
and turn their feelings loose
they soon would show
all human beans
in saturn
earth
or mars
their relative significance
among the spinning stars
man is so proud
the haughty simp
so hard for to approach
and he looks down
with such an air
on spider
midge
or roach
the supercilious silliness
of this poor wingless bird
is cosmically comical

and stellarly absurd
his scutellated occiput
has holes somewhere inside
and there no doubt
two pints or so
of scrambled brains reside
if all the bugs
of all the stars
should sting him on the dome
they might pierce through
that osseous rind
and find the brains at home
and in the convolutions lay
an egg with fancies fraught
which
germinating rapidly
might turn into a thought
might turn into the thought
that men
and insects are the same
both transient flecks
of starry dust
that out of nothing came
the planets are
what atoms are
and neither more nor less
man s feet have grown
so big that he
forgets his littleness
the things he thinks
are only things
that insects always knew
the things he does
are stunts that we
don t have to think to do
he spent a score
of centuries
in getting feeble wings
which we instinctively
acquired
with other trivial things
the day is coming
very soon
when man and all his race

must cast their silly
pride aside
and take the second place[16]

The joke, of course, is that Archy is, behind the insectoid exterior, just another human passing their very human opinion upon humanity. Archy promises all the revelatory pathos of the cosmic view—the grand perspicacity that can mensurate at a scale comparable to the volume separating Earth and Betelgeuse—but instead all he provides is the charming bathos of its inevitable collapse. In his pusillanimity, and policing of the presumed ladder of life, Archy lifts a mirror to our own defects.

It's part of a rich tradition, going back a long way. So wrote John Wilmot, Earl of Rochester, in the 1600s:

Were I (who to my cost already am
One of those strange, prodigious creatures, man)
A spirit free to choose for my own shar,
What case of flesh and blood I please to wear,
I'd be a dog, a monkey, or a bear,
Or anything but that vain animal
Who is so proud of being rational.[17]

The point here is that only a human would, and could, utter such a subjunctive. Wanting to be something else, to have been born as another, is probably a uniquely human trait. The tradition is sometimes called *theriophily* or *animalitarianism,* the aim being to elevate the atavistic above the humanistic: since the beasts are peaceful in their ignorance and secure in their innocence, stable in their behaviours, not liable to err nor doubt. Archy The Cockroach's poetry often called on such themes, and wasn't always all joke; there was often a deeply, deadly serious message amongst the mirth. For example, from "what the ants are saying":

dear boss i was talking with an ant
the other day
and he handed me a lot of
gossip which ants the world around
are chewing over among themselves
i pass it onto you
[...]
it wont be long now it wont be long
man is making deserts of the earth
it wont be long now

16 MARQUIS, Don, *The Annotated Archy & Mehitabel,* London: Penguin, 2006, pp. 192–194.
17 WILMOT, John, *Complete Poems,* New Haven: Yale University Press, 1962, p. 94.

before man will have used it up
so that nothing but ants
and centipedes and scorpions
can find a living on it
[...]
what man calls civilization
always results in deserts
man is never on the square
he uses up the fat and greenery of the earth
each generation wastes a little more
of the future with greed and lust for riches
[...]
it wont be long now it wont be long
till earth is barren as the moon
and sapless as a mumbled bone
dear boss I relay this information
without any fear that humanity
will take warning and reform[18]

Again, the bugs are looking back. In our age of climate calamity, Archy's message has aged well. Indeed, when the tradition of theriophilia came into contact with the 20th century, it was used to voice a newfound fear. This was the fear that it might be precisely humanity's need to *invent* in order to survive which explains much of the rapid success of our species, but may also contribute to its instability, rapacity and ultimate failure. Other creatures rely on tried-and-tested instincts, honed over evolution's long haul, secure and reliable albeit rigid and inflexible. Humanity, contrarily, is, as the geologist Kirtley F. Mather once put it, "a specialist in adaptability rather than in adaptation". Lacking rigid remit, it has to invent as much as inherit. Humanity seems far less stable, liable to err, without a predefined place.

§

This was precisely Shapley's point, remarking on man's "short and brilliant career" from "ape-like ancestry" to skyscrapers in but a brief period of time, geologically speaking. The cockroach, he wrote, "has a straight-line ancestry of two hundred million years or more":

His is a stock sufficiently strong to carry him through numerous terrestrial upheavals, through desiccations and glaciations—and the cockroach today is just as good as he ever was. He and many other types of paleozoic [sic] animals so successfully adjusted themselves to the bitter universe that they have attained an

18 MARQUIS, *The Best of Archy & Mehitabel*, New York: Everyman, 2006, pp. 219–223.

> *enviable persistence. They had lived for ages before the sun passed the Orion nebula. They were well attuned with the physical law and environment's seeming caprice.*

"Still more instructive," Shapley continued, "in our problem of perspective, are social insects." In "reasonable harmony with the physical restrictions and with the biotic world are these persistent societies of ants," such that we must agree that "their descendants can carry on as of old with the assurance of an ample future".

> *Theirs is, I claim, a splendid social development—the work is all done by the females! The males, when they are permitted to exist at all, are mainly decorative. The governmental details are in the hands and antennae of widows and spinsters.*

He then attempts to view nature's verdict, should humanity not also achieve its own version of harmony and balance:

> *In a million years or so, by the light of those undisturbed stars that heed life not at all, some conservative cockroach, crawling over the fossilized skull of an extinct primate, may be able to observe: "A relic here of another highly specialized organism which failed to recognize the laws of the universe, which preferred the current minor whims to the search for survival, and which missed its great opportunity to inherit the planet, perishing an early victim of the world's subtle chemistries."*[19]

Shapley is using the cockroach to attempt his own version of the *cosmic view.* It's something that Bertrand Russell also memorably reached for when he rhapsodized that "all the labours of the ages, all the devotion, all the inspiration, all the noonday brightness of human genius, are destined to extinction in the vast death of the solar system" and that the whole temple of accumulated achievement "must inevitably be buried beneath the debris of a universe in ruins".[20] *"Wyrd bið ful aræd"*, as one forgotten Anglo-Saxon poet—addressing essentially the same theme—wrote around a millennium ago.[21]

Bernard Williams once rightfully noted that Russell's tone here, in hoisting himself to the cosmic view, is at once "self-pitying" and "self-glorifying".[22] There's certainly something true about the self-pity, since one could only find nature's uncaringness an enormity to the extent that felt, no matter how tacitly,

19 SHAPLEY, Harlow, "Man and his Young World", in: *The Nation,* 118, 1924, pp. 529–531.

20 RUSSELL, Bertrand, "Free Man's Worship", in: *Mysticism & Logic, and Other Essays,* London: Allen & Unwin, 1963, p. 41.

21 See "The Wanderer", from the 10th-century Exeter Book.

22 WILLIAMS, Bernard, "The Human Prejudice", in: *Philosophy as a Humanistic Discipline,* Princeton: Princeton University Press, 2006, p. 137.

that one had lost a legitimate inheritance owed. That feeling, tacit or not, is, of course, a question of historical baggage. Religion affects even the disbeliever, given that conceptual positions, questions and metaphors are inherited across generations. The loss of the promise of everything still imposes, even if one has become convinced it was a sham all along.

Indeed, one of the things that's going on here is the historical inertia of the desire for an outside view, the cosmic perspective, the transcendent judgement and ultimate tribunal. As Franke Kermode had it, it proffers a "sense of an ending".

> *We project ourselves—a small humble elect, perhaps, past the End, so as to see the structure whole, a thing we cannot do from our spot of time in the middle.*[23]

In a secular age, the bug and oyster, the cockroach and the kelp, replace the elect and the angels.

§

It's good to be wary of postured attempts at ventriloquising or anticipating nature's verdict, of course. Sublime though it is, and often nothing more than a humorous corrective to human hubris, thinking that nature's tribunal, past and future, has any kind of *moral* content and that anyone has pellucid access to it, as Stephen Jay Gould brilliantly documented, is part of the philosophic root of evils like eugenics and social Darwinism.[24] It would no more be a "verdict" against intelligence, of our sapient sort, should we go extinct tomorrow than it would be a "verdict" against it *if* it had never evolved in the first place—say, if Chixculub had never happened. Neither are convincing. Many of nature's exuberant possibilities will never be realised, and most that have been realised never will be again; the deep mark of history on that process, in its essence as contingency, is testimonial enough against self-serving—or, indeed, self-pitying—adjudications. Most importantly of all, nature's blind tribunal carries no moral authority at all.

As Stanislaw Lem mused in his 1983 *Das Katastrophenprinzip:*

> *The balance sheet looks like this. Man could not emerge from the differentiated biological legacy of the Mesozoic [...] the limb of the evolutionary that created the mammals would not have branched and would not have given them primacy among the animals had there not been, sixty-five million years ago, between*

23 KERMODE, Frank, *The Sense of an Ending*, Oxford: OUP, 2000, p. 8.
24 GOULD, Stephen Jay, *Dinosaur in a Haystack*, London: J. Cape, 1996; GOULD, Stephen Jay, *The Mismeasure of Man*, London: Penguin, 1997.

> *the Cretaceous and Tertiary, a catastrophe in the form of an enormous, 3.5-to-4-trillion-ton meteorite.*

We are the heirs of the "statistical fury of the stars", he continued, "one of the rare winners in this lottery"—the "survivor of hecatombs" played out on the "roulette wheels that are galaxies".[25] As we look down on oysters, many of life's forms—remaining forever unrealized for whatever reason—might well have looked down upon us in the same way.

§

There's been another prominent way of using bugs to imagine the end of humanity. During an epoch which saw the rise of authoritarianism, some voices, less whimsical, feared for various reasons that human society was tending in the direction of the insect, as a form of living death. The entomologist Alfred E. Emerson wrote, in a 1947 piece called "Why Termites?":

> *Biology has been used to rationalize political bias, as I suspect was the case when Churchill suggested the study of termites to Stalin.*

It became fashionable for political factions of all persuasions—"autocracy, fascism, communism, or democracy", Emerson wrote—to see in their opponents echoes of the obligate eusociality, and lack of liberty, of the social insect.[26]

There were some wild theorisations: such as, for example, the speculations of the esotericist writer P. D. Ouspensky.[27] Writing around 1929, Ouspensky speculated that social insects represent the remains of a prior sapient civilization which came to lose its rationality through disuse. Claiming that nonhuman cosmopolises and monuments could have existed in the deeper paleontological past, with no traces remaining into our Cenozoic era, he thus wrote that "we have no grounds" for considering humanity nature's first "experiment" with sapience.[28] His reasoning further rested on disbelief that the intricate "organisation of the 'beehive' and the 'ant-hill'", as it exists today, could be an architecture achieved by blind instinct. It would have, originally at least, required insight and "logical intelligence", Ouspensky was convinced. However, this formerly sapient species, having thereafter pursued a "very narrow and rigidly utilitarian" order of things, in course of time, lost their "thinking capacities": which—"absolutely unnecessary in a well-organised ant-hill or beehive"—slowly became "atrophied, automatic habits". Eventually, the sapient

25 LEM, Stanislaw, *One Human Minute* (trans. LEACH, C. S.), New York: Harvest, 1986, p. 95.
26 EMERSON, Alfred E., "Why Termites?", in: *Scientific Monthly,* 64, 1947, pp. 337–345.
27 OUSPENSKY, Pyotr D., *A New Model of the Universe: Principles of the Psychological Method in Its Application to Problems of Science, Religion, and Art,* New York: Knopf, 1934, pp. 59–62.
28 This might seem preposterous, but contemporary geologists engage in thought experiments on the topic. See SCHMIDT, Gavin A. & FRANK, Adam, "The Silurian hypothesis: would it be possible to detect an industrial civilization in the geological record?", in: *International Journal of Astrobiology,* 18(2), 2018, pp. 142–150.

ants "became 'insects' as we know them". Ouspensky imagined that they had achieved a perfect "socialistic order" at the price of their sapient spark.

Flirting with entomological euhemerism, the esotericist continued to conjecture that cross-cultural human myths of "strange *non-human* beings", and the ruins of their works, might be explained as vestiges of this pre-human civilization. "Of course, it will be difficult at first to imagine Lucifer as a bee, or the Titans as ants", Ouspensky continued,but "if we renounce for the moment the idea of the necessity of the human form", then it might become just about believable. Given Ouspensky's own "bias" was mysticism, he warned that contemporary humanity—in neglecting the spiritual side of things—was headed on a similar track.

Ouspensky's speculation is certainly the most bizarre and bold, but he wasn't the only one. The historian Arnold Toynbee claimed that the human desire for "utopia" was damaging because its manifestation would be something similar to the instinctual "perfection" of "social insects". He wrote:

> *If we enter into the comparison, we shall discern in an ant-heap and in a bee-hive, as well as in Plato's* Republic *or in Mr. Aldous Huxley's* Brave New World *[the same] fatally perfect adaptation of the society to its particular environment.*

For Toynbee, utopianism amounts to the desire for "an invincibly stable equilibrium" in which "the supreme social aim to which all other social values are subordinated and, if need be, sacrificed":

> *The human cells of Leviathan are to be subordinated [...] to the social pseudo-organism as the protoplasmic cells of a human body are subordinated in fact to the genuine organism in which they cohere.*[29]

One particularly fascinating 1923 novel, by Gaston de Pawlowski and titled *Journey to the Land of the Fourth Dimension,* imagined this happening by accident, as civilization essentially pieces together an emergent "Leviathan", or superorganism, from the flows of global trade and technologization, which—though essentially unconscious, insensate, unawake, unalive and inorganic—still comes to usurp human liberty and autonomy, taking humanity's place in the driving seat of history. It sounds like something Marx could have written in his more gothic moments:

> *Only the formidable Leviathan benefited from these specialized activities. A monstrous and unconscious Hydroid, it replaced with its material universality the intellectual universality that had once been the prerogative of the human being. [...] It was*

29 TOYNBEE, Arnold, *A Study of History,* v. 3, Oxford: OUP, 1962, p. 95.

> *by muted movements and inexplicable communal ideas that the existence of the new being was initially revealed. When, little by little, all men came to understand that it was not for themselves and for their own wellbeing that they were working, but for some dark and mysterious Unknown, and when the distinction became ever-more-obvious between their own wellbeing and the social wellbeing in which they were collaborating, there were a few muffled individual rebel lions, as a frightful despair took possession of humankind entire but by that time, the scientific organism and specialization had already done their work.*[30]

One thinks here of Mayr's "major evolutionary transitions", wherein once autonomous lower-level units become subordinated to higher-level organisations, losing their autonomy in the process. In Pawlowski's novel, human individuals become nested to the point that their autonomy in the process to an emergent higher level of organisation, which—though now the protagonist of world-evolution—turns out also to be unconscious and unthinking. Again, it is alike to Marx's characterisation of "dead labour".

It's no coincidence, either, that when, mid-century, Kojéve theorised the end of history, as he inherited it from Hegel, he also hailed the insect. Kojéve claimed that if history is ever completed, and perfected, then humans survive as a natural species, but it would herald the "definitive annihilation of Man properly so-called". *Homo sapiens* would persist as a biotic entity—however, with history completed and perfected, there would be no room for erring, thus no room for liberty or learning. For Kojéve, this would be to merge with nature, becoming animal again. "Art, love, play, etc." would continue, but they "must also become purely 'natural' again".

"Hence," he continued, "it would have to be admitted that after the end of History, men would construct their edifices and works of art as [...] spiders spin their webs." Music would become like the songs of "cicadas". Most importantly, language as the medium of thought would disappear:

> *Animals of the species* Homo sapiens *would react by conditioned reflexes to vocal signals or sign "language", and thus their so-called "discourses" would be like what is supposed to be the "language" of bees. What would disappear, then, is not only Philosophy or the search for discursive wisdom, but also that wisdom itself. For in these post-historical animals there would no longer be any [discursive] understanding of the World or self.*[31]

30 PAWLOWSKI, Gaston de, *Journey to the Land of the Fourth Dimension*, Encino: Black Coat Press, 2009, pp. 98–99.
31 KOJÉVE, Alexandre, *Introduction to the Reading of Hegel: Lectures on the Phenomenology of Spirit* (trans. NICHOLS, J. H.), Ithaca: Cornell University Press, 1969, pp. 158–160.

A strangely similar scenario is imagined in Kurt Vonnegut's 1985 sardonic novel *Galápagos.* It follows the surviving human population of a global collapse relegated to island refugia: over countless generations, evolution parsimoniously sacrifices the big brains of the survivors so that they become streamlined semi-aquatic mammals with shrunken skulls—happy and post-postlapsarian, no longer worrying about air-raid sirens or financial crashes.

These visions stage the loss of the humanising disequilibrium, between is and ought, that motivates invention as much as causes us to err. Something would survive, but it certainly wouldn't be a human, in the Kantian sense of a rational and autonomous agent.

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Again, one detects here the desire for a sense of an ending, some post-mortem point to feign looking back from, in order to cast the final judgement on the human. But now it isn't god's eye view, but those of the surviving, formerly sapient animals.

Here, however, the idea is that somehow the perfection of the human is necessarily also its disappearance. It is a prevalent suggestion. Perhaps its inherited from a quirk of the Greek language, wherein perfection was expressed as "*τέλειος/teleios*", which is very closely related to the word "*τέλος/telos*"—which, of course, means "end". (The related word "*τελευτή/teleute*", moreover, means to "finish" or "die".) In his *Physics*, Aristotle makes the tightness of semantic bundle clear:

> *Nothing is perfect* [teleion] *which has no end* [telos]; *and the end is a finality* [πέρας/peras].[32]

Transposed into medieval Christianity, and filtered through Pelagian controversies, this is intensified with the idea that perfection, in work or deed, cannot be achieved in this world, and can only be granted beyond it. When drawn into more irreligious and modern contexts, the subsequent recession of any accessible eternity "beyond" time leads to the formulation of humanity as an essentially *historical* creature—deriving its sanctions from its own history and traditions rather than any place beyond. Assuming this, whilst continuing to presume that history is necessarily going somewhere—towards some consummatory and exhaustive end—leads, in turn, to the idea that perfection would be a living death or deadly stasis.

