I

Here.Goes.Nothing.

“You’re in a desert walking along in the sand . . .”

In a walnutshell:

Desert Turtle Dilemma >
Tu’i Malila Turtle >
World Turtle >
Third Universal Sigh >
N-LSD >
Ghost in the Shell

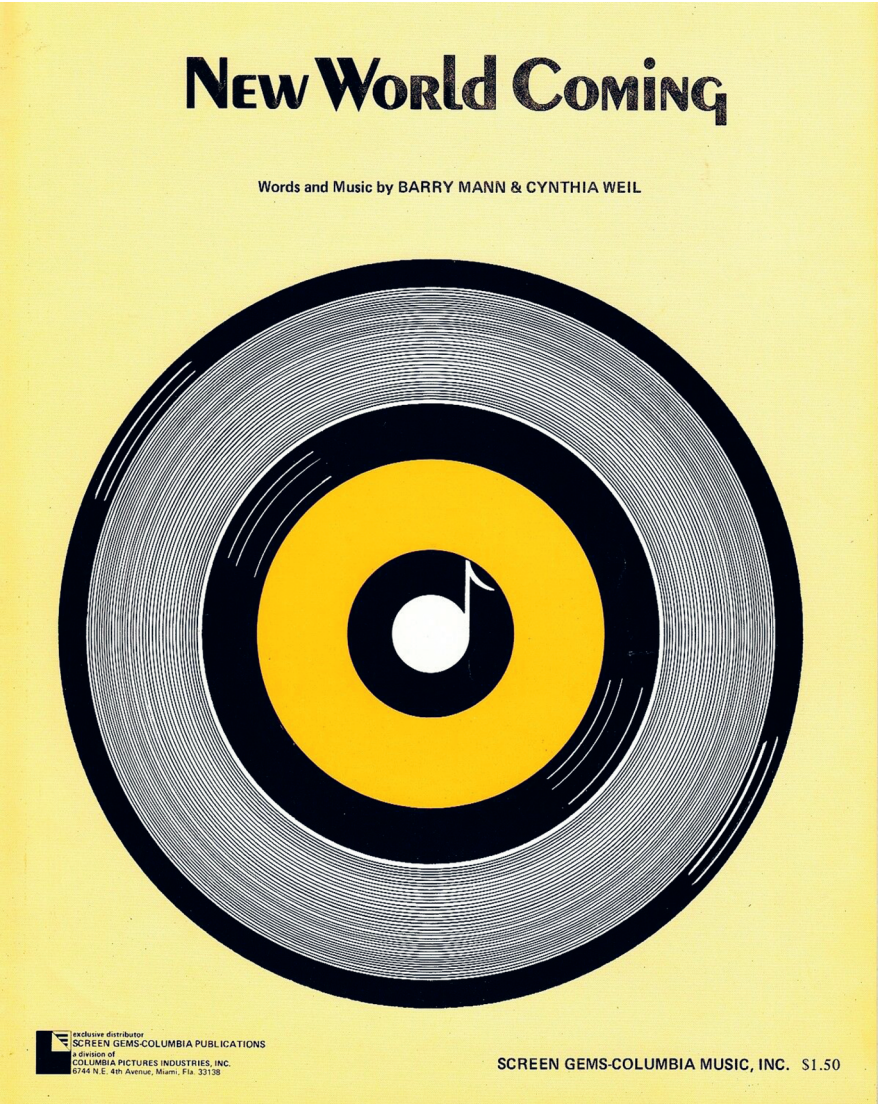

Fig. 2: Barry Mann and Cynthia Weil, *New World Coming*, sheet music cover (Columbia Music, 1970).

Borrowed Time v Burrowed Space

> You can force a story's shape, but the colour will always bloom upstream.
> – Shane Carruth, *Upstream Colour* (2013)[35]

> Are we ready to be 'true' to conditions and processes that threaten a radical undoing of the human capacity for collective action – to seek fidelity to a story that puts the cataclysm upstream of our humanity, and not simply downstream where we can still dream of diversion and escape?
> – Nigel Clark, *Inhuman Nature* (2011)[36]

Clark's question begs three types of responses. The first is a flat "No. Thank you for offering to dash my dreams of diversion and escape but I am not ready yet." That answer keeps on singing a sheltered worldview, akin to the 1842 version of *Three Blind Mice.* Scaled up to a collective answer, rejecting the invitation amounts to a society that only maintains itself by sheltering its worldview.