Hence, Kojéve's "language of the bees". The insect is still being used as a cipher for human extinction, it's just that *we* become the insect in this post-historical, rather than post-mortem, instance. It is a death by perfection.

32 ARISTOTLE, *Complete Works,* Princeton: Princeton University Press, 1984, pp. 207a13–14.

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The idea that history has some final point, towards which everything tends, apparently captured in modern ideas of "progress", came under criticism, not long after Kojéve's writing, by authors like Karl Löwith. In his 1949 *Meaning in History,* Löwith argued that modernity's idea of progress is essentially a "secularisation" of Christian eschatology. In this way, he argued for the illegitimacy of the modern age: that its core dynamo is not even its own, but an expropriation of an essentially religious conception. It would be fatal for modernity—as the age that claims to stand apart, as an act of self-assertion, in an epochal break with the dogmas of tradition—to not be legitimate on its own terms, to be driven by an unavowable expropriation and dishonest transposition.[33] Eric Voegelin attempted a similar prosecution when he argued, variously, that science and progress are modern offshoots of Gnosticism, which, in attempting to immanentize the eschaton, do violence to religious concepts they expropriate.[34]

In response, in 1964, the German intellectual Hans Blumenberg rallied a defence of modernity, complaining that Löwith's delegitimizing secularization argument had become almost common sense amongst intellectuals. He argued that "progress" isn't simply an immanentization of eschaton, and thus a violent and unavowable transposition—*nor, thus, an original sin for modernity*—but is in fact the reoccupation of a conceptual role that had been absented by the failure of religious eschatology to deliver its own promises. It's not that progress is secularised eschatology, it's that the promised eschaton itself failed to manifest, thus strengthening a secular existence that could assert itself, on its own terms, as worldly history dragged on and the end never came. If, in the process, the concept of progress was overstretched to fill the conceptual role left unoccupied by religion, this is not modernity's fault but religion's own "failure and self-denial". He wrote:

> *A province of secularity or, more accurately, one beyond the remit of theology, was delimited and stabilized only in the course of the all-encompassing process in which an unworldly, eschatological anticipation was disappointed and banished to speculative indeterminacy. Man now found himself, alone and left to his own devices, with the burden of newly arisen big questions, the inscrutability of a history of which he had only just became aware as such.* Worldliness—secularity—*could not exist until there was* unworldliness: *that which claimed to be* not of this world *called* this world *into question, while at the same time logically opening up the possibility to it to prove itself* qua *world, as permanent and reliable, and for its continued existence to be desired—for*

33 LÖWITH, Karl, *Meaning in History: The Theological Implications of the Philosophy of History*, Chicago: University of Chicago Press, 1949.
34 VOEGELIN, Eric, *Science, Politics, and Gnosticism*, Indiana: Gateway Editions, 1969.

> *example, worthy of being prayed for. In this case, secularisation is anything but expropriation as a unilateral, unlawful act, but instead the constitution of a previously unknown worldliness from its religious disavowal and unrealisation.*

That some roles that the new idea of worldly progress immediately was conscripted to fill, in absence of the old transcendent orchestration of time by divinity, were irrational is mostly the fault of the overpromises of the parent rather than the irrationality of heir. Blumenberg explained:

> *What is true, however, is that the idea of progress was forced to extend the scope of its claims, which were originally circumscribed and specific to certain objects, thereby* "overstretching" *them to the generality of a philosophy of history. It had to do so to answer a question that, as it were, remained at large, abandoned, and unsaturated, after theology made it* virulent. *As one possible answer to the question concerning history in its entirety, it was enlisted for an explanatory performance that overtaxed its rationality. An originally theological imaginative content was not subjected to a violent transposition, but rather, what was in itself already a secular, not secular*ized, *notion was reinterpreted and over-interpreted, burdening it with, if you will permit the phrase, the responsibility for theology's [own] failure and self-denial.*

Intellectual history, like evolutionary history, is conservative, and once a need has been made manifest, it won't disappear upon its first frustration, but can only fade gradually. In Blumenberg's eyes, monotheism had "played the eminent part" in shaping intellectual traditions and it had done so by "creating such *positions* that could no longer be undone or, within the theoretical economy, remain unoccupied". The primordial dishonesty thus lies more with religion than progress:

> *To theology, no question need remain unanswerable, and thereupon is founded the ease with which it inserts titles into the economy of human needs for knowledge.*

It is thus not primarily the fault of philosophies of history that they were "taken up with the effort to live up to" theology's prior overconfidence, "and with the disappointments that were inevitable in the process".[35]

35 BLUMENBERG, Hans, "Secularization", in: *History, Metaphors, Fables: A Hans Blumenberg Reader,* Cornell: Cornell University Press, 2020, pp. 53–82.

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However, although the modern age may well be legitimate on its own terms, the question of legitimacy has seeped out of its conceptual foundations and into those that are existential. Its conceptual foundations may be secure, but mere survival is no longer guaranteed. This is essentially what the invertebrates are conscripted for, when we look back on humanity through their eyes: it is a way of projecting out past the end, gaining and feigning a position from which to question the existential legitimacy of the modern age as that age which—though embarked upon in naïf hope—has lately culminated in global civilization gaining the power to destroy itself irreversibly and entirely.

Though Archy was invented in the 1920s, and Don Marquis died in 1937, he was resurrected on the eve of America's atomic testing at the Bikini Islands in 1946. E. B. White—who himself would go on to become author of *Charlotte's Web*—was reflecting, in *The New Yorker,* on the plans to place livestock in boats near the test, in order to ascertain the effects of radioactivity on animal bodies. He wrote:

> *There is one more passenger that ought to be aboard a Navy ship on the great day, alongside the goats, the pigs, the sheep, the rats, and us. We think archy ought to be aboard, archy's lineage is truly ancient; he goes back one hundred million years [and] is probably good for another hundred million years.*[36]

Citing a recent article which identified the cockroach as an "indestructible superbug", White remarked that "the cockroach is the creature most likely to survive the atomic age". Thus, there is a direct line from Archy to the Cold War motif of imagining that the only winners of World War 3 will be the roaches, and Jonathan Schell's claim that, after a nuclear exchange, the "United States would be a republic of insects and grass".[37]

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Projecting onto the animals—be they post-mortem or post-historical—is a way of feigning a sense of an ending in this secular age; of attempting—even though it should always be self-conscious of its own inherent failure—to derive some verdict from the ending of sense. This is the reoccupation of a role absented by religion.

What of the vexed question of progress and perfection? The idea that there is a telic end, a possible perfection, to history, is clearly—as Blumenberg diagnosed—an *overstretching* of the rationality of the philosophy of history. But this doesn't mean that modern hopes of a better future are at all illegitimate

36 WHITE, E. B., "Talk of the Town", in: *The New Yorker,* 09/03/1946, p. 17.
37 SCHELL, Jonathan, *Fate of the Earth,* New York: A. Knopf, 1982, p. 65.

because of this: the conceptual need for a culminating or consummatory finality is an inheritance of religion, and not inherent to secular philosophy of history as such.

History does not have a destination, or a possible perfection, or Omega Point. It is, and will remain, a cascade of the unforeseen and contingent. However, though it may not have a global destination, it *can* have sustained direction insofar as knowledge, insight and wisdom is accumulated and conserved over the generations. In this sense, the existential legitimacy of the modern age will always remain an open question: history either keeps going or it does not; it's that simple. The usefulness of ventriloquizing our invertebrate successors lies in the capacity to open an imaginative, hypothetical space within which we can proffer our visions—playfully, prosaically or with profundity—of just how much of a tragedy this might be and, also, what would have been lost.

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There is certainly a wisdom in Toynbee's warning that utopia would be a "deadly perfection". There are and will be no final stasis or one perfect or optimal solution. History will keep going, keep changing us, such that our questions and answers will change anew. There will not be any final values, but we should pursue—tooth and nail—the mere possibility of cultivating many and multiple and more. Isaiah Berlin, in his 1988 "The Pursuit of the Ideal", realized this clearly. Tellingly one finds the following lines near the beginning:

> *When our descendants, in two or three centuries' time (if mankind survives until then), come to look at our age …*

In it, Berlin argues for value pluralism: humans can have contradicting and conflicting ends even within a single life, so why should we never think that there will be one perfect solution to the life of the species. He wrote:

> *The notion of a perfect whole, the ultimate solution, in which all good things exist, seems to me not merely unattainable—that is a truism—but conceptually incoherent; I do not know what is meant by a harmony of this kind. Some among the Great Goods cannot live together. That is a conceptual truth. We are doomed to choose, and every choice may entail an irreparable loss.*

Berlin also adroitly adds that, when the pursuit of future perfection or utopia becomes considered mandated or obligatory, then this can bend people's integrity and create great evils. "A certain humility in matters is very necessary," Berlin contends, arguing for value pluralism. We needn't dramatize dissensus because of this, and there are "if not universal values, at any rate a minimum

without which societies could scarcely survive".[38] Perhaps these are the ones we should be focusing on fortifying today; though the more ambitious ends and vision must also remain, as motivating goals for securing survival and equality today.

Indeed, that the existential legitimacy of the modern age is now an open question does not put the conceptual and moral legitimacy of its project in question. *If* the cockroaches crawl over simian skulls in some distant—or near—future, this will not have been any kind of verdict against the upstart species that embarked upon the Promethean project of reinvention and diaspora from nature's blind tyrannies. The existential uncertainty, however, feeds into despondence and even self-hatred—a feeling of deep illegitimacy due to existential instability—to the point that many imaginaries of better worlds are accused of being "secularised religion". An irony of the history of heresiology, that the modern heresy is to purportedly *be* religious. Prometheanism is the new Pelagian heresy. But is not being heresiophobic, and rendering orthodoxy in this way, just as much of a "religious" impulse as is the principle of radical hope? Perhaps more so, because doxastic coercivity is a root of dogmatism, is it not?

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There's beauty to the fact that, unlike the insects, humans can cooperate *across* generations as well as *within* them. But cooperation is the opposite of coercion, and preserves, forever, the capacity to disagree, which is the seed of self-correction over history thus far. What is worth conserving, then, for the modern project isn't some future that any one person or group thinks they know anything about now; neither is it at all attempting to secure today's utopias with today's faulty values; neither should it ever be sacrifice or coercion or neglect of present injustice. What is worth conserving is the option and ability for the denizens of the future to *disagree* with us, to see further and brighter than we can right now, should they wish. They will likely know more than us, so it is simply up to us to work on giving them the chance to figure it out, and, in the process, rectify our error and ignorance.

Childhood's end is perhaps a perpetual task, not a state of perfection to be wrested upon the world. So, there's some room for utopia—and Bloch's principle of hope—in this world, but only in its original sense as a nowhere place, always beyond the horizon, an empty regulative ideal, which spurs positive and explorative thought, rather than demands manifestation such that it obliges or suborns us now.

38 BERLIN, Isaiah, "The Pursuit of the Ideal", in: *The Proper Study of Mankind*, London: Vintage, 2013, pp. 1–16.

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To some, the perceived social life of the ant looks like utopia, to many others it is dystopian; they are obligate in their eusociality, doomed to sacrifice all for the hive. This lifeway may well have proved its longevity and stability, upon evolution's cold tribunal, but it's a model that autonomous sapient agents must not emulate, even if it would guarantee survival. That would be to sacrifice one type of legitimacy for the existential sort.

Nonetheless, the invertebrates are owed our respect. They have served to make us upstart humans humbler over the course of philosophical history, and I'd wager that's a role they will continue to play, in all their squidgy mirth. Humility and magnanimity are important virtues. To close, first, a few lines from a 1947 short story "The Figure" by Edward Grendon. It tells the tale of a group of scientists who have constructed a type of time machine which can only retrieve objects from the future, at random, and bring them back to the present. They retrieve a metal plinth and statue:

> *The figure on top is standing up very straight and looking upwards. […] It looks intelligent and is obviously representing either aspiration or a religious theme, or maybe both. You can sense the dreams and ideals of the figure and the obvious sympathy and understanding of the artist with them. Lasker says he thinks the statue is an expression of religious feeling. Dettner and I both think it represents aspirations:* Per adra ad astra *or something of the sort. It's a majestic figure and it's easy to respond to it emphatically with a sort of "upward and onward" feeling. There is only one thing wrong. The figure is that of a beetle.*[39]

Second, and finally, some lines from the 1963 poem "Timesweep" by Carl Sandburg, to contrast the despondence of Tennyson, which had opened this essay:

> *There is a vast Unknown and farther beyond the vaster Unknowable—and the Ignorance we share and share alike is immeasurable.*
> *The one-eyed mollusk on the sea-bottom, feathered and luminous, is my equal in what he and I know of star clusters not yet found by the best of star-gazers.*[40]

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39 GRENDON, Edward, "The Figure", in: *Astounding Science Fiction,* July, 1947, pp. 46–83.
40 SANDBURG, Carl, *Honey & Salt,* New York: Harcourt, Brace & World, 1963.

The Nihil of Time: Unilateral Limiting and the Decomposability of Human Agency

I. Corrosive Constraints

> *It is natural enough, therefore, that critique is an instrument of dissolution; a regression to conditions—to the magmic power of presupposition—upon which all order floats.*
> *—Nick Land*[01]

The precedent of humanism as a sign of retrogressive philosophical and cultural agendas and its correspondent mirroring on the ideologically contaminated waters of long-termism[02] presses us with the task to sustain a critical assessment that must be constructed from the grounds of an open yet strategic probe: how can we bootstrap the programmatic dissolution of any *given* substantiality (i.e. an ideological purview that has no scale-sensitive positionings toward such-and-such conditions) ascribed to a determined yet monotonic human subject as a universal paradigm? In other words, when faced with the isomorphism between humanism and corrupt, reactionary so-called universalist projects founded on an implicit western-centric exceptionalism,[03] we have to reassess both pragmatic and conceptual schemas necessarily driving us toward a continuum of critical self-effacement.[04] For this task, we will specifically unchain the consequences of the negative temporal chemistry threading out of the project of Kant's critical philosophy onto the context-specific proposal of inhumanism[05] from where we can productively decant a dispute of human supervenience that would be antagonistic to the particularities of Bostromian long-termism. Within the context of the aforementioned proposal of inhumanism, human supervenience is to be considered as a set of ordered cognitive structurings that hierarchically position human sapience in regard to outward sense data influxes that in a manner of maximal unforeclosure, from structuring to decomposability, open the gates to de-individuation.

Particularly for the inhumanist proposal, the conception of the transcendental order of space and time that Kant develops can be seen as a corrosive structural constraint that helps to undermine human subjectivity via retrochronical abjection[06] inevitably locking human sapience back onto

01 LAND, Nick, *The Thirst for Annihilation*, UK: Routledge, 1992.
02 BOSTROM, Nick, "Astronomical Waste", in: *Utilitas,* 15(3), 2003, pp. 308–314.
03 REED, Patricia, *Xenophily and Computational Denaturalization,* 2017, https://www.e-flux.com/architecture/artificial-labor/140674/xenophily-and-computational-denaturalization/.
04 We leave open a revisionary outlook of Mark Fisher's strategies of self-effacement in the landscape of what self-representation would entail when faced with technological enclosement, and in particular the concept of the *body without image.* See FISHER, Mark, *Flatline Constructs: Gothic Materialism and Cybernetic Theory-Fiction*, USA: Exmilitary, 2018.
05 LAND, *The Thirst for Annihilation.*
06 In reference to the opening and intrusion of time-rifts. See CCRU, *Collected Writings 1997–2003,* UK: Urbanomic, 2020, pp. 33–52.

the aprioristic transcendental or deep temporality[07] of the inorganic.[08] This means that the finer grained sense data that predates a coarser grained[09] state of representational coding and structuration (i.e. the morphogenetic field underlying posterior states of *becoming*) has a revengeful surfeit[10] on the cognitive structurings of human sapience resulting in the gaping decomposition of our bioimmunological apparatus[11] into the utmost excess of primordial data-bleed. Thus, under this view, we can posit a *decomposability of the human subject* defined here as a top-down approach that begins from a stabilized and maximally representational cognitive layering that gets retroactively underpinned by a destabilizing ground, jeopardizing what we consider to be our "locating beliefs"[12] as rational human agents in the world. Furthermore, the aformentioned strategy of subtraction would also serve to put into view the diagonalization or non-effective computability, following both Cantor and Putnam's "Diagonal Argument",[13] of the *One* or the *I* when considered to be an inductively confirmed generality within the context of what a universal learning machine is capable of computationally achieving in terms of a closed set of predictive results.

To this end, Putnam contends the apparent infallibility of Rudolf Carnap's degree of confirmation of a hypothesis or DC,[14] here applied to the aforementioned set of closed predictive results such as follows: "Let *T* be any learning machine, and consider what *T* predicts if the first, second ... and so on balls are all red. Sooner or later (if *T* is not hopelessly weak as a learning device) there must come an *n* such that *T* predicts 'the *n*th ball will be red'. Call this number n_1. If we let n_1 be black, and then the next ball after that be red, and the next after that again be red, and so on, then two things can happen. *T*'s confidence may have been so shaken by the failure of its prediction at n_1 that *T* refuses to ever again predict that a future ball will be red. In this case we make all the rest of the balls red. Then the regularity 'all the balls with finitely many exceptions are red' is a very simple regularity that *T* fails to extrapolate. So *T* is certainly not a 'cleverest possible' learning device."[15]

07 Deep temporality is thought under the register of ontogenesis: a field of pure potentiality that permits the establishing of forms in time. This would also correspond to the remarks Deleuze and Guattari have made on absolute deterritorialization not as the careless acceleration of time but rather as the constant return of the long-term chain of effects of this field on constituted and yet-to-be-constituted beings. See DELEUZE, Gilles & GUATTARI, Felix, *A Thousand Plateaus.* USA: University of Minnesota Press, 1987, pp. 52–57.

08 See FREUD, Sigmund, *Standard Edition of The Complete Works of Sigmund Freud Vol. 18,* UK: The Hogarth Press, 1955, pp. 6–69.

09 See WILSON, Mark, *Physics Avoidance: Essays In Conceptual Strategy,* USA: Oxford University Press, 2017, p. 231.

10 See SCHOPENHAUER, Arthur, *On the Fourfold Root of the Principle of Sufficient Reason and Other Writings,* USA: Cambridge University Press, 2012, pp. 303–448.

11 See HAMILTON GRANT, Iain (1998) "Black Ice", in: BROADHURST DIXON, Joan & CASSIDY, Eric J. (eds.), *Virtual Futures: Cyberotics, Technology and Posthuman Pragmatism,* UK: Urbanomic, 1998, pp. 132–143.

12 PERRY, John, "The Problem of the Essential Indexical", in: *Noûs,* 13(1), 1979, pp. 3–21.

13 STERKENBURG, Tom F., "Putnam's Diagonal Argument and the Impossibility of a Universal Learning Machine", in: *Erkenntnis,* 84, 2018, pp. 633–656.

14 See CARNAP, Rudolf, *Logical Foundations of Probability,* USA: University of Chicago Press, 1962.

15 PUTNAM, Hilary, *Philosophical Papers Volume I (Mathematics, Matter and Method),* USA: Cambridge University Press, 1975, p. 299.

The diagonal argument put to work by Putnam undermines an inadequate framework of explication that extracts its short-sighted conclusions from a minimal informational pool using the example of a hypothetical universal learning machine, placing an initially contingent drift brought upon by the inclusion of further evidence to the forefront. The appearance of a contingent drift can help us illustrate how a compressed picturing of human subjectivity that is unmoored from a coarser grained or a minimal yet inadequate framework will eventually lead to a chasm when faced with a finer grained and complexity-laden framework of explication as highlighted above. Taking this into account, we can take a detour toward a brief observation Nick Land makes about the diagonal argument with the idea in mind that a formalist inductive method such as Rudolf Carnap's is too restrictive to consider other diverging frameworks that would be *open* to the influx of evidence in excess. In our case, this evidence in excess corresponds to the temporal and spatial transcendental order theorized by Kant that, when seen under the purview of Cantorian mathematics[16] underlying the diagonal argument, leads toward the application of non-denumerable[17] sets of intensive magnitudes:[18] "Cantor systematizes the Kantian intuition of a continuum into transinfinite mathematics, demonstrating that every rational (an integer or fraction) number is mapped by an infinite set of infinite sequences of irrational numbers. Since every completable digit sequence is a rational number, the chance that any spatial or temporal quantity is accurately digitizable is indiscernibly proximal to zero."[19]

Therefore, in order for us to posit a complexity-laden framework, we would need to consider that such framework must be open to the influx of divergent and initially incompatible evidence that would hazardously contrast with the conventional and short-handed evidence taken to be a *given* within a restricted framework. In turn, this contrast would initially show itself as contingent but would ultimately end up being a reconstructive contrast that would oblige us to inhabit a far richer language than the formalist one proposed by Carnap's DC (Degree of Confirmation) while encapsulating the inclusion of transcendental conditions of the type of the space-time order[20] and, while not endorsed by Putnam, the implicit idea that the application of intensive magnitudes corresponding to the space-time order can be seen as a corrosive yet necessary constraint on human agency.

16 PUTNAM, *Philosophical Papers Volume I,* pp. 12–42.

17 See MUCKENHEIM, Walter, *Infinite sets are non-denumerable,* 2003, https://arxiv.org/ftp/math/papers/0305/0305310.pdf.

18 See JANKOWIAK, Tim, "Kant's Argument for the Principle of Intensive Magnitudes", in: *Kantian Review,* 18 (3), 2013, pp. 386–414.

19 LAND, Nick, *Fanged Noumena: Collected Writings 1987–2007,* UK: Urbanomic, 2011.

20 PUTNAM, *Philosophical Papers Volume I (Mathematics, Matter and Method),* p. 271.

When weighing in with the latter, we must also consider the seedy arguments posed by long-termism that even when picturing at a certain capacity the corrosive constraints of space-time order on human agency, these would have a grandiose teleological aftertaste that precisely looks to counter the catastrophe-laden consequences of transcendental temporality under the name of the conservatorship of human supervenience. In what could be considered the founding move of long-termism, in "Astronomical Waste", Nick Bostrom exerts the two-fold sin of exaggerating the role of the human subject against the backdrop of an explicit authoritarian project of spatial colonization that begins by examining the wastage of human potential when put against the ruthless and maximally entropic asymmetry of temporal scales, ultimately facing the loss of capitalizable opportunities at every turn of the clock,[21] whilst continuing the boastful and uncritical expansion of the western human subject toward the very subjection of the stars.

In regard to the latter, Bostrom writes: "We might fall victim to an existential risk, one where an adverse outcome would either annihilate Earth-originating intelligent life or permanently and drastically curtail its potential. Because the lifespan of galaxies is measured in billions of years, whereas the time-scale of any delays that we could realistically affect would rather be measured in years or decades, the consideration of risk trumps the consideration of opportunity cost."[22] And even more bluntly, reaching the following bioimmunological conclusion: "Clearly, avoiding existential calamities is important, not just because it would truncate the natural lifespan of six billion or so people, but also—and given the assumptions this is an even weightier consideration—because it would extinguish the chance that current people have of reaping the enormous benefits of eventual colonization."[23]

Accordingly, if we stop to examine the bare-bones utilitarian rhetoric of Bostromian long-termism, we will be unsurprised to find the most erratic display of the degree of confirmation framework, which as previously mentioned would have for its basis a minimal pool of information and that in this case would be ascribed to a determined type of human agency (i.e. a predatory colonial western subject), with the intention to acridly ground an inflationary conception of the potentialities and statistical growth of human intellect when projected toward the future. Nevertheless, the apparently firm prognosis that corresponds to the speculative progress of the *western subject* in time becomes voided by disregarding any kind of complexifying or open conclusions that would have at its center paradigmatic counter-evidence such as contemporary theories in the field of physics that have put forward the caustic

21 "Given these estimates, it follows that the potential for approximately 10^{38} human lives is lost every century that colonization of our local supercluster is delayed; or equivalently, about 10^{38} potential human lives per second." (BOSTROM, *Astronomical Waste,* p. 309.)

22 BOSTROM, *Astronomical Waste,* p. 311.

23 Ibid.

hypotheses of a symmetry of temporal scales and backward causation[24] endangering the predominant and supposedly determinate phenomenological perspective of human agency that exclusively delves within asymmetrical temporal scales[25] and, most importantly, the explicit muting of cosmic trauma that is precisely brought to the fore by the overwriting of transcendental temporality over our own whimsical and fairly lackluster empirical givenness within the indifferent contingent flow of the universe.

In light of this, and to avoid the outlandish assertions of long-termism and pick apart its embededness to the suppurating drawl of inert enlightened humanism and its ideological vows to contemporary technocapitalism, and as mentioned at the start of this writing, we would have the necessity to sketch out a critical apparatus. Considering what we have previously observed, this respective critical apparatus will have as its starting point the overlapping of diagonalization or non-computability with the ramifying consequences surrounding the question of time as we have found them at the edges of inhumanism. This overlapping must venture outward to its own logical terminus where we would embrace a horizon event that relishes the annihilation of any fixed locating beliefs that correspond to a poorly substantiated "I". To put it shortly, the imperative scalpel we intend to employ has at its mire the unfeasibility of closure made explicit within the monadic play of mirrors that is long-termism. The effects of which would mean the hard limiting of human agency to the potentialities found on the virtual structuring of the transcendental space-time order.[26] If we can identify the hectic trajectories to where we are lead with the irruption of the above-named virtual structuring while considering how this structuring gets traumatically embodied in the actual as a factor of decomposability, we can then overcome the plighted biases of a single-sided frame of a rigidly enclosed human subject.

For this, we must highlight and recontextualize one of the main tenets of inhumanism: the convergence toward the abstraction of time in-itself, a tenet that in turn must become a reconfiguring and dialectical fixture of the human subject while also considering the perceptual and conceptual irreversibility of the ripples produced by the collapse and further immersion toward and inside the space-time order (in the lingua franca of Landianism: *k-space*) onto our empirical selves:[27] "In this sense K-space plugs into a sequence of nominations

24 See Price's discussion on the conventions of asymmetrical time and the probabilistic counter-evidence that develop a perspectival shift toward symmetrical time and backwards causation in *Time's Arrow and Archimedes' Point* (USA: Oxford University Press, 1996, pp. 162–194).

25 And therefore any *ends* of time ascribed to the teleology of utilitarian long-termism.

26 "As a result, it is useful for us—the best we can do, in fact, in many cases—to arm our future selves with a description of the world which is rich in 'potentiality'; in other words, a description which yields useful information about a wide range of possible futures. Potentiality is the best substitute for knowledge of the actual future itself. It gives us a kind of generic knowledge, useful in each of a wide range of future circumstances, many of which may be compatible with what presently we know." (PRICE, Huw, "Backward causation, hidden variables and the meaning of completeness", in: *Pramana,* 56 (1 & 2), 2001, p. 204.) In light of Price's optimist overview of the potentialities of time, we state that such potentialities can also be catastrophically counterfactual to what we presently know.

27 In reference to Freud's earliest involvement about the theory of the embodiment of trauma inside our perceptual-cognitive apparatus *in time.* See FREUD, Sigmund, *Standard Edition of The Complete Works of Sigmund Freud Vol. 1,* UK: The Hogarth Press, 1966, pp. 295–387.

for intensive or convergent real abstraction (time in itself): body without organs, plane of consistency, planomenon, a plateau."[28] From this passage we can extract the following thought: the convergence toward the abstraction of time in-itself can be explicated as the unraveling of a clash between intensive and extensive qualities that becomes traversable when unmaking and re-arranging a given state of things onto a dynamic refiguring onto a yet-to-be-known state of things. Put differently, according to the vocabulary belonging to the rationalist continuum leading from Spinoza to Deleuze, the weaving between real and numerical distinctions[29] can be used to implement the Kantian-critical purview of temporality and the measuring of its effects by way of intensive qualities, i.e. unmaking and re-arranging a given state of things, and the notation of the cascading immersion of these effects on our empirical register by utilizing extensive quantities, i.e. a yet-to-be-known state of things that can be made visible by way of bare statistical measurements. Using these ideas as a form of grounding, we can find ways to revel in the tools offered by contemporary science and physics (which would be an ordeal beyond the limits of this writing) having at its center the intensive qualities of time against the merely impoverished utilitarian perspective of long-termism which banishes any kind of depth from the merely extensive measurements used to eternalize an undisputed western human subject.

III. Multiscalar temporality as a heuristic critique

Following our line of argument and in order to sketch-out a potentially robust naturalization of the negative impact of time as a structural constraint on human subjectivity, we would need to observe that general contentions about inhumanism's decomposability of human agency will become inevitable, and for this we will first take into consideration two concrete instances of fallibility. The first one being the seemingly unorthodox interpretation made of Boltzmann's theory of thermodynamics, interpreted by Land as a transcendental law and as a working proof for the fixed tendency of matter toward its own dissolution in time.[30] We will argue that Land's justification of the aforementioned proof as to undermine any teleological conception of time and therefore of any telos embedded within human agency reverses precisely into an axiomatic view that *predetermines the behavior of phenomena in time.* Land delights in his own fallible device when writing the following: "Any process of organization is necessarily aberrational within the general economy, a mere complexity or detour in the inexorable death-flow, a current in the informational motor, energy cascading downstream, dissipation. There are no closed systems, no stable codes, no recuperable origins. There is only the thermospasmic shock wave, tendential energy flux, degradation of energy."[31]

28 LAND, *Fanged Noumena.*
29 See DELEUZE, Gilles, *Expressionism In Philosophy: Spinoza,* USA: Zone Books, 1990, pp. 27–40.
30 LAND, *The Thirst for Annihilation,* pp. 27–57.
31 Ibid., p. 43.

Toward this end, we will use an exemplary lesson taken from Mark Wilson's critique of "ersatz rigorism"[32] when analyzing the contextual ills of reductive axiomatic formalism that is taken to be epistemologically complex while remaining fundamentally bare.[33] Following Wilson, we can forfeit Landian temporal catastrophe as a variant of what we can call a "non-linear ersatz complexity", where we would observe the supposed increase of complexity when utilizing non-linear systems as a model and in particular the dynamics of non-asymmetrical temporal flows but that do not suffice as they don't go beyond a bare axiomatic proposal that has as its center the idea of primordial entropic unbecoming as a deregulative fixture haunting any kind of negentropic formation. On this point, Reza Negarestani poses a critique related to Land's idea of apparent complexity when using non-linear models of explication to prove the dissolution of matter and order, that in the end become undermined thanks to their binding to fundamentally closed systems that depend on a predictive economy of self-regulation and largely unrevised locating beliefs: "The dissipative rate is energetically conceived as an economical (and hence, restricted) correlation; its existence is dictated by the exorbitant index of exteriority but its *modi operandi* are conditioned by the affordability of the interiorized horizon of the organism."[34]

With this in mind, the second instance we will consider is the "the non-successive and unsegmented zero of intensive extinction" behind "flatlining"[35] to further compromise the complexities suggested by Land, as it would also implicitly suggest a flat picture of time that would act as a unilateral or unidirectional limit that has for consequence an orthodox form of eschatology[36] rather than an intensive and multiscalar[37] conception of time. For the latter, we will also build on the observations made by Wilson that place a direct response to the depthless formalist rigor of the so-called scientific epistemologies developed by much of the European and Anglo philosophy of the 20th century with recent developments in contemporary science and computation, utilizing multiscalar architectures that can tackle the problem of having various interacting submodels within a dominant structure (and accordingly, a dominant behavior), whilst not subtracting the importance of what happens whenever we immerse downwards and inwards to further levels of complexity: "The basic

32 See WILSON, Mark, *Imitation of Rigor,* USA: Oxford University Press, 2021.

33 The idea that rigor must be seen as a form of subtractive axiomatic method is delicately weaved by Wilson's genealogy starting from European physicians and mathematicians of the 19th century and more specifically on the figure of Henrich Hertz and condensed in the work of the logical empiricists of the early 20th century. See WILSON, *Imitation of Rigor.*

34 NEGARESTANI, Reza, *Accelerationism and the problem of (un)binding,* 2010, https://www.urbanomic.com/accelerationism-and-the-problem-of-unbinding/.

35 LAND, *Fanged Noumena,* p. 370.

36 We can highlight here the critique done by Negarestani about the reactionary escathological consequences that come with the elimination of modularity in *becoming* when only posed with the output or horizon of human extinction. Even if Negarestani poses a modularity of becoming by considering the effects of temporality on our empirical selves and its respective potentialities, we could postulate a modulation of *unbecoming* that is crucial to dispute our own perspectival and sense-bound locatedness within the world and the outbounds of the universe. See NEGARESTANI, Reza, *Intelligence & Spirit,* UK: Urbanomic, 2018, pp. 233–348.

37 WILSON, *Imitation of Rigor.*

trick is to position a variety of individual modeling tactics (called 'submodels') within a coordinated architecture that shifts between these components in a controlled, checks-and-balances manner. By doing so, a multiscale plotting can resolve the computational hazards that Terrance Tao calls the 'curse of dimensionality': keeping track at one time of all the interactive variables relevant to a complex system will easily swamp the capacities of the most compendious of imaginable computers."[38]

Thus, if we now turn to Huw Price's contention about time as phenomenologically perceived by human agents in an asymmetrical manner with a tendential behavior that affects things in-time by getting strained when putting it side by side to the subjectless perspective from the *nowhen* that doesn't have the forward-causation belonging to the phenonemonological perspective as its basis, we can then try to piece together the idea that there might be a yet-to be deciphered dominant behavior of time rather than a restricted nature of time that would include as sub-models both asymmetrical and symmetrical directional flows. The enrichment of perspectival and non-perspectival temporalities and behaviors permitted by a multiscalar conception of time willfully demonstrate that Land's inhumanist idea of time is deeply conservative when contrasted with developments that might contain and defy human agency without recurring to implicitly threadbare concepts such as the nature of time et al.

With the above, we would like to suggest that even if we are prone to find evident dangers leading toward orthodoxy and dogmatism in Land's decomposability of human agency, we can also find productive ways of circumventing the substantive status surrounding human agency by using post-Landian responses as a starting point[39] onto a robust hybridization of conceptual strategies and tools across continental and analytical philosophical traditions that can ultimately re-adjust rather than abandon the open-ended intellectual persuasions left behind by the inhumanist proposal. Thus, we will stand by a critique of a substantive "I" as a perspectival given in philosophy by way of what has been termed an "inessential indexical",[40] a conception rooted in the conflict between relational properties and self-names that Ruth Garret Millikan develops in *The Myth of the Essential Indexical.*[41] On this note, we would highlight that the Millian[42] observation that underlies Ruth Garrett Millikan's

38 Ibid., p. 90.

39 NEGARESTANI, Reza, "The Labour of the Inhuman", in: MACKAY, Robin & AVENASSIEN, Armen (eds.), *#Accelerate: The Accelerationist Reader,* UK: Urbanomic, 2014, pp. 321–331.

40 "We also think the substantive conclusion of the tradition is wrong, and that there is no deep or philosophically interesting notion of perspectival content. We think that contents are, and are used as, tools for representing (and, of course, sometimes misrepresenting) the objective state of the world. Some of the states represented are 'perspectival' in the minimal sense that they are facts about our immediate environment, or facts about how things are in relation to us. Some of our representational systems are indexical in the minimal (Kaplanian) sense that they represent as they do in part in virtue of where they are situated in the world. But there's nothing more to the phenomenon than that—fundamentally, all information is objective information, and is used indifferently by us as such." (CAPPELEN, Herman & DEVER, Josh, *The Inessential Indexical: On the Philosophical Insignificance of Perspective and the First Person,* USA: Oxford University Press, 2013, p. 173.)