The second is a half-arsed answer to a half-full glass of a question. It is a Lisa Simpson-like shrug of the shoulders with her characteristic cynical and apathetic "Meh." That answer acknowledges the 1609 version of *Three Blind Mice* and, by implication, acknowledges that sheltered worldviews are hollow conceits. But it stops there. Scaled up, shrugging off the invitation amounts to a society mired in the ennui of acknowledging the falsity of the worldview, but continuing to seek shelter in it all the same.

The third is an emphatic embrace of the universal sigh, and thus of the universe: "Yes! I am ready to be 'true' and to dream only of fact, not fantasy." 'Yes' responses sing out loud in public about freedom from tyranny. Not the tyranny of the 1555 executions of the three bishops though. 'Yes' responses sing about freedom, albeit one that is footloose, born of endless revelations that stem from embracing impact, rather than bracing for impact. Because "to seek fidelity" to the vicissitudes of the cosmos means greeting the next "whenever" of a rupture with open arms.

Answering yes means no longer falling into the universe in a one-way transformation, as when the title character of *Alice in Wonderland* falls down the rabbit-hole, since the response also yields a wonderland in Alice. Imbibing the universal sigh reveals wonderlands within, out, and without you too. Scaled up, accepting the invitation amounts to a society inhaling and exhaling the universal sigh, with earnest ear cast toward wonder at the-new-world-that-is-coming-into-being.

In improv comedy the golden rule is never answer "Yes" followed by a full stop. Always answer "Yes, and . . .?", making each embrace beget successive

---

35 Shane Carruth, director, *Upstream Colour*, logline (VHX, 2013), DVD.
36 Clark, *Inhuman Nature*, 31.

stages of improvised actions. Answering "Yes, and . . .?" begs questions of how to counter chasms between becoming "ready to be 'true' . . .", versus becoming 'true', versus being ". . . 'true' to conditions and processes that threaten a radical undoing of the human capacity for collective action."

To go from becoming to being, Act I journeys back upstream. From near, through far, and onto the distant past, lying wholly "upstream of our humanity." Our "story" puts the cataclysm somewhere thereabouts, at an undisclosed location, and flowing back along cascades of cataclysms that emanate from undisclosed locations to close the Act in the present desert destination, encountering our tortoise and therein, being 'true.'

The journey runs counter to going "Gently down a stream/Merrily merrily merrily merrily life is but a dream."[37] Not because it goes upstream rather than down, but because it is anything but gentle, and anything but a dream. The situation comedy version would be Frankenstein's monster cohabiting with *Three Blind Mice*: travelling up and down this river of time conjures a hybrid *pre*cautionary and *post*cautionary tale. A tale foreshadowed by how the Act ends downstream, already rife with dashed "dream[s] of diversion and escape." Daring to ask, let alone unearth, how we ended up here seems a luxury we can ill afford, but the Dour demands that this be done.

Given a choice between truth or dare, truth will always be a stranger to fiction. Rhyme or reason are not to be found in the phenomenon of ruptures of life on earth, in any of their guises. Not for lack of looking, for there is none to be found. Instead, the journey goes upstream to locate a basis, however unstable, from which to view the cosmic joke, whose *modus operandi* is that shift happens.

So Act I borrows from time we never had in the first place, in order to flesh out this readiness to be 'true.' It dares imagine what *is*, if expectations of stability and predictability are wayward views, not only of our predicament, but of life-at-large. Confounded at the unfolding of the universe? That will take forever-and-a-day to unfurl. Meanwhile, a dour demeanour travels upstream, starting with turtles as a conceptual model for understanding the world.

This world – and its worldview – are shaped by "seek[ing] fidelity" toward placing the "cataclysm upstream," and this journey upstream will be an encounter made through the following trail of breadcrumbs: epistemology, complexity theory, nonlinear system dynamics, biogeochemistry, volcanology, thermodynamics, oceanography, and thermohaline circulation. But since we are seeking "fidelity to a story," the tenor of this journey – the style giving colour to the substance – draws on a fable.