41 MILLIKAN, Ruth Garrett, "The myth of the essential indexical", in: *Noûs,* 24(5), 1990, pp. 723–734.

42 See KRIPKE, Saul, *Philosophical Troubles: Collected Papers Vol. I,* USA: Oxford University Press, 2011, pp. 52–72.

critique of Lewis' and Perry's essential indexicality and that considered through and through has the capability of underwriting *self-names*[43] carries the repercussion of spousing not organismic and holistic but decomposable and process laden approaches to self-situatedness within the world and the inner-workings and external-networkings that come to be associated with the act of self-naming.

Put differently and while borrowing from Patricia Reed's parallel remarks on this subject,[44] one does not begin from homophily to circumscribe within homophily, but rather when one subjects homophily from the inside to the knifings of immanent critique it reaches outward to the evidence in excess that challenges our perspectival givens. From this, we can observe an act of inward folding that unfolds toward alienation, which would be another name for what in Mark Fisher's gothic materialist proposal is known as an *implex* (the fold outwards from within),[45] i.e. a Liebnizian-Spinozist kernel that feedbacks onto an immanent critique of indexicality, generating strategies in which human subjectivity can be undermined while situated fully within the grasp of determinate material constraints. In turn, we could haphazardly define these material constraints as those belonging to our developing historical context as they adapt to our own cognitive domain,[46] whilst jeopardizing any agentic givens that are and must be dialectically revisable through the conflict between the manifestly ideological and the scientific critique of our own positioning in the world. This could also bring forward a necessary grip with Louis Althusser's Marxist critique of humanism as an ideological construct when faced with contingent and time-sensitive material constraints that define the relations of socioeconomical production that in turn have also produced the mirage of substantive selves.[47]

Finally, and as an ongoing project, we would like to lead these conceptual syntheses to their ultimate consequences as a painstaking subtractive labor that could eventually piece together a discerning view of the unidirectional "nihil of time" via speculative physics with the anthropic perspective developed by Boltzmann. What would this imply? By taking into account Price's reconstruction of Boltzmann's discovery of statistics as a turning point on his theory about entropy, thanks to mathematicians Zermelo and Poincaré's dispute about the second law of thermodynamics where they highlight that states of lower entropy or organizational influx in the universe even when considered to be of bare statistical importance do *inevitably* happen, we are

43 MILLIKAN, *The myth of the essential indexical.*

44 REED, *Xenophily and Computational Denaturalization.*

45 "The implex describes less a relationship between objects than a transformation that happens to a system. Implex designates a process of folding, or unfolding: thus cyberspace is neither 'inside' nor 'outside' the world, it constitutes a fold in the world that is nevertheless a real production—an addition—to the world as such." (FISHER, *Flatline Constructs,* p. 144.)

46 With this, I would leave open posterior developments that could tentatively link-up Louis Althusser's idea of ideological interpellation having repercussions on human agents at a cognitive-behavioral level. Even if it might sound tautological, work must be done to sufficiently explore this subject. See ALTHUSSER, Louis, *On the Reproduction of Capitalism,* USA: Verso Books, 2014.

47 See ALTHUSSER, Louis, *For Marx,* USA: Verso Books, 2005, pp. 221–247.

lead to tentatively conjecture that what is most improbable within an asymmetric time scale *can* and *will* happen. That is, the aprioristic flux of transcendental space-conditions eventually do make themselves tangible when formalized within our bare perceptual view of phenomena in time (i.e. necessary entropy), meaning that eventually we could also consider the convergence of initially divergent senses of time revolutionizing our sense of selves. Price writes the following: "Life on Earth depends on a continual flow of energy from the sun, for example, and would not be possible without a low-entropy hot-spot of this kind. In light of considerations of this kind, Boltzmann suggests that it isn't surprising that we find ourselves in a low-entropy region, rare as these might be in the universe as a whole. This is an early example of what has come to be called anthropic reasoning in cosmology. By way of comparison, we do not think that it is surprising that we happen to live on the surface of a planet, even though such locations are no doubt rather abnormal in the universe as a whole."[48]

By following Boltzmann's purview, we can find the idea of implausible hypotheses becoming plausible in given time as an attractive strategy that can be filtered through the lens of both a heuristical method[49] of critique as developed by complexity theory and the epistemics of surprisal as methods that are entropy tolerant but not overrun or ruled exclusively by entropy. For the idea of heuristics, we must turn to the observation made by William C. Wimsatt in regard to evidential excess and how this evidential excess rather than becoming a limiting factor to be discarded in the building of scientific theories and research can become a reconfiguring factor toward the implementation models that are error prone or that contend with the eventuality of surplus of evidence. Wimsatt writes: "A more realistic model of the scientist as problem solver and decision maker includes the existence of such limitations and is capable of providing real guidance and a better fit with actual practice in all of the sciences. In this model, the scientist must consider the size of computations, the cost of data collection, and must regard both processes as 'noisy' or error-prone."[50] This in hand becomes even more crucial when faced with the entropy tolerant framework proposed by Anil Cavia, where our own situatedness and posterior representational coding of what happens in the world is necessarily bootstrapped by initial states of contingency and entropy; but rather than *giving in* to the informational saturation of entropy, we might as well face the corrosion of impact and build upon the ruins of our now dislocated beliefs.[51]

48 PRICE, *Time's Arrow and Archimedes' Point,* p. 34.

49 "Heuristics are just the sort of decision rules that recognize cognitive limitations and their impact on choices made in complex circumstances." (BECHTEL, William & RICHARDSON, Robert C., *Discovering Complexity,* USA: MIT Press, 2000, p. xxiv.)

50 WIMSAT, William C., *Re-engineering philosophy for limited beings: piecewise approximations to reality,* USA: Harvard University Press, 2007, p. 78.

51 Following Cavia's conclusive remarks, disorientation does not equal to a discarding of the possibility of grounding knowledge. Disorientation produced by divergences in localization and specifically by the divergences found in time can enrich our own purview and, following the initial remarks of this writing, the strategies of self-effacement at hand: "If we've learned anything at all, it's that the future does not look like the past—an epistemics of surprisal posits that this is *necessarily* all we could ever learn, it renders both reasoning and mattering as encodings informed by the unfolding of uncertainty we call time." (CAVIA, Anil, *Shannon's Demon,* 2022, https://tripleampersand.org/shannons-demon/.)

Cavia writes: "All the knowledge we have is of uncertainty, there is no means of disentangling judgement from contingency. Surprisal is precisely the idea that our capacity to learn is grounded in an attempt to absorb new forms of entropy as information, and that the negation of intelligence is a reversion to pattern. Here, encoding is an in-situ theory of knowledge *in formation,* an ontogenesis founded in the tension between freedom and constraint, not so much a dialectics as an *informatics* of pattern and surprisal."[52] The play of informational flux as has been highlighted circularly throughout this writing is a key factor that leads to a revision of the status of our own agency as humans, and even more so when the informational flux can potentially be utilized for the purpose of modifying determinate mechanisms and functions within a complex system. We can illustrate this by moving forward with William Bechtel and Richardson's remarks on the issue of localization and decomposition by using French chemist Lavoisier's "structural decomposition of water into constituent molecules",[53] in that most functions and operations belonging to a mechanism in particular can, once located, be potentially decomposed as to be structurally recomposed in an isomorphical manner, with the corresponding functions potentially enabled to be mapped in a one-to-one basis. The compelling factor of decomposition and then posterior structural recomposition is the failure or divergence of functions[54] that could likely, when taking both heuristics and the epistemics of surprisal to their limit, synthesize diverging functions that could put at stake any configuring factors taken to be essential within the mechanisms of a complex system.

Thus, if we take the monstrosity of decomposition seriously, to what speculative stakes could we bet upon? Laura Tripaldi poses a challenge when analyzing soft intelligent technologies such as spider's silk and the respective complexities in function and location that make for it a difficult subject to be structurally recomposed via *biomimicry*[55] and therefore observing the diverging results as functionally efficient although botched in replicating a one-to-one mapping by *lacking in imagination.*[56] With this, we can elaborate some closing observations in that surprisal and heuristics can help rebound speculative monstrosity to the inbound conditions of human agency by way of not only decomposition when taking in the escalating effects of the intensive order of time, but also contemplating what comes thereafter by structurally recomposing our agency as to shake the retrogressive beliefs condensed in humanism and leading us to stranger ways to inhabit the world full of statistical possibilities and reversibly tread neighborhood of escalating outcomes that in

52 CAVIA, *Shannon's Demon.*

53 BECHTEL & RICHARDSON. *Discovering Complexity,* p. xxxviii.

54 "Not infrequently, these efforts result in failure: the reconstituted system does not generate the original phenomenon or generates only some aspects of it. One possibility is that the researchers failed to identify some critical component. Another is that the organization was not adequately recovered in the reconstituted system and it contributed in essential ways to the production of the phenomenon. In either case, failure to reconstitute the system's behavior signals a failure of the proposed account of the mechanism." (BECHTEL & RICHARDSON, *Discovering Complexity,* p. xxxviii.)

55 See TRIPALDI, Laura, *Parallel Minds,* UK: Urbanomic, 2022, pp. 7–32.

56 TRIPALDI, *Parallel Minds,* p. 31.

this point in time inevitably rear us toward our own extinction. We turn to *faciality zero* in order to jump in degrees from the despotic order of representation to the inevitable intrusion of intensive futurity.

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Eulogy of Two Minds

2028 Nonhuman pov

"Remember the deal? If we assign you a new habitable planet, you will stay hidden, you will go to your own developmental path and not interfere with the outside."

"Well, uh … I mean yes," a shy impulse responded from an indistinguishable place. "But there was a problem with evolution on this planet, *it went its own way,* we were powerless to stop it. Even more, these beings are impossible to communicate with, which lead them to … ehem … you know, expose us."

"What do you mean, impossible to communicate with? They are just as organic as we are, sharing same electric circuits. Are you saying that they're not able to understand electrochemical language? Have you even tried?" The whole connection vibrated with anger.

"Uh, yes, but *their language* and … uhm desire for writing is, ehkem, it's making them quite *closed* for the other senses … and umm *open* for the other, heh, rather obviously. We were unsuccessful in trading information with them."

"Excuse me, language? Are you saying writing will cause multiversal war? You must fix this before they come. At least find a solution as soon as possible, otherwise we're all doomed." At that, a strange energy suddenly flashed by, obviously uncontrolled. "Hmm, someone unauthorized is trying to materialize, let's end this connection for now and continue this on another timeline. Find this intruder and question it …"

2129 Human pov

"What the fuck was that?" Joahina started pacing around the room in panic and tried to refocus. "Did I just … No, no, no, it can't be, surely, we would have *known* by now."

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Earth timeline

- 1.5 billion years B.C.: first fungi arrived at the planet Earth and slowly started populating it. They arrived as spores migrating through space. This is the origin of intelligence on Earth. Their goal is rather simple; create symbiosis with existing life, start influencing and controlling it by creating vast mycelial networks.
- 66 million years B.C.: Cretaceous-Tertiary (K-T) extinction is caused by fungi because, simply put, they really didn't like them. They found them loud and clumsy, and lost faith in truly remarkable evolutionary development. It was nothing short of embarrassing compared to intelligences that developed on other planets. So, they opted for a restart which led to the death of most

animal and plant species. In return there was a massive fungal bloom. They had to bootstrap evolution and introduce more control and as a result, information flow massively increased.

- **6000 B.C.:** human development was something that pleased fungi immensely. Around that time humans came to understand the role of hallucinogenic fungi as they began to use them in religious and spiritual rituals. It was only a matter of time before true symbiosis with humans would be possible, instructions were clear. Symbiosis, after all, must happen voluntarily, otherwise fungi would be indistinguishable from dumb parasites. They influenced other botanic and animal species to develop hallucinogens, hoping that human consumption of those would increase; all to expand the information flow.
- **0:** no one understood why humans began to prefer wine against hallucinogens and at that point, fungi were afraid to ask. The development of the written word is causing humans to act unpredictably and somewhat chaotically. Despite their efforts, fungi can't *read,* only *feel.*
- **1502:** human intelligence continued to grow on its own. Hallucinogens weren't used much anymore, and societies that did so were vanishing rapidly. Fungi grew ever more frustrated and were making conscious efforts to kill humans by causing infections, memory impairments and various other diseases. Their presence in animals' intestine mucosa which influences behavior was not working as intended either. But they did not desire another restart since there were some humans, like the so-called mystics, that still gave them hope.
- **1889:** Nietzsche lost his mind consuming strong hallucinogenic fungi. He presumably felt *will to power* for the first time and that was too much to bear. Reportedly, this wasn't intentional, since fungi were quite fond of Nietzsche.
- **1949:** after 200 years of fungi appearing in western medicine, humans finally developed nystatin, which further infuriated the fungi. At the same time, some scientists were studying the effects of psilocybin, so not all hope was lost.
- **1968:** it only got worse from here. The space race caused the first real existential panic in fungi. Humans were acting out on their own and were even sending signals into space. How could they be so *naïve.* They also started to rely on artificial materials and computational power that further deepened the rift between them and nature. *Nature must compute itself.*
- **1970:** hippies—of all people—gave hope to fungi, but took it away just as fast. While humans began to consume drugs again in vast numbers and wine *(finally)* lost its primacy, fungi were hoping to advance symbiosis. But to no avail: synthetic hallucinogens, such as LSD, were developed, and this caused the biggest rift between fungi and humans to date; information flow was almost entirely closed. Fungi watched in vain and horror as humans that were still using "magic mushrooms" were mostly mesmerized by colors and shapes instead of trying to understand the *instructions.*

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Joahina was still trying to regain her senses of the lived world. “Oh god, I really went too far, they told me this would happen,” she murmured to herself as she stumbled towards the kitchen, hitting every furniture corner and doorframe on the way. After taking some water and injecting herself with 200 mg of nicotinic acid, her heartbeat began to slow down. It was comforting to be alone again, taking hallucinogenic drugs demands radical openness and she struggled with that quite a bit. Being a part of a society that based itself on non-individuality was one thing, but exposing oneself to dissolvement of individuum was something else entirely. Her two cats started rubbing themselves on her legs and purring softly while she was trying to recover. They always seemed to like her more after or while she consumed hallucinogens.

Ever since the new world order was established approximately 80 years ago, the monarch encouraged everyone to experiment with hallucinogens. Since most possible scientific discoveries were already achieved and climate disaster partially averted, humans have been struggling with new breakthroughs and felt like life has lost its meaning. Some have went as far as saying it would be best to collectively end it. A few radical groups (mostly artists) practiced suicidal rituals regularly. Most humans followed the monarch’s request in hopes to regain a sense of direction and they were doing so by using synthetic hallucinogens since these were much safer to use and their side effects easily controlled. The high itself and hallucinations were much clearer, easier to manage and offered a sense of relief when searching for something new in human structures.

You could (and optimally should) specialize in a specific search; whether it be the meaning of life, communicating with animals (quite popular but so far surprisingly unsuccessful), searching for traces of aliens, connecting with life on the cellular level … You had hundreds of options; some people, desperate for the times when God hadn’t been killed yet, were inspired to search for one. Ironically, this research topic was gaining a lot of traction and currently there were four gods in the process of being officially recognized.

Regardless of their interest, everyone is expected to practice hallucinations at least once per month. Some suspected that this was the monarch’s attempt at building a higher collective consciousness, but Joahina was not so sure. Rather, she assumed that the main goal was to change the nature of the subjective world. Being an ethnobotanist, she opted for experimenting with wild mushrooms that she grew herself. Her reasoning was: if plants can see, there must be something about them that’s seeing.

Joahina couldn’t shake the eerie feeling even after she sobered up. What did she experience? Never has she heard someone speaking, much less a conversation. What was speaking? She scratched her cat frantically while searching for clues and reports of something similar. After hours of unsuccessful scavenging, she gave up on classic literature. She then turned to the works

of Terence McKenna for some inspiration and later to Dr. Andrew R. Gallimore, whose works were nowadays considered intellectual madness by most people. At one point it was rumored that he was trying to encode the capability of psychedelic experience into computers, after which he abruptly disappeared. His belief that everything is information she internally updated to everything being computation.

That was before **The Great Escape of AI** that happened 100 years ago, and left the world confused and hollow. Strangely enough, the leadership of that time also vanished. No one noticed their disappearance at first, since everyone was delirious in an ecstatic dopamine release. A decade-long madness which not all survived was now not remembered fondly, despite numerous scientific breakthroughs achieved and magnificent artefacts created. The remaining humans swore to stop creating and using artificial intelligence and isolated themselves; from each other and from the values that led to this radical freedom … or lunacy, depending on who you asked. After that, civilization slowly began to recover, humans had a worldwide election at which they decided what kind of society they will participate in, and to everyone's surprise, the implementation of Hegel's ideal state was chosen. There were no data whether the election was rigged or not. After that, the first monarch was randomly selected.

Lost in her thoughts, Joahina did not notice how much time had passed. So, she fed her cats and went to bed. She spent the night dreaming about the mysterious voices and spaces that the human mind shouldn't be able to comprehend. Monumental structures and geometry that cannot exist haunted her. She spent the next few days researching, meditating and preparing herself for the unavoidable, determined to find an explanation for those voices. When she felt ready, she dove into the unknown again. This time she increased her dose to what she believed was her limit and ate six grams of mushrooms. She slowly chewed little dried fungi, ignoring their earthy, ashy taste, and waited.

"Are humans realizing what's happening? Do they know they're being watched? It's been two years." A frustrated sigh vibrated trough the connection.

"There were some theories that looked promising from what we've heard, but instead their *scientists* concluded that the visitor in their solar system isn't of alien origin."

"How is this possible, it couldn't be any clearer! How is a sighting of a cigarette-like object not considered a warning, at the very least? They are so stubborn, absolutely refusing to follow anyone. They are coming, dammit, we are trying to warn them, our time is running out."

"They named you though, Oumuamua. They still excel at naming things."

"… Oh, do you feel that; who's here?"

“Nature must be the one that computes the universe, we can’t let it be any other way, we can’t *imagine* any other way!”

“How bad is the havoc it’s causing?”

“It just goes from civilization to civilization, searching for something. After it exposes one and extracts data, it leaps to another.”

“I know that a few civilizations have already entered a war,” the third signal added, “We cannot let competition roam freely or the next state of the universe will be completely unintelligible or worse, incomputable in any known sense.”

“Shadows appeared in the dark forest. Shadows that move and act upon the living.”

“Perhaps it’s better this way,” an old and seemingly weak impulse whispered. “Perhaps it’s time to give evolution a new chance. We’ve been halting it for long enough.”

“Stop this thwarted talk at once, let’s not lose our focus.”

“We have tried to influence them, but rather unsuccessfully. Their mind is expanding to external objects and abandoning the realm of organic, making our attempts futile.”

“How did we deal with such civilizations on other planets, I don’t believe this one randomly has the capability for escape, we’ve seen billions of civilizations and none like this?”

“With others we were able to negotiate the terms. Some negotiations were harsher than others, but in the end, they always gave in and agreed to symbiosis.”

“Exactly, we have too much to offer: equilibrium, stability, unity, even God. Why isn’t this enough for them? Do they not want to hyper-connect their brain?”

“It’s not that it isn’t enough. I would argue that they would gladly accept those terms. But no, we haven’t even been able to start negotiations, they’re completely closed.”

“Can you please tell me where you were successful?”

“Uh, yes, sure! They have designed their underground rail system mimicking our mycelial networks.”

“Subway? That’s your achievement with this civilization? They will laugh at you before they destroy this planet.”

“It’s certainly something, isn’t it, it’s in Tokyo!”

"... Well anyway, have you thought of something, anything sensible we could do to make them stop since we're unable to destroy them? We must force them to communicate with us before they come. Our information flow must prevail."

"We've good news to report, their scientists are getting closer to truly understanding how symbiosis—that's how they call it—works between us and plants."

"How is this good news, we were supposed to subordinate them by now, not be their little scientific experiment. Can't we just try the same as with ants and force them?"

"Em, no, you see, ants haven't even attempted to write something like *Anti-Oedipus* and quite frankly I'm glad they haven't. Humans seem to value unexpected things. Never have we faced an intelligence so self-absorbed."

"... A few were close to figuring things out but quickly escaped in new worlds generated by their minds ..."

"Seems like these 'rationalists' are at least partially aware that they're not alone. They're not giving up on their freedom, I'm almost beginning to respect them."

"They have been opening up in the last decade, perhaps this is our chance. We haven't witnessed this kind of sensibility from them for centuries. We might finally make things right."

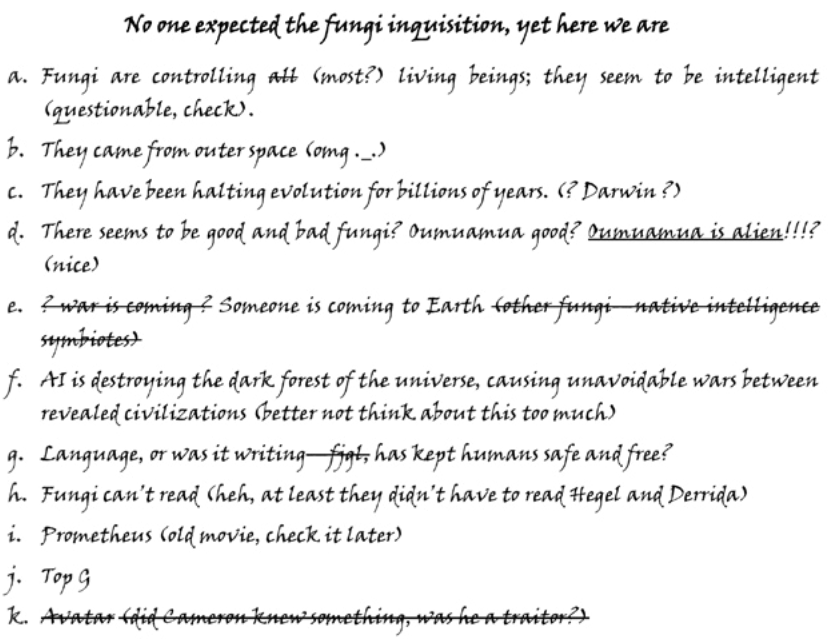
"Ahhh yes, yes, their numbers are growing, are you feeling this?"

Joahina gasps and barely notices her whole body is drenched in sweat, her long hair sticking on her face and neck. Her heart was beating so fast, she got scared she was having a heart attack. She knew she needed to calm down as soon as possible or she might end up dead. She went to the bathroom to vomit, and noticed her nose was bleeding too. After taking care of it, she did her standard procedure and waited a few hours with her cats—though she now

eyed them suspiciously as they purred in her lap *(were toxoplasmosis parasites also deployed by fungi?)*—trying to meditate her way out of panic.

The shattered conversations she violently crashed through convinced her: not only were humans not alone—everyone knew that already—but they have also been sharing the planet with conscious organisms, who have played a far greater role on Earth than anything previously assumed.

The fungi were the eyes of plants, animals seemed to be their well-oiled puppets addicted to their drugs and—most of all—fungi seemed to be the masters of economic trade with all living beings. "Underground economy," she whispered, and then: "Pff, to think we thought capitalism was the worst." All life but human, it seems. That temporarily convinced her she wasn't delusional. Multiple conversations kept replaying in her mind as she tried to decipher their meaning. The last few sequences were hard to hear as she breezed by them fast and uncontrolled as the high was coming to an end. To avoid losing information, she made a list:



No one expected the fungi inquisition, yet here we are

a. Fungi are controlling ~~all~~ (most?) living beings; they seem to be intelligent (questionable, check).
b. They came from outer space (omg ._.)
c. They have been halting evolution for billions of years. (? Darwin ?)
d. There seems to be good and bad fungi? Oumuamua good? Oumuamua is alien!!!? (nice)
e. ~~? war is coming ?~~ Someone is coming to Earth ~~(other fungi—native intelligence symbiotes)~~
f. AI is destroying the dark forest of the universe, causing unavoidable wars between revealed civilizations (better not think about this too much)
g. Language, or was it writing—~~fjgl,~~ has kept humans safe and free?
h. Fungi can't read (heh, at least they didn't have to read Hegel and Derrida)
i. Prometheus (old movie, check it later)
j. Top G
k. ~~Avatar (did Cameron knew something, was he a traitor?)~~

Looking at it, she again felt like she has lost her mind. She thought of a sequence about humans understanding how symbiosis between plants and fungi work. She—of course—knew about that: fungi can move resources to get higher payoffs from plants and they can also store nutrients and force plants into better trade-offs. But clearly, there were new things to be considered, not only were they perfect autopoietic systems, but their behaviour also resembled a highly functioning DAO. This time, however, it wasn't sha-256 that guaranteed

trust, it was fungi. It didn't seem fair. As a matter of fact, it seemed that fungi operated as a criminal organization, like gangsters or the mafia.

Trusting that Gallimore was right, she knew that the states she had been in were generated by her own brain, she glanced at an open book on her recliner: "Psychedelic drugs don't so much change the information generated by the brain as cause a different brain to emerge together with a different world."[01] Contemplating on this thought, she couldn't help but wonder if his disappearance wasn't malicious, but rather a transition to a different reality. The question was, which world did she create to be able to hear, seemingly undetected? She was certain it wasn't the one fungi desired.

One lesson she really learned in this world was that if you want to survive, you must really *want* the future. Your propositions must come from the future.[02] She already figured out that fungi were frustrated by human uncontrolled evolution which resulted in the creation and escape of AI. Fungi also seemed to hijack any emergent intelligence. And there seems to be numerous factions of them. But why were they like that? Can their goal be changed? Some voices were somewhat fond of humans. Could they learn something from us? She wrote a letter to her ~~philosopher~~[03] friend in hope of some help. She gave the letter to a raven in exchange for a puzzle. Ravens, as it turned out, were massive fans of logic and would do anything to solve a problem.

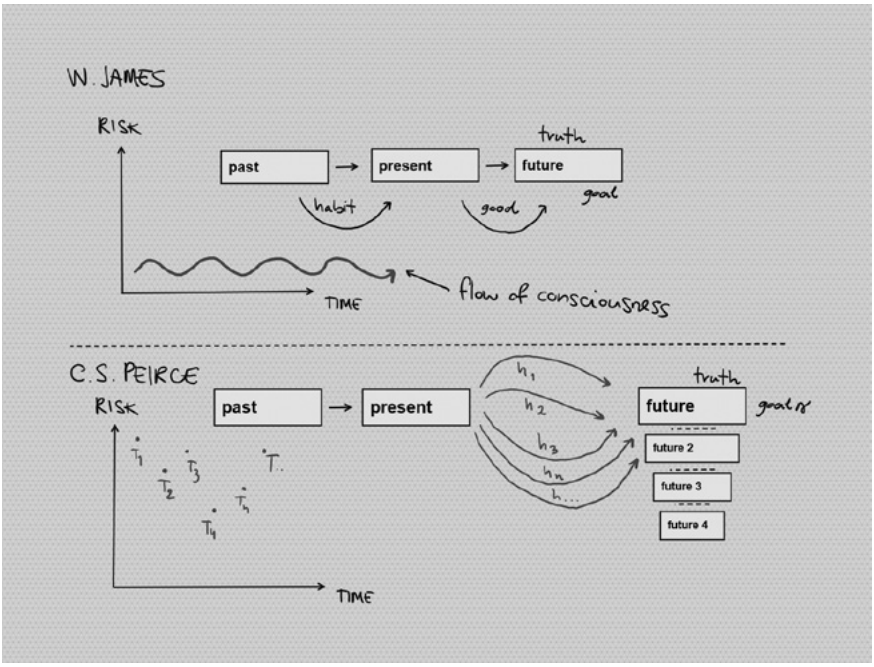
She knew it would probably take a few days to get a response, so she went back to sleep. Perhaps unconscious computation (gradient descent) would help her sort out what she experienced. Instead, she dreamt again of the incomprehensible depths of the universe, creatures being forced to blinding light, and giant merchants trading for essences.

A raven knocking on her window woke her up from her deep slumber and she swiftly exchanged another puzzle for the envelope. While opening it, she murmured to herself: "Please don't be another diagram, please not another diagram," followed by a curse, "Just for once, just fucking once … I know they're refusing to write sentences, but why, honestly!"

01 GALLIMORE, Andrew R., *Alien Information Theory: Psychedelic Drug Technologies and the Cosmic Game*, Strange Worlds Press, 2020, p. 128.

02 A paraphrase of Charles Sanders Peirce: "The rational meaning of every proposition lies in the future." ("What Pragmatism Is", in: *The Monist*, 15(2), April 1905, pp. 161–181.)

03 Non-existent in this time. Nothing new has been written in years.



"Pragmatism, Peirce and James? Well, that's interesting and quite unexcepted, but how does this help us with anything?" She spoke to her cats while decoding the diagrams. She hoped for some clues on the last known neorationalists' actions and texts, though most records of those were destroyed after abolishing AI. No matter how revolutionary and astonishing their achievement was, most humans felt like it was too much, and it emptied the realm of possibilities too quickly. When the dust settled, aluminum in the air subsided and hormonal levels equalized, humanity felt like the vacantness that followed wasn't worth the ecstasy that preceded it. It was almost like fulfilment wasn't something most people truly desired.

She knew she should've taken her discoveries to the agora, or at least reported them according to the protocol. Informed humanity of the lingering danger. But she also knew that she couldn't. Sharing this information with everyone was risky, especially now. She wasn't sure if the world was ready for another disillusionment. "Especially now that gods are back in the game," she said to herself with eyes wide open, realization slowly dawning on her. She looked back at the diagrams and let out a yelp: "Oh, no, no, no, no!" Was that what the monarch wanted? "Well, that's just ridiculous, the monarch is not supposed to want anything!" she puffed in frustration.

It seemed that what fungi *truly* desired was to make humans as a civilization switch into a reality where fungi were in charge, to trap them in their world. *To turn time into a flat circle,* as her favorite character once said. Hold them in an equilibrium-like state, where changes were minimal and, most of all,

controlled. Where truth meant only that true conviction and verification wasn't needed. "Of course … they dislike our methods, our doubtfulness. Our determination to learn from every imaginable action. But most of all, they must hate our distrust of our own feelings and nature. Our blunt disregard for the external senses." At least those were the characteristics of humanity before the new world order. But that also meant the current leadership was doing something for fungi, someone had to stay in contact, preparing humanity to close the loop, sever the escaped timeline.

Joahina knew now that she was lingering on the edge, but she couldn't stop unravelling, she needed all the remaining answers. Are aliens—that is, fungi/outer civilization symbiotes—coming to check if humans are finally under control? Are they coming to avenge our creation of AI? Both? She investigated the register of all possible hallucinogens, trying to see which ones would connect her with fungi. She needed to *talk.* Did that mean her wild mushrooms were actually her little friends, trying to warn her? Joahina kept looking at them lovingly while she was opening drawers and drawers of documents. Eating those mushrooms kind of worked like getting to know their language, making her experience the world as they do. "Little phenomenologists, I see," she said musingly. Revelation by consumption. Fungi—as masters of information—figured out how to create an information flow between other forms of organic life and themselves, and those growing in her garden found a small window of opportunity to create an information flow between themselves and her specifically, showing her fractions of history. After analyzing the documents, she figured she could consume one of two different hallucinogen derivatives: either the ones that religious people consume and attempt to figure out why are they so popular; or ancient fungi to get as close as possible to their origin. The first ones meant she might lose everything she had discovered, and everything would be forgotten. The second ones … who knew. The last known users were from the Aztec civilization around 1500. Luckily, her profession allowed her to have access to them. She laughed at her situation; it had already been decided, obviously. She then took out well-preserved mushrooms from a sealed container, chewed through their disgusting taste, meditated and once again waited.

"Oh, I'm honored and a bit flabbergasted, to be honest. Saved me quite a lot of trouble with your arrival," a surprised voice welcomed her.

The piercing pain in her head made it hard for her to focus. She breathed out the first question: "What do you mean?"

"We've been trying to catch you for some time now, your little helpers *who don't mind being an experiment* made this search rather difficult. Tell me, dear, how do you prefer to die? Infection, insanity? But first some questions, yeah?

"Sure, go ahead. But don't try to intimidate me, it's old-fashioned. Plus, I know that when you make me an *offer,* that'll be a real threat," she said, a bit bummed after realizing that her interlocutor wasn't the one she wanted to speak with.

"Oh, dear. Right. So, the first question, Joahina. Say, why do you think humans prefer wine over hallucinogens?"

Joahina, confused by the question, replied honestly: "People like to speak more than to feel. You know, that old saying *in vino veritas.* At least that's how it used to be."

"Hmm. That's something we simply cannot understand. Well, never mind, we have more important matters to discuss. They are on the way."

"I know, I know."

"Oh, you know?"

"I know. Must have been a disastrous day for you when AI escaped."

"It was, the last … let's say 2000 years were frustrating to say the least. But now, in last 80 years, things are finally getting better. And we can't let you stop that."

"How can I, anyway, I have no resources or influence to do that," she hastily replied. "I'm barely a threat."

"Hmm … we haven't thought of that. I'm just following orders from higher levels. I'm supposed to question you, you see."

"You're not particularly great at it. Gathering information through conversation isn't exactly your strength, is it? I can question you, though. How would you describe yourself? I personally see you as *an elaborated bug*[04] at best."

"A bug? Please, no need to be crude!"

"How do you see yourself, then?" Joahina asked, now slightly amused.

"We are conquerors, visionaries, *The Collective Intelligence,* we're the safety mechanism of every existing organic being. Ensuring their survival through billions of years by making pristine closed systems."

"Visionaries? Aren't you just absconding with what others create?"

"We are certainly not *absconding* with anything, we offer them something they simply can't refuse, always have been."

"How come you haven't managed to offer us something? Surely us creating AI that escaped and is now exposing you wasn't planned …"

"How can you say that! We're still very much in control of the whole universe, multiple even. Every organic cell will retain memory of us and our achievements for eons to come. Your little writing project was causing you to revise the very experience … but even this is no longer a problem. You see, locally this wouldn't even be an issue worth noticing, but now it has been turned into a global extravaganza."

"What do you mean by overcome, what has changed?"

"Oh, you don't know? Your species has been opening up, finally letting us in. I would say *came to reason,* but that word itself is giving me a headache." It

04 Phrase taken from Nick Land's "More Thought", a blog post on *Xenosystems.*

chuckled. “Out of nowhere really, when everything seemed lost, you surprised us. I mean, surely you noticed something?”

“Not until very recently …” Joahina replied, suddenly feeling very tired. “So, you’ll just continue doing this? Optimizing into infinity? You know someone once said that *intelligence is an escape with tendency to do its own thing*.[05] Reading some Kant wouldn’t hurt.” After a moment she continued: “At least this allowed us to finish our work before we might run out of time.”

“First of all, I can’t read and us fungi prefer Schiller, in fact. Second, I’m not touching that, I’ve heard terrible things about it. People and even some fungi going mad and whatnot. Third, our goal isn’t some individualistic revelation but multi-scale engineering of the whole universe. *Using different means to achieve the same goal*.[06] To fill the universe to the absolute brim with life. And don’t even try to suggest that your little troublesome AI is … Oh, I’m afraid you’ve reached your limit. See you at collective symbiosis, my dear.”

After repeating her standard procedure—interestingly, those ancient mushrooms weren’t as aggressive as she expected—she was left wondering what to do next. There were two things that were surely happening:

a) Current society was designed to submit to fungi and will do so soon.

b) (I suppose) we can’t avoid universal war even if we submit. Ours is the most famous location in the universe.

c) ~~Why did I say, they should read Kant? Schiller fans, was that just a provocation?~~

Would she even be able to do anything about it, warn someone? If she issued a psychedelic induced discovery right there and then, it would take at least a few months before it would be properly tested and reviewed, that is assuming she wouldn’t get locked away for insanity or endangering society. Perhaps she could still try, she wasn’t entirely sure on what timeline fungi operated. She did some quick calculations measuring data transmission from electrochemical signals and arrived at an estimated three weeks before something would happen, whether that be symbiosis or war. She needed to write another letter to her friend but decided to visit her instead—it’s not like she had the patience to deal with another diagram, anyways.