---

37 Eliphalet Oram Lyte, "Row, Row, Row Your Boat," in *The Franklin Square Song Collection* (New York: Harper & Brothers, 1881).

Starting with colonial exploits meeting feudal Polynesian society, diffracted through the lens of human-induced extinction and human-induced evolution by wild minds of sci-fi literature and cinema. From the life of an individual human and turtle, beyond to the world-as-idea and the world-as-planet, upwards to when there was no planet, and outwards into the cosmos. Where to begin but with the world? A world that may not start with the place where the tortoise encounter occurs, but whose Dour understanding of it does.

Love Minus Zero/No Limit

> "The legs of toads are weak," Rick said. "That's the main difference between a toad and a frog, that and water. A frog remains near water but a toad can live in the desert. I found this in the desert, up near the Oregon border. Where everything had died." He reached to take it back from her. But she had discovered something; still holding it upside down, she poked at its abdomen and then, with her nail, located the tiny control panel. She flipped the panel open.
> – Phillip K. Dick, *Do Androids Dream of Electric Sheep?* (1968)[38]

"You're in a desert walking along in the sand . . ." The encounter with the turtle in *Blade Runner* takes place in an undisclosed desert. After all, it's a thought experiment, designed by humans, to distinguish humanoid from replicant. So let us take the indeterminate location with a grain of sand: Sahara. Yet tortoise is to desert as fish is to/out of water. To wind up in a desert, a tortoise would need to go on a continent spanning journey. There is such a thing as a desert tortoise, but they still need water. And they are rarities in the greater turtle order to which tortoises belong, *Testudines.* Scaling up, let us talk turtles *en masse* instead of limiting our discussion to tortoises. Most members of the turtle order tend toward water, being in and out of it throughout their life. But never away from. Or at least, never voluntarily away from. Is this the placement of the upstreamed cataclysm? But if we place the headwaters of the stream here, then we fail to consider how the turtle wound up in the desert, before we even entered the scene. Daring to ask how the turtle got here seems a luxury we can ill afford.

In matters more at hand, a desert location means most turtles could survive about nine hours without drinking water, on the balance of probabilities. Nominally the same duration required to read/sing this book cover to cover. Or listen

38 Phillip K. Dick, *Do Androids Dream of Electric Sheep?* (New York, Doubleday, 1968), 240.

to Max Richter's music marathon *Sleep*,[39] running for the optimal duration of a night's sleep, or a waking nightmare, depending on how you spend your lifetime.

Let us then bear in mind that a third of our turtle's remaining life is evaporating through dehydration over the course of Act I. In this Act, we can discount any intense hydration, shade or sycophantic patronage provided by *homo sapiens* – that burden is born by Act III. The here and now Dour favours a worldview where comedy = tragedy – time. We "read books, repeat quotations" as per *Love Minus Zero/No Limit* while our turtle progressively dehydrates. And yet we cannot begin to begin to "draw conclusions on the wall"[40] without this act of reading and quoting. Starting with the real-world turtle behind the dilemma itself.

The turtle's remaining facet is the epigraph that opens *Do Androids Dream of Electric Sheep?*, the Philip K. Dick novel on which *Blade Runner* is based. The epigraph announces the death of a tortoise named Tu'i Malila on 16 May 1966, quoting verbatim the Reuters newswire that appeared three days later. She had been living as royalty since 1777, when Captain James Cook gifted her to King Paulaho of Tonga. But she had been hatched roughly a century before that fateful day of exchange, making Tu'i Malila the oldest known tortoise to have ever lived.

Tu'i Malila means King Malila. A title earned not just because she entered the royal family, but also granted as part of Tongan cultural veneration for turtles. Before passing from Cook to King Paulaho's hands she had lived among Madagascan waters and islands, where her *Geochelone radiata* species heralds from. Cook likely had no noble intentions when his crew captured her in Madagascar during their global colonisation drive: turtles such as *Geochelone radiata* were kept alive aboard ship, as they provided bountiful nutrition for such European invaders criss-crossing the globe.

By the time Cook reached Tonga, Tu'i Malila was the largest of his bounty pillaged in Madagascar, and thus most worthy to offer as a venerable gift. Starting with a seemingly simple twist of fate, an unnamed individual becomes royalty, achieving such renown that her death was reported internationally, and later inspired the plight of the more-than-human world in *Do Androids Dream of Electric Sheep.* And now, she is synecdoche for the plight of the more-than-human world in the unfolding rupture.