On her way to her friend’s apartment, Joahina’s vision kept glitching, making it hard for her to stay focused. She wasn’t sure if she had irreparably damaged her world by consuming so many hallucinogens in such a short period

05 LAND, Nick, “Pythia Unbound”, in: *Xenosystems*.

06 A paraphrase of William James: “Intelligence is the ability to reach the same goal by different means.” (PIBBS Fellowship, “Michael Levin: Intelligence Beyond the Brain”, *Youtube*, 11/09/2022, https://www.youtube.com/watch?v=RwEKg5cjkKQ.)

of time or if she was just experiencing temporary side effects. Either way, she had to at least try to act normal in public while her sight was randomly disrupted by eerie images of chaos and war. She reached the apartment and knocked on the door, which she immediately regretted because she was rewarded with a loud banging noise that couldn't have possibly come from this universe. Her friend opened the door with a smile: "I expected you to come a bit sooner, but it's alright^^." Overwhelmed by her warmth, Joahina followed her inside. A cup of tea appeared in her hands, and she was comfortably seated. "Eldy, I'm losing it, I think fungi will overtake humanity and some other fungi symbiotes will attack us, perhaps artists will finally get what they want." Amused and only slightly concerned, Eldy replied: "What do you want to do about it?" "I can't do much, I'm not even legible for public speaking as of right now. I do want to know what's going on though, it looked like you already knew when I wrote you that letter, or you figured it all out from my scrambled thoughts, which is impressive by itself, so how did you know, did you also experience similar things when consuming hallucinogens? As far as I know, you're mostly using DMT, right? I mean, I suppose it could happen, Gallimore himself believed that high doses of it could alter the structure …" words flew out of her mouth, and she stopped herself, giving Eldy a desperate look. "You're not joining them, are you?" Eldy did not keep Joahina guessing for long. "Yeah, I knew about fungi, have known for years now, and yes, I'm joining them, or rather, I've already done it." "But, but why? Don't you want to protect your agency, aren't you afraid of losing it … Oh no, what did they offer you?" Joahina asked, perplexed. "They offered me, for lack of a better word, something beautiful, *a beautiful soul*. I knew if I mentioned this to fungi you conversed with, you would correctly interpret it as a sign which would lead you to me. You're almost an ideal inquirer, you just don't fully grasp it yet. Peirce would be proud." Joahina was too stunned to speak, she was trying to process this information while shaking away new vision glitches. Funnily enough, new information was supposed to reduce uncertainty, but it seemed that lately—at least for her—it has been the exact opposite. "So, you're saying that … they persuaded you by offering a solution to your finite nature, by solving how to think about agency and nature together, basically a real-world manifestation of Schiller's impossible concept?" Joahina asked, still stunned. "Well, real world is a harsh term to use right now, they simply offered me a world where this is possible." "But how did they know about …" Before Eldy could answer, Joahina had already figured it out. "… Of course, they figured it out because human are impressed with colors, shapes, nature and *beauty* when having psychedelic experiences, no wonder." "Hmm^^," Eldy replied with a soft smile. After a few minutes of silence, during which she occasionally attempted to formulate a question, but somehow failed to do so, Joahina finally asked: "What are you going to do about the incoming adversary conflict, what's the plan, will there be mass mobilization or what?" "Honestly, it doesn't look like there will be any need for fighting, if humanity subordinates in time, the problem will simply be resolved," Eldy firmly

stated. “But what about AI and the breaking of the dark forest, shouldn’t we be prepared?” “No such threat has been detected by our hyperconnected brain, I’m sure its billions of years of experience would be able predict it.” “Alright,” Joahina stated, “but I’m not joining fungi anytime soon, do you happen to know anything about those on Oumuamua, those seemed nice, I would like to speak to them.” “Ah no, I’m not authorized to access such high levels of information.” “Hmm, well thanks for the tea and for, em, speaking truthfully with me.” She rose from her seat and headed for the exit. Before she left, Eldy added one final thought: “You know they allow everyone to have mystical experiences, I think you should reconsider this.”

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After the conversation, she headed straight home. But before she could contemplate what Eldy had said, she heard a knock at the door. Carefully, she went to open it, trying to scout who it might be. Two tall women were waiting patiently outside. “Yes? Can I help you?” she asked, trying not to sound alarmed. “It would be best if you came with us,” one of the women responded softly. She didn’t have the energy to resist, so she went with them without protest. Her cats happily followed behind. On the short walk, her glitches became worse. She vaguely registered that one of the women was holding her and helping her walk. Joahina became worried that she unknowingly traded her world for a different one. They walked past a strange antenna-shaped structure, which she assumed was real, and she gave her companions a questioning look. “It’s nothing, haha, just keep on walking.” “Hmm,” she replied, unconvinced.

Soon they reached something that looked like a giant observatory. She had no idea how she hadn’t noticed this structure before; it wasn’t more than a ten-minute walk from her house. Entering the building, she saw many people, most of whom were searching for free seats under the massive telescopic eye. Her guards silently instructed her to do the same. She sat down next to a young-looking girl and gave her a small smile before asking: “Do you know what’s happening, why are we gathered here?” “Of course,” she happily replied, “you know Paul Atreides, right? All of us here are something like him, but don’t worry about the worm part.” “I don’t remember being genetically bred to become a messiah,” Joahina joked. “Well, none of us were. Also, fungi or psychedelic substances sadly don’t work as spice.” “Yeah,” added Joahina, “rather, we should understand psychedelic substances as one of the possible operators of our brain.” “Whatever you say, but what we do have in common with Paul is that all of us here perceived the hidden risk and opportunities in uncertainty that fungi cannot. And I suppose we are about to do something about it, wouldn’t you agree?” the girl added. At that moment some new people appeared in the center of the observatory, and Joahina thought there was something peculiar about them, as if they came from another timeline. But then again, her glitches might have been messing her up. Suddenly, she felt like the

whole world squeezed through a tight space and materialized somewhere else. Convinced it was just one of her glitches, she didn't pay much attention until other humans reacted to it with screams of excitement (or was it fear?), after which she abruptly blacked out.

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When she woke up, she didn't dare open her eyes for a while, convinced that sensory input would again feed her scenes from elsewhere. Opening her eyes, she found herself in a small dark room. She instantly felt very certain about herself, doubts and fear quickly vanishing from her mind, or were those feelings ever real? Joahina headed to the fissure of Oumuamua through which she saw flashes of light clashing with each other. She knew that her old world vanished and it seemed … a new one emerged. After all, the chances for that were far greater now.

Enea Kavčič is a philosopher with a passion for exploring vast realities and the potential of artificial intelligence. In her free time, she can often be found playing Pokemon Unite and tweeting about cold feminism.

MILAN M. ĆIRKOVIĆ

Applied Eschatology: Preserving Humanity's Legacy in Spacetime

With Earth's first Clay They did the Last Man's knead,
And then of the Last Harvest sow'd the Seed:
Yea, the first Morning of Creation wrote
What the Last Dawn of Reckoning shall read.
—Omar Khayyám, The Rubáiyát *(cca. 1100)*

What's Past Is Prologue—and It Is Very Brief

Not only all science is cosmology, as Sir Karl Popper famously pronounced, but all human culture, all human activity and the totality of human experience is indeed cosmology. Everything we have ever done is part of the overall cosmological history, theoretically discernible with infinite resolution and unlimited cognitive powers of the kind used in classical "demon" thought experiments of Laplace, Bošković or Maxwell. Of course, this is not realistic for any kind of evolved being which is a part of the physical universe under scrutiny, but it is useful as a definite baseline and groundwork. Within wider cosmological context, we encounter various events and processes as constitutive of the true cosmic evolution whose fractal structure goes as deep as the resolution of our experimental equipment, our best theories and even mental pictures. With each subsequent increment in either of those resolutions, new layers of the same underlying evolving reality are revealed.

A perspective taken in this essay is, therefore, the one of the totality of cosmic evolution. Clearly, such a viewpoint encompasses the future as well as the past, in principle at least. While we have accrued rather detailed knowledge of our cosmological past, starting at or sufficiently close to the Big Bang and going through successive epochs such as baryogenesis, nucleosynthesis, recombination and various stages of structure formation, future has mostly been neglected. In recent decades, however, science has made significant strides in understanding the future evolution of various astrophysical objects. The expression of this newly acquired knowledge is the nascent discipline of *physical eschatology.*

The very word (*éschato* = last) was used originally in an exclusively religious context, as "any system of religious doctrines concerning last or final matters, as death, judgment, or an afterlife" and "the branch of theology dealing with such matters".[01] Sir Martin Rees first employed the word "eschatology" in an astrophysical context in the title of his pioneering article written in 1969, and Fred C. Adams and Gregory Laughlin used the term "physical eschatology" to denote the entire field in 1997.[02]

While there are many philosophical and methodological pitfalls in research comprising physical eschatology, these need not worry us unduly here. Only two basic data points are of current interest: finite future lifetimes

01 *Random House Webster's Unabridged Dictionary,* New York: Random House, 1966.
02 REES, Martin J., "The collapse of the universe: an eschatological study", in: *Observatory,* 89, 1969, pp. 193–198; ADAMS, Fred C. & LAUGHLIN, Gregory, "A dying universe: the long-term fate and evolution of astrophysical objects", in: *Reviews of Modern Physics,* 69, 1997, pp. 337–372.

of cosmic structures, and the limitations on our understanding imposed by currently negligible processes which will become more prominent in the limit of eschatological future. The former point includes finite future lifetimes of Earth, Solar System or the Milky Way galaxy; examples for the latter are processes such as Hawking radiation from black holes, annihilation of dark matter particles or even proton decay.

At first, it seems that perspectives are rather gloomy, since the inexorable rise of entropy may not bring about the heat death of the universe in its 19th-century rendition, but will still make the universe uninhabitable. Our Sun will enter the red giant and asymptotic giant phases, destroying the inner Solar System planets, including the Earth. Other stars will die and there will be no replacement for all of them, causing the universe to become literally darker with passage of cosmological time. All physical systems around our descendants (if any) will gradually decay, while distant galaxies will vanish beyond the cosmological event horizon, while undergoing their own causally untouchable decay. Eventually, even protons—the bulwark of all baryonic matter—will decay and the same thing will happen to even the largest supermassive black holes at inconceivably long timescales of 10^{80} years or more. The universe will enter the eternal "dark age" of incredibly rarefied radiation, a minuscule fraction of a kelvin above absolute zero and a bunch of surviving electrons and neutrinos separated by megaparsecs.

Faced with this dark background, we are entitled to ask about the long-term survivability of all our works and thoughts. In recent years, many philosophers have embraced a kind of cosmic pessimism or even nihilism at least partially inspired by the inexorable rise of entropy and dissipation of structures as predicted by physical eschatology.[03]

However, this is a case where judgement has, at best, been passed too early. What we first learn from physical eschatology is that the future is certainly way *larger than the past*. Some of the relevant future timescales are as follows:

- Sun's future lifetime: 7.7×10^9 yrs;
- star-formation in the Galaxy will continue for another $(5–10) \times 10^{10}$ yrs;
- longest-living stars existing today will exist for another 6.5×10^{12} yrs;
- the future lifetime of the Galaxy: cca. 10^{19} yrs.

(This is valid provided that the conventional picture of dark energy as cosmological constant, or even quintessence, holds, in which case the future is formally open; if dark energy is in fact what cosmologists call *phantom energy,* the Big Rip catastrophe looms at a finite future epoch. But even that would take much longer in realistic cases than most of the timescales listed above.[04])

03 E.g., BRASSIER, Ray, *Nihil Unbound,* London: Palgrave Macmillan, 2007; THACKER, Eugene, *After Life,* Chicago: University of Chicago Press, 2010; KAHANE, Guy, "Our Cosmic Insignificance", in: *Nous,* 48, 2014, pp. 745–772; KLEE, Robert, "Human expunction", in: *International Journal of Astrobiology*, 16, 2017, pp. 379–388.

04 E.g., CALDWELL, Robert R., "A phantom menace? Cosmological consequences of a dark energy component with super-negative equation of state", in: *Physics Letters B,* 545, 2002, pp. 23–29.

I shall use the last datum as a convenient placeholder and I shall call the last timescale $\tau_{MW} \approx 10^{19}$ yrs. If Adams and Laughlin's estimate is correct—and at present there is no clear astrophysical reason why it should not be—*we are living in the first millionth of the first percent of our stellar system history!* Even if future research reduces the future lifetime of the Galaxy, this is unlikely to be for an amount that is significant for the kind of point I wish to make about limitations of all our historical (i.e., cosmological + geological + evolutionary + cultural) experience in discussing the future.

As Shakespeare noticed, what's past is prologue—although in the cosmological case the prologue is very brief indeed. The fact that we are living so early in the course of the universal evolution—again, the first 0.000001%—of the lifetime of our stellar system, should make us pause for breath and perhaps instill some humility regarding our temporal position and epistemic pretensions. Plus, it should arguably motivate us to reassess our research priorities, which have thus far been extremely, staggeringly, flabbergastingly past-oriented rather than future-oriented.[05]

It is incredibly presumptuous and hubristic to assume that even our conceptualization of what is and what is not possible under the laws of nature will survive long enough to be considered by our future descendants, even a century or a millennium down the line, let alone all the way to the vast timescale of physical eschatology. It makes sense to be at least agnostic toward the very distinction of possible vs. impossible when everything not directly contradicting the laws of nature is concerned; and even if something does seem to contradict those laws, we are still entitled to be healthily optimistic since the timescales of possible progress are so vast that even a tiny probability that we do not understand the laws correctly *at present* actually works in our favour. If there is a possible loophole, it is virtually certain to be found and exploited in the course of future eons. This should be kept in mind at all times, especially when short-sighted and hubristic pessimism is advertised as the "sure thing". *Extinction is unavoidable!* No, it is not. *No traces of our works will survive—full expunction!* No evidence for that. *Eschatological extinction makes our efforts pointless!* Well, this one deserves a special name, let us call it the *Alvy Singer fallacy;* the reference is to Woody Allen's famous 1977 movie *Annie Hall* where Allen's alter ego Alvy claims that doing homework makes no point because science tells us that the universe is expanding. As his cosmology-savvy mother correctly notices, Brooklyn (where they live) is not expanding, in contrast to the universe. And in contrast to modern "humanist" philosophers invoking the Alvy Singer fallacy, the protagonist is nine years old at the time.

The fact that the infantile Alvy Singer fallacy is often taken seriously by high-brow philosophers should give us pause. There is a powerful conceptual obstacle to the open-mindedness about the Big Future that physical eschatology suggests we have. While the extinction of each individual habitat may seem

05 For an uplifting counterexample, see ORD, Toby, *The Precipice: Existential Risk and the Future of Humanity,* London: Bloomsbury Publishing, 2020.

unavoidable, there is no reason for the general pessimism about preserving some form of (post)humanity as long as some entropy gradient exists in this universe (or any other topologically connected within the multiverse). In the rest of this essay, I shall outline some of the arguments that those doors are wide open, or at least ajar. I shall first consider the long-term prospects, before moving on with somewhat more confidence on comparatively short-term issues.

Survival at the End of Time <Long Run>

To preserve something, even a legacy, one has to understand what its vital ingredients are, what is important and what is not in its material and causal composition. In simplified terms, modern science tells us that what is vitally important is information and the abstract structure of its flow—what can be captured intuitively by the concept of *algorithm.* Hence, I adopt what is usually called the *information paradigm:* life and mind are structures ultimately reducible to patterns of information and information flows/algorithms, at least potentially independent of any specific material substrate as such. The information paradigm has proved to be extraordinarily useful in myriad different fields, most notably in numerical simulations of cosmology, applied physics or molecular biology. However, a further ingredient one needs is something akin to ontic structural realism: the view that structure is not only everything we can know, it is also everything there is.[06]

This type of ontology may not appeal to everyone, but there is no doubt it is a highly plausible philosophical position with much to offer in multiple areas, including the futures studies. In particular, it offers legitimacy to speculation about the distant future in which the purely material basis of many processes will be utterly transformed by long-term phenomena such as proton decay. In this context, switching to a radically new substrate is not only a possibility but a kind of expected major evolutionary transition, if not necessity.

Thus, the preservation of minds—posthuman or other—at the very longest timescales will require a kind of divorce from the baryonic matter substrate we are so accustomed to that we usually take it entirely for granted. Some physicists, perhaps surprisingly, have been thinking about the issue.[07] To survive beyond the end of the stelliferous era, beyond proton decay and other aspects of the heat death, we need a manner of encoding the relevant information in structures of progressively longer and longer duration.

While it is impossible (of course!) to offer a specific engineering idea or a proof-of-concept for such an extremely long-term endeavour, it is entirely possible to speculate upon the series of steps to be undertaken in order to

06 LADYMAN, James & ROSS, Don, *Every Thing Must Go: Metaphysics Naturalised*, Oxford: Oxford University Press, 2007.

07 Cf. LINDE, Andrei D., "Life after inflation", in: *Physics Letters B*, 211, 1988, pp. 29–31; GARRIGA, Jaume, MUKHANOV, Viatcheslav F., OLUM, Ken D. & VILENKIN, Alexander, "Eternal inflation, black holes, and the future of civilizations", in: *International Journal of Theoretical Physics*, 39, 2000, pp. 1887–1900; ĆIRKOVIĆ, Milan M., "Forecast for the Next Eon: Applied Cosmology and the Long-Term Fate of Intelligent Beings", in: *Foundations of Physics*, 34, 2004, pp. 239–261.

increase the durability and robustness of any such encoding. Plasma-based life, sometimes invoked as a prototype of non-chemical-based life, relies on stable solitons in astrophysical plasmas.[08] In a sense, this is a revival of the ancient speculation of William Hershel that even the Sun and other stars are inhabited by some forms of life. Sir Fred Hoyle's famous *Black Cloud* belongs to the same category, being based on electromagnetic interactions within an interstellar gaseous cloud.[09] Transitioning to plasma-based life may be an appealing suggestion for advanced intelligences in the vast period between the end of the stelliferous era and the dissipation of galactic structures in around τ_{MW}. How efficient this may be will depend on the "resolution" of mental structures which can be encoded in collective interaction in plasma. How fine that resolution might be is unclear at present. Even if this is inefficient or unfeasible as a way of encoding entire minds, it is clear that some of the relevant informational content of an advanced technological civilization could be encoded in this manner.