Her death caused much consternation across Tonga, as she had been a venerated fixture for almost two centuries. After all, who is not the most royal but that which outlives all other royalty? Her biophysical limits to life far outstretched the

39 Max Richter, *Sleep* (Deutsche Grammophon, 2015), LP.

40 Bob Dylan, "Love Minus Zero/No Limit," track 4 on *Bringing It All Back Home* (Columbia Records, 1965), LP.

social limits to life of her human keepers, bearing witness to a succession of human kings while she lived. Her outstretched biophysical limits also meant she bore witness to the decimation of her fellow kin, over her lifetime spanning 1677 to 1966, from initial turtle hunting inflicted during her youth by colonial invaders, to the rupture currently unfolding.

Now she haunts us, bearing witness from beyond, entombed in the Royal Palace of Tonga, motionless in shell and flesh made everlasting by taxidermy. Now we mourn her, along with her entire species, hanging precariously on the International Union for the Conservation of Nature's list of critically endangered species.

Tu'i Malila did not make it into *Blade Runner*, though she haunts this filmic world populated only by synthetic owls, snakes, spiders, and unicorns created by humans to replace all those creatures they have rendered extinct. Her plight finds its way into the narrative obliquely, through the desert tortoise dilemma, and her epigraph in this novel about humans designing lifeforms is really an obituary. Not of a turtle, but of the more-than-human world, at the hands of humans. Wherein, twentieth-century science-fiction about humans designing synthetic lifeforms was inspired by the real-life plight of a turtle whose trajectory was dramatically skewed by James Cook, one of the foremost figures in modern European colonialism in the eighteenth century. But is this the headwaters of the cataclysm upstream that we are seeking?

Cook set sail from the epicentre of the European Industrial Revolution, right at its advent, systematically forcing European politico-economic hegemony onto regions across the globe. Does this provide a compelling breadcrumb trail for the headwaters of the cataclysm? How far can Cook's encounter, jumping between row boat and beach shore on arrival at Nuka Alofa, the Tongan capital, and Tu'i Malila's encounter, dipping her flippers into Tongan waters as she is handed alongside to Paulaho, fare as the primordial turtle flip, and thus the terminal location for the cataclysm upstream?

In the worldview that posits this as the terminal location, the catalyst of the unfolding rupture is placed by foregrounding the protagonists: a (white, European, colonising) man and a (now precipitously endangered) turtle. But an encounter of this magnitude may only be held up as the headwaters if the stage upon which their encounter takes place is relegated to a mere static background, like painted landscapes to a vaudeville tragicomedy. This is not a faithful perspective. And therein lies the problem: as Clark admonishes, this is extent of the scope within which "progressive social thought" views the ecological crisis. Such a viewpoint proves woefully insufficient for understanding the unfolding rupture, or even ruptures of life on earth in general. And yet it is the dominant view in so-called "progressive social thought" about the ecological crisis: a worldview whose

scope extends only to Cook as synecdoche for the roll call of usual suspects – colonialism, capitalism & co. – behind the unfolding rupture, and Tu'i Malila as synecdoche for human forcings of more-than-human lifeworlds wrought by colonialism, capitalism & co.

Cook and Tu'i Malila's life stories make for conventional readings on the ecological crisis. They do not foreground human agency, but merely the agency of European colonialism in a planetary plight. Thus, to posit this encounter as the headwater is to prematurely and myopically give in to the Dire's crisis-mindset, and the Dice's impetuous responses, but in ways wilfully oblivious to the seemingly static background of the stage, as well as ways unfaithful to the scale and complexity of that stage. What then, if we let our dour demeanour spin the theatre and make the stage the foregrounded protagonist of this play? Once we do this, it becomes clear that the fable of Cook and Tu'i Malila can only fare as far as being the mere first immersion into "the cataclysm upstream."

In seeking fidelity to an expansive reading of their fabled encounter, we can no longer pretend we are talking about Tu'i Malila's plight – subsumed into tyrannical colonialism, capitalism & co. Nor can we pretend we are talking about the present tense