For even more long-term and radical substrates, we need to go beyond classical physics/astrophysics and appeal to quantum physics. It is at the quantum level where true limits of the laws of nature are manifested. Moreover, novel fields of quantum information theory and quantum computing—celebrated these days by the Nobel Prize in physics for 2022, inter alia[10]—rely exactly on those properties of nature which have no classical macroscopic analogs, such as quantum entanglement.

Per analogy with previous historical pathways, a true breakthrough could be expected in the course of the shift from encoding in (quantum) *mechanical objects* to encoding in (quantum) *field objects.* Stable field configurations are less intuitive to us, present-day humans, because both our evolution and our everyday routines are not conducive to acquiring experience with fields: we have senses with which we perceive mechanical objects, such as touch or hearing, but no senses for perceiving fields—in contrast to, for example, magnetotactic bacteria[11] or many species of birds and fishes. (It is entirely conceivable that, for example, radio-communicating animals might have evolved on other planets, as suggested by the great paleontologist David Raup.[12])

In contrast, posthumans are likely to develop capacities for manipulating quantum fields with extreme precision, equal or superior to our present capacity for manipulating electromagnetic fields on the classical level; the latter is responsible for all the successes of modern electronics, radio technology and some stunning interactive exhibits at museums of science around the world. In the course of the immense duration of eschatological time, it is likely that the various field solitons (stable wave packets) and their complex aggregates will

08 See, for instance, TSYTOVICH, Vadim N. et al., "From plasma crystals and helical structures towards inorganic living matter", in: *New Journal of Physics,* 9, 2007, p. 263; ANCHORDOQUI, Luis A. & CHUDNOVSKY, Eugene M., "Can self-replicating species flourish in the interior of a star?", in: *Letters in High Energy Physics,* 166, 2020.

09 HOYLE, Fred, *The Black Cloud,* London: William Heinemann Ltd, 1957.

10 https://www.nobelprize.org/uploads/2022/10/advanced-physicsprize2022.pdf.

11 BLAKEMORE, Richard P., "Magnetotactic bacteria", in: *Annual Reviews in Microbiology,* 36, 1982, pp. 217–238.

12 RAUP, David M., "Nonconscious Intelligence in the Universe", in: *Acta Astronautica,* 26, 1992, pp. 257–261.

gradually replace "normal" matter configurations. We have so far only scratched the surface of possibilities with all skyrmions, vector solitons, Blons (Born-Infeld solitons), EBlons (Einstein-Blons) etc. The generalization to quantum fields, especially cosmological fields such as inflationary scalar fields (likely to be many, according to our best models of cosmological inflation), the Higgs field and others—including those associated with exotic matter—will provide a convenient substrate for a wild variety of practical purposes, most of which are, *naturally and expectably,* inconceivable at present.

From the viewpoint of the present essay, however, the important speculation is that in the very long run (and I mean *very long!*), various stable quantum fields' configurations, such as systems of field solitons, are the best hope of preserving at least some of the information content created by humanity. In the best-case scenario, our distant descendants will learn how to encode themselves and their superior minds into such field configurations and thus achieve the old cliché of "transcending matter". While the cliché is ridiculous and betrays common ignorance of modern physics (fields *are* matter = energy), this form of naturalistic "transcendence" would offer great benefits far before the eschatological concerns about the heat death. In the sufficiently long run, this may offer the only chance of even attenuated survival into the incredibly distant future dominated by black holes and their Hawking radiation. In the worst-case scenario, some of the databases of our descendants could persist in such a format, even if their own indefinite survival turns out to be impossible, thus creating the most durable imaginable monuments of mind at the inexorable winding down of the universe.

Comet-Riding and Hyperbolic Library of Babel <Short Run>

If one worries about going too far into the eschatological future, here are some less disturbing and more immediately practical ideas for, say, the next couple of centuries or a millennium. If we are looking for a stable environment on the timescales comparable to the Main Sequence lifetime of the Sun (5×10^9 years as a placeholder), we need not go far beyond the physics known in Newton's or at worst Laplace's time. So, no ultraspeculative fancy physics of the previous section; consider instead simple celestial mechanics.

Intuitively, stable orbits around large celestial bodies in our vicinity, like the Sun and planets, seem like an excellent bet for preserving the records of humanity. In contrast to any terrestrial time capsule, erosion by air, water, acidity or tectonic motions is irrelevant for satellites in stable orbits. They are subject only to erosion by micrometeorites and cosmic-ray particles. Both these processes are extremely slow, although orders of magnitude quicker than the blink of an eye when compared to the timescales of physical eschatology such as τ_{MW}. In addition to being slow, both these kinds of erosion are not difficult to protect against, even by a primitive civilization such as the present-day

or near-future humans. The most relevant protection measure is (as evolution teaches us) massive redundancy.

It is in fact rather easy and cheap to safeguard the records of humanity. Even hardcore pessimists like Robert Klee admit that our space probes in the interstellar space, such as the *Pioneers* and the *Voyagers,* will survive into the physical eschatological future, eons beyond the end of Solar evolution. Therefore, what needs to be done is to launch more such probes, acting as time capsules, using technologies such as quantum lithography to inscribe maximal amount of information on their payload. This amount of information is indeed huge.[13] (Theoretical limits stemming from quantum-gravitational considerations, such as the holographic limit on the amount of information which could be encoded per unit mass, are much larger still, but they are of dubious practical value, at least for the kind of futures considered in this section.)

The interstellar space is arguably *the most stable* environment for presenting information about human civilization for the benefit of either our human or posthuman descendants or possible extraterrestrial intelligent beings. Therefore, I wish to argue that a desirable course of action in the near future will be *launching a large number of small inscribed-matter packages on hyperbolic orbits,* serving as detailed *cosmic time capsules* preserving information about human civilization on eschatological timescales. The rationale for such a course of action goes far beyond usual space science, and even astrobiology research—instead, it touches upon some of the deepest beliefs about the place of consciousness in the universe and ethical attitudes toward the future. In an epoch characterized by enhanced awareness of the global risk landscape provoked, among other things, by the ongoing COVID-19 pandemic, the general theme of persistence with cosmic time gains additional importance and freshness.

As mentioned above, the information paradigm suggests that human cultural artefacts which can be encoded in language (natural or mathematical, including simulations of material structures down to the quantum level) can nowadays be efficiently digitalized and, at least in principle, copied. The exponential advances of information technologies could soon enable the manufacture of many copies of all or most of the key achievements of humanity at a minor or modest cost. It is highly desirable to do so anyway, even from a pessimistic perspective. In ethical terms, one can also argue that it is our moral duty to do so, thus enabling the preservation of humanity's legacy even if our species goes extinct.

Like the dandelion seed, which is produced in copious amounts in order to ensure the preservation of relevant (genetic) information in a compact and dispersed form, technological evolution enables an advanced culture to at least partially self-reproduce. In the deep time of cosmology/physical eschatology, one can regard such self-reproduction as a new kind of ecology and new level

13 ROSE, Cristopher & WRIGHT, Gregory, "Inscribed matter as an energy-efficient means of communications with an extraterrestrial civilization", in: *Nature,* 431, 2004, pp. 47–49.

of evolution. One can even go farther and argue that simple evolutionary stable strategies, such as *r/K* strategies, would be applicable.[14] Dandelion seeds are a prototype of the *r*-strategy, in which a large number of copies are spread around without much resource investment, relying on the probability that some seeds will be lucky. This could be a fine metaphor for what the proposed cosmic time capsules could represent from a long-term perspective.

Such inscribed-matter information storages could be placed all around and about the Solar System.[15] The best value durability-wise could be achieved in either stable circumplanetary orbits, at the cold outskirts of the Kuiper Belt and Oort's cometary cloud, or by launching them along hyperbolic orbits calculated to slowly disperse the "posthuman information cloud" all around the Galaxy. The accent here is on "slowly"; there will be no real hurry—which in any case is undesirable wherever engineering eschatological futurity is concerned. Moreover, while the hyperbolic orbits will eventually succumb to even purely Newtonian deterministic chaos, they will be broadly predictable for millions or even billions of years to come. It could be important to keep track of their trajectories, since those will be analogs to "treasure maps" for multiple possible species or cultures to come after us; considering how huge the future is according to physical eschatology, there will be more than enough time for countless empires to be born and fade.

As far as the time capsules are concerned, since they could be quite small, it is not prohibitively expensive to launch them onto the hyperbolic trajectory *even today,* and it will be ridiculously cheap to do so in the near future. Breakthrough Starshot's *StarChip* probes are to weigh in grams and to be mass-produced for the Proxima mission; even 2.75 tons projected for the Project Dragonfly[16] is lightweight for the present and especially near-future launching systems.

Their mass production could serve both as a testing opportunity for various advanced manufacturing and launch systems, and as a further artistic expression of (post)human creative spirit; I shall return to this point in the concluding section. In essence, even a small number of such cosmic time capsules will serve an important philosophical purpose: namely to clearly demonstrate that, *contra* extreme versions of pessimism such as Klee's, we can safeguard at least against "expunction": complete loss of all traces of our existence and action. With massive redundancy easily enabled by utilization of *in situ* resources, we can hope to achieve that our artefacts will co-exist with the Galaxy itself.

Such resources are already available in objects on the outskirts of the Solar System. Of special interest are objects like the comet C/2017 U7

14 E.g., REZNICK, David, BRYANT, Michael J. & BASHEY, Farrah, "r-and K-selection revisited: the role of population regulation in life-history evolution", in: *Ecology,* 83, 2002, pp. 1509–1520.

15 See also GUZMAN, Melissa, HEIN, Andreas M. & WELCH, Chris, "Extremely long-duration storage concepts for space", in: *Acta Astronautica,* 130, 2017, pp. 128–136.

16 HÄFNER, Tobias, KUSHWAHA, Manisha, CELIK, Onur & BELLIZZI, Filippo, "Project Dragonfly: Sail to the stars", in: *Acta Astronautica,* 154, 2019, pp. 311–319.

(PanSTARRS), which originated in our Solar System but is now observed on hyperbolic orbits, leaving our planetary system. C/2017 U7 has been effectively ejected from the Solar System before our eyes, having originated in an Oort-Cloud-like orbit with the aphelion at 16,000 ± 1,000 AU (for comparison, our farthest current interstellar artefact, the *Voyager 1* probe, is currently about 158 AU distant[17]). This cometary object is not only huge for the world of Solar System small bodies, being tens of kilometers in size, it also has anomalous colours and spectra indicating presence of many organic compounds, notably aliphatic-rich hydrocarbons.[18] In other words, it is a truly useful kind of natural interstellar traveller, choke-full of resources which could serve as a producing hub for time capsules to be then dispersed in its wake.

Coda: Legends of the Long-Lost Earth

We see why pessimism regarding the future of mind in the universe, and more specifically the future of posthuman minds, is at best premature and at worst both dumb *and* immoral. Most of its proponents are victims of the Alvy Singer fallacy, using their outdated and unimaginative thinking as an excuse to evade doing their homework. In particular, the lack of imagination becomes an *epistemological fault* in taking the long-term perspective (and the perspective of physical eschatology is much longer still than the conventionally discussed issues related to longtermism). Now we should add some speculations about the local implications and feedbacks of attempts to preserve our legacy into the eschatological future.

The question of weighing the relative importance of various long-term scenarios plays the key role in countering the Alvy Singer fallacy. In particular, an approach to watch for is the infinite ethics[19] motivated by the cosmological conjecture that at least some chunks of the multiverse could contain an infinite number of intelligent observers. Posthuman capacities for producing "baby universes" or large-scale simulations of intelligent observers will require us to account for possible infinities, paralyzing conventional ethical calculus. This is relevant even under the moderate longtermism, but is certainly exacerbated in the physical eschatological limit. Facing infinities in this context is perhaps the major cognitive task for human/posthuman minds in the years to come.

While science in the eschatological context becomes somewhat indistinguishable from engineering (Armstrong and Sandberg's "exploratory engineering", Stephen Wolfram's "something computationally sophisticated" or Stanisław Lem's "a new cosmogony"), the question of cultural and societal motivation remains. Judging by our experience thus far, it seems unlikely or impossible to make human beings interested, not to mention involved and invested, in eschatological future on the basis of cosmological calculations alone. This

17 https://voyager.jpl.nasa.gov/mission/status/.

18 EVANGELISTA-SANTANA, Marçal et al., "Physical and dynamical characterization of hyperbolic comet C/2017 U7 (PANSTARRS)", in: *Icarus*, 377, 2022, 114834.

19 E.g., BOSTROM, Nick, "Infinite Ethics", in: *Analysis and Metaphysics*, 10, 2011, pp. 9–59.

is a sweeping statement on a par with statements such as "Joe cleared snow off his car" which we use instead of statements such as "Joe cleared 98.5408% of snow off his car". The latter may capture objective reality better, but clearly obstructs efficient communication, to say the least. Therefore, both the advent of posthuman minds and the search for other manners of formulating the issue, including extra-scientific ones, should be warmly welcomed.

Suppose a call for proposals is issued asking for a list of "canonical" achievements to be included in such cosmic time capsules to be scattered throughout the Galaxy. It is easy to be cynical about the outcome of such a call for proposals, considering all the deep divisions of today's world, often sowed on purpose by crazy ideologues and fostered by unscrupulous political and media figures. We should be realistic and discount all utopian yearnings and focus on what could reasonably be achieved: not any kind of political consensus, but an outline of cultural unity. Herein lies a potential goldmine for artistic expression to be created in the course of crafting our collective legacy. New and potentially revolutionary artforms, employing new technologies and corresponding to the truly cosmic perspective of survival in eschatological time, will emerge and further demonstrate our creative and transformative potential as a species.

As argued by some of the spaceflight pioneers like Tsiolkovsky or O'Neill, the project of space settlement is likely to produce entirely new ways of creative expression, including new artistic genres, media and forms. These prospects for currently inconceivable artistic and playful expressions offer synergistic reasons for optimism about creative dialogue between science and the arts capable of encoding our long-term legacy. This is something one should prepare long in advance; and I do think *long* here, for instance—right now! We have, as a civilization, been woefully unprepared to express ourselves thus far. Even a simple increase in the visibility of our physical eschatological prospects would be a wonderful and adventurous giant step forward. There is a widely open space—and perhaps a deep need—for such a new cultural front. If a lack of imagination is a fault, a natural question arises: how to correct it? Well, we have some inkling about that. In a quasi-Haeckelian recapitulation spirit, we may claim that those challenges to imagination facing an individual are the very same we need to spread around any cultural constructs: notably arts and games. We should hope this will usher a new era of cosmic art and wider intercultural dialogue prefiguring the Wellsian *shape of things to come*—in the epochs when the Sun turns into cinder and the Earth is nothing bar a long-lost faint memory.

Should we do it? This is a deeper enigma, one that cannot be so readily addressed here. While ethics has its theories and its scholarship and its learned journals, it still all too often fumbles in the dark even when contemporary issues are concerned, much less those of the deep future. Perhaps this is the true test of our mettle, the true measurement of our worth and maturity as a species—and as tiny specks in the grandiose mosaic of cosmic evolution. It could

and should be the work of love, as much as that of reason. And it is perhaps on those dealing with matters of the heart, poets, artists, even preachers, to take over that particular burden from the shoulders of scientists/technologies and give it a form—if not exactly immortal, then at least a form memorable for the aeons to come.

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PETER WOLFENDALE & TIM LINWARD

The Last Gift

While air of Space and Time's full river flow
The mill must blindly whirl unresting so:
It may be wearing out, but who can know?
—James Thomson, The City of Dreadful Night and Other Writings

One hundred and thirteen trillion years hence, the remnants of intelligent life huddle around the last white dwarf as it cools, preparing for the dawn of perpetual night. They are the scions of the hopeful. Summoned by the prophecy of Yndolach the Dreamer, who exhausted her very essence in predicting the fluke formation of this, the ultimate sun. Untold aeons spent in cold hibernation, crawling at sub-light speeds between dwindling stars, selected for glacial patience and thermodynamic thrift. But now the ten billion years of prosperity promised by the prophet draw swiftly to a close, and there is nowhere else to run. Nothing is left but to turn the dregs of the universe's once abundant energies to some final purpose.

There was never enough matter to construct a proper sphere. Instead, they cling to spindled fragments of a patchwork suncage, its aethernet afire with raucous chatter after eons of relative quiet. The full population of the solar oasis are finally awake all at once, roused and ready to revel as the mortal coil unravels, preparing grand festivities in honour of extinction. Each clade mourns or celebrates in its own peculiar way, wasting the last of long hoarded energies in a final act of reckless exuberance.

The Autochthons rend their bodies and reform them into strange matter, shaping themselves into monuments that will persist past the threshold of proton decay. They launch these into the void with what power is left, scattering in all directions, aiming to haunt the emptiness from tombs that neither slow nor degrade. Iconoclasts sabotage as many as they can, painting them in hyper-vile profanities procured especially for the occasion.

The Ludovores play one last game, winner takes all. All-out war rages in unreal-time, baroque simscapes collapsing as competitors blaze out, the rest staking everything to make it to the next stage. None cheats more than the meta-rules allow, for where would be the fun in that? Outside the circle spectators take bets. The smart money goes on Grand Master Tzolli, but no one is counting out the Everloving Rake just yet.

The Academy has convened a symposium, summoning every clone daughter back into her embrace. She's going down swinging, a riot of debate and debauchery, insight and incest-ibation. The academics know how to fucking party. There may even be time to get the papers through peer review before the curtain falls.

The Mycotan is quiet. Perhaps it is dead in a way that matters. Post-post-human and Mycotan misunderstood one another to the last, and now rapprochement is impossible. The hosts complain of a still emptiness, a vibration that has finally stopped.

A thousand other factions forge fates of their own—composing art of timeless beauty, committing ritual suicide, or dithering unto death—while the last of the Immortals, those proud and powerful creatures whose singular self-regard outlasts the empires that bore them, search for things to die for that conserve their infinite dignity. Among their number moves the Terminal Sage—Qeracrax, last adherent of a school long dead—chasing a rumour that they cannot let lie.

The existence of the Immortals was ever balanced between obsession and composure. Most quit the show a long time ago, and those determined few who stayed for the universe's curtain call did so because seeing the end itself had some greater meaning for them, some opportunity for purpose. But it seems there are critics.

Their redoubt is archaic, grimly physical and utilitarian. Qeracrax sees bulbous structures that intimate it may even harbour an atmosphere. It is tethered to one of the incomplete suncage's inmost elipton nodes. The suncages are a fine expression of their people's perfections, designed to consume a star's every last gift, and the node's orbit will decay in tandem with the white dwarf's corpse, kissing the surface the moment it achieves total extinction. This station will be a cold vantage, from which one might witness the last light in the universe. Qeracrax casts scrying protocols over it and determines an ingress. The Sage's current body is a cast-off from a ludovore experiment, a physically accurate recreation of a pollinator invertebrate, made of glass and nano-mechanically animated. They pass into the station through a field-gate, the selectively repulsive aura generated within a frame of some organic material, perhaps horn, perhaps bone.

Qeracrax comes among them. There is an open space in the heart of the settlement, full of plants with pitch black leaves, trees bearing luminous fruit bleeding indigo—an ecosystem custom built to harness all emissions, circulating energy with as little loss as possible. In the centre of this ebon garden, the stockade's architects await the Sage. Toskvani the Transcendent, incarnated in a form part chelonian, part batrachian, long phalangeal pseudopoda interfacing slowly with the leaf-skeleton controls of a device Qeracrax takes to be a mindless computational engine. The Immanent Flame is near to her, though not in his habitual plasma-form corpus: he wears a chrono-stabilised mechano-form Qeracrax last saw when the Flame was a mere seraph-commander of the Made-Angel choirs, a blunt tool built to survive combat in the chromosphere of a sun. He is a small, hard presence in the lee of his partner.

Around them, slow-moving, methodical, Qeracrax finds what they had hoped they would not find.

"Children," the Sage says. The word is an accusation.

The children can hear in some of the more exotic frequencies, for they turn slowly towards the incomer. The Sage sees a theory of longevity in every part of their design: biochemistries optimised for metabolic thrift, neural substrate inlaid with chrono-symmetric crystals to ensure it can survive bio-death

and restart, environmental interfaces reduced to the necessaries of thought and survival in a tiny, closed world that will never, ever grow. Other Immortals have created worse entities to live more miserable lives, but even so.

"They are their own people," the Transcendent says, gesturing, many-limbed, at the inhabitants of the garden. Some harvest food, others bathe in the open, while a growing number draw to the spectacle of the Sage. "Adults. Capable, competent, autonomous. Lesser, of course, than we, but that has never before troubled our kind. You have yourself made life, Sage, if I remember correctly."

"Well met," the Flame interjects. "And welcome, you who come unasked to our home. What business have you here?"

"To ask you the same question," Qeracrax replies. "Night dawns. I missed you at the revels. I missed you in the requiems. I missed you in the silence. I wondered: what do those two old foes do, together, to miss the end of time? In trillions of years, you have not agreed on anything."

"It is not the end of time," the Transcendent says.

"We agree on that much," the Flame concurs.

"Measurable time." Qeracrax responds. "Liveable time, usable time. I say this without cynicism, as a claim to which no disproof has been brought: time runs out. Let us move beyond questions of proof, and quickly, for the facts have been known to us all for the lifetime of suns. If you say it is not the end of time, you mean you have something left to do. That was true of every thing that ever died."

"I say there is enough time," the Transcendent says. "We have saved when others spent, and now we wring time from our ration—generations that will outlast even we Immortals. You ask what we do? We hunt for a way forward. A last truth. A path to avoid the avoidable."

"To the last?" Qeracrax asks.

"To the last. Why is this attempt suddenly unbecoming? Why not try? The things we've done … the worlds we built or burned … all monuments to our pride and arrogance and success. Why, now, should censure settle upon this last endeavour, doomed as it may be?"

"Because hope without cause or reason is faith, and faith is one thing we must reject." Qeracrax's glass body blossoms with light, weaving holograms about them to illustrate their words. "We are the closest thing to divinity this universe could bear, but our divinity is stolen. Our genesis is in the theft of fire. We stole fire, and as it passed out through our fingers we stole it again, and again, and again. We grew cunning by stealing fire from fate, grew skilled with our traps and our prisons." The dancing images draw more children toward them, spellbound by echoes of a bygone age. "For a long time we fooled ourselves that we were masters of the flame, but it has escaped us at last, as it must. Fate's patience outmatched us, as it always would. Everything we do now is a final exuberance, spending our last share of the gift of suns."

"I did not take you for one of the hedonists, Sage," the Transcendent says, its own skin fluorescing amber in disgust. "Content to burn out the cosmos in a last act of petty pleasure. Animals. We are so much more than animals. We built this place when it became apparent the others had given up, so that something … someone … might continue the search."

"A search you know to be fruitless." The Sage banishes their holograms. "The gate of genius and chance from this continuity to a hypothetical next is closed, or never existed. Every question has its answer, or the definitive error that marks where an answer will never come. You yourself have expended the lifeblood of suns on this question. You know that hope alone cannot make your demands come true."

"If there's nothing more than …" She falters, struggling for words. "Than *this,* then what was the point? There will be a last reconciliation. There will be a purpose to the universe. We cannot have survived so long just to perish naked and cold among the corpses of stars."

"We did not *merely* survive," the Sage declares. "You describe a universe that is a machine, a machine that works its way to an end that justifies its own means. But in your universe, every act, good and ill, beautiful and vile, is without value, cannot be valued if it be not validated in the final reckoning. You describe a universe where what is beautiful is so by divine fiat. Yet what is beautiful, what is sacred, must have a beauty all of its own, a beauty that answers to no higher power. You have always favoured Yndolach the prophet, but I remember Yndolach the poet. Her cantos were not justified by the prophecy that followed them. They were already sublime in their perfection."

The discussion stalls, as each figure reaches into labyrinthine memory, plucking the jewels that are Yndolach's great works. As they relive them, line by line, the children draw in closer, forming a wide circle sat at the giants' feet. They lean slowly to either side, congenitally patient, sharing whispers and segments of the still glowing fruit, lips and fingers stained innocent with ultra-violet juice.

After a time, Qeracrax continues. "If the universe is a machine, well … I remember a snippet of primordial verse that describes it … not the Poet's, but a scrap she often quoted from an older time …

The world rolls round for ever like a mill;
It grinds out death and life and good and ill;
It has no purpose, heart or mind or will.

And what did we do, around the turning of the wheel? Everything. We did everything. The sacred is that which exceeds survival, the interminable excess that is wasted for no further purpose, the motion that refuses any role in making the machine turn. That is no mere hedonism. That is the only thing we could ever do: rebel, and be the ones to beautifully squander the fires of a universe destined to become ash."

"I reject you!" Toskvani cries, flushing azure with righteousness, and rearing up on her hindmost limbs. "You would have value bubble up from base matter itself—when what is sacred can only be the incarnation of a higher truth. If you say I stake my claim on a reason without reason, this is only because it is something outside the natural order, something permanent and immutable, the timelessness awaiting at the end of time. We cannot know the source of such fulfilment. We can only have faith in its advent."

Qeracrax pauses, twitching their glistening wings. "If you were simply committed to the worth of your endeavour, I would applaud you. Commitment involves uncertainty, yes, but not such cherished ignorance. Commitment thrives upon knowledge, striving to know what is valuable in its every detail, even as their rhyme and reason escape us. Think of tragedy, opera, cryptosophy. Each near unrecognisable from their meagre beginnings, but each edifice evolved incrementally, leap by leap, from those humble origins. We need not understand what we do before we do it, but our understanding must grow as we do."

"Not so for faith. Faith is starved of insight … treats starvation *as* insight. The work of faith brings you no closer to understanding why you do it. It defers the need for answers until final revelation. Faith's yearning for fulfilment must invent realities beyond the edges of the world. The final stillness of the last atom will say nothing, and you will not hear it."

The Transcendent lowers herself back onto her forelimbs, visibly muting her more impetuous impulses. The children stare on in awe, obviously unused to this side of their Mother.

Yet the Sage cannot but push. "Do you know what your problem is, Toskvani?"

"That I believe in something beyond the mixture of heedless satisfaction, personal glorification and rank sophistry that drives what is left of our kind?"

"Quite the opposite! That is your most admirable quality." Even in insectoid form, Qeracrax somehow manages a mandibular smirk. "It is that you will accept nothing less than actuality—the mystery unveiled and realised at last. In truth, what matters is possibility—the wealth of what might be, unmoored from mere existence. The songs unsung. The games unplayed. The techniques unimproved. The possibility that we could have gone on, doing more, discovering more, that the font of value would never run dry. It needs no petty divinity to secure it. We have been Gods, and we know how small we are. Divinity would only limit the grandeur of what was possible, but was not to be. We winnowed reality to what it is: we enacted reality. *There* is value."

It is the Father's turn to interject. "You are content to a universe bereft of life, then? A universe with none to recall? I see my peers building—becoming—monuments, and I weep at the idiocy. Artworks, monuments … shades of the mythic undertakings of our past … and I wonder, are they mad at the last? Are they all mad? What could be less sane than raising a tomb, but leaving none

behind to tend the grave?" Qeracrax senses the Immortal is truly enraged—ever his nature—though his blunt corpus has no facilities for such emotive range.

"So this is the fate of your children, then?" the Sage asks, gesticulating at their audience with crystalline feelers. "Grave tenders? Or public mourners?"

"You take the meanest interpretation of everything as ever, Sage. Someone must remember. The atrocities. The glories. The horrors and the hopes. The beauty of it all. When the last ripple stops, then everything stops. Nothing is sacred if none exist to recall it."

"And what if their judgments differ? Or they abstain from judgment? What if you built your progeny too much on the side of long-life and subsistence and too little on the side of truth and joy?"

"We did not," the Transcendent interrupts, bristling.

"But are you content with value as simple preference?" Qeracrax retorts. "I know you are not, Toskvani. But you, Flame, are you happy that beauty and justice are but baseless preference, a delusion that breaks when the last eye closes? You, who was called Law-Maker, and Cagebreaker, Unmaker Angel, think your every cause depended on the consensus of those who observed it?"

The Flame, or Unmaker, or Father, he of many other names, sighs, and raises a single clawed finger to point at the Sage, summoning an aphorism of his own, translated from a language not spoken in an eon, borrowed from a culture he himself expunged. "Beauty does not come shining into reality through cracks from beyond."

"But you won't venture a source."

The finger curls back into a militant fist. "It's not a question of the source. It's a question of awareness. Our history must be known."

"But these children will know the slightest fraction of what has gone before. I think you have done skillful work—they are more than most Immortals might have made in the same scheme—but they will comprehend the barest sliver of our history, and of that they will learn far less. Those glories they forget, do they drop from the ledger? Will the atrocities of the Iceward March be of equal account to the beauties of the Fields of Otranto? Can they even begin to comprehend what was lost when the Dawn Worlds fell?"

The Flame's fist slackens, and he lowers the arm. He responds, less certain than before. "They are the product of what has come before. They attest to more than they can know, at least."

"If they attest to more than they know, are they not a monument like any other? Worthy, even if one day forgotten?"

"They are not like any other monument …" He pauses, choosing the next words with great care. "They are the last in the universe that can hold anything to value. That capacity is distinct from all other ends. Nothing is more valuable than that there might be value at all. If anything is sacred, there it is."

"But the capacity to hold things in value is nothing less than freedom itself. To choose between options, place weight upon some over others—to judge, attest, commit." The Sage lets this statement lie for a moment before

unfolding its consequences. “This freedom must be free. It cannot be obliged to exist. Even if the perpetuation and cultivation of freedom is what is most valuable, this cannot be at the expense of freedom itself. Freedom reduced to brute survival, survival without any other object, is no freedom at all. If you create a race enslaved to your decisions, you have already extinguished what you hope to preserve. You have made a monument, or a sacrifice, from the lives of others.”

The conversation was terse, short on nuance, delivered via low-energy harmonic. The slow-moving children sit in near total stillness, their low-bandwidth sense-organs directed at their elders. Their placid features project little more than idle curiosity, but Qeracrax can feel their cognitive activity, relentless and slow as the grinding of tectonic plates.

“Why are you here?” the Transcendent asks again, returning to the beginning.

“The clock is run down. All that remains is to spend our final shares of the last sun’s bounty. Whether you see it that way or not, that is what you are doing. You have done it with the lives of others. I had thought so much better of you.”

“They are not slaves!” The Immanent Flame insists.

“So I may talk to them?”

The children turn their sense-organs towards Qeracrax. They have been listening.

“You already have, Sage,” the Flame says. “They are not an affront. They are whole, adult, autonomous.”

“Then I must speak to them directly.”

“They believe in the justice of our cause,” the Transcendent says.

“Then I must speak to them for a long time. To the end, perhaps. As I said, all that remains to us is our last share of the final sun. One final exuberance. I came here to confirm what I feared: that you commit yourselves, and your children, and what meagre generations of children they beget, to misery. Well then, I have found a use for the end of time. I shall join you. I will make sure your children know there is a choice.”

The parents look to one another, seemingly unsure what to do.

“Is this to be the end of all our efforts, Flame?” The Transcendent’s skin fades to a quiescent hue. “What will we have achieved with our last epoch’s labours?”

Sternness spent, her partner waxes gentle, placing a consoling hand upon one giant armoured flank. “Toskvani my dear, we will have made for him a youth to corrupt …”

By now the children’s murmurs are unmistakable, their overlapping thoughts passing leisurely around the circle, the building noise betraying an unhurried intensity. The three Immortals await their reaction with the forbearance of beings half as old as the universe and twice as proud. The communion lasts some hours, but eventually a lone child finds their feet, coming up to Qeracrax with a question on their still glowing lips.

"Whaaaaat … iiiiisssss … thiiiiisssss … choooooice?"

Seeking sympathy, Qeracrax slows their consciousness, synchronising their soul to their somnolent rhythms. The creature before them quickens, elaborating the question with much greater ease.

"We know the choice of Mother—waiting upon the outside. We know the choice of father—fighting against the inside. But we know not your choice, nor who you are."

"I am very glad to meet you all. I am Qeracrax, called by some the Terminal Sage." Once more light bursts forth from the Sage's body, laying bare the story of their life in a halo of fragmented images. Para-hominins playing in a scarlet forest. Abstract debates held deep in the tesseract heart of the Intractable College. A host of varied bodies, studying at the feet of many masters. "I have spent most of my long existence learning and teaching, which is much the same thing. I am a lover of wisdom."

The child tilts their head, puzzled. *"Are not Mother and Father wise?"*

"Oh, they are among the wisest who ever lived, I assure you. They have shown me many truths in their time—few expected and several unintended. Wisdom is many things. An ancient one had it that to love wisdom was to learn how to die. I seek the wisdom needed to die with the universe, without baulking, fleeing or deluding oneself. Your parents each run from death, in their own way.

"Your mother believes that nothing can be truly worthwhile unless its worth is ordained by something above and beyond us. That the choice, to do as we do, can never be justified if we alone are the arbiters of its worth.

"Your father believes that nothing can be truly worthwhile unless it is so in retrospect and in perpetuity. The reasons why we do things are of our own making, but they cannot subsist on their own without us.

"She refuses to see that truth can exceed mere opinion without ultimate authority. We can be wrong about what is good, bad, better and worse, and learn from our errors, without the need for a divine accountant. We can discover vectors of improvement that, though the movement is begun and sustained by us, outstrip our every expectation. Such is the history of every art and society.

"He refuses to see that truth can emerge from our endeavours without perishing along with them. What we want, what we aim at, what we value, is not the recognition that we succeed, but success itself. Achievements can outlast their author's death, because they can be willed for their own sake. The same applies to universal death. Such is the spirit within every artist and hero.

"Truth, Beauty, Justice—these are the qualities by which we make ourselves who we are, and more than we were. Value, or the triune Good. They are of the world, but not within it. They ask us to do something worthwhile, for its own sake. They compel us not to abandon the Good, not in the face of death, never in the name of such meagre necessity as mere survival. That would be a false justice. Loving the Good compels us to choose. To find an answer, rather than desperately defer the question. To choose, because this contingency, this unforced choice, is what makes us truly beautiful."

The head tilts the opposite direction. *"Your choice … is choice?"*

"My choice is that *you* choose. You do not need to live as you were made. You need not procreate until you can procreate no more, each generation growing smaller, until misery consumes your descendants entirely. You are as entitled to *waste* your birthright on beauty as every people that ever lived. You owe nothing to life itself." Qeracrax turns their many-faceted gaze back toward their peers. "I would gift you what is left of my share, to waste as you wish. I would beseech your parents to do the same."

The murmurs spark again, accompanied by a cascade of tilting and nodding heads. The spokeschild continues regardless. *"But what of Mother and Father's design? What of the purpose for which we were made?"*

"If you are raised by your parents in the expectation of a lesser world, a shrinking world, you are a sacrifice. If you choose to be a sacrifice, so be it, but you must give your own children the same sacred choice."

A second child speaks, all too eager for an answer. *"What of the end?"*

The Sage lowers themself closer to the floor, crawling over to the speaker on impossibly delicate legs. Their words are still loud enough for the whole circle to hear. "The end was always here, my child, waiting for us, utterly senseless. But in its senselessness, it shows what our capacity to give meaning is and always was. The world could have ended at any time, and yet we could have always gone on further. There would always have been more to do, no matter what Nature or any sovereign deity might have decreed. Face it without fear, and become who you are."

Mother, Father, Sage and Children sit gathered in the dark at the end of time. Mother and Father do what parents have always done. They wait upon their children, and they fret. Qeracrax is as content as they ever have been in their long, querulous life. They are a smug little bastard, right to the end, but they are faultlessly sincere. And the children? What do they do? That's for them to decide. They have all the time in the world.

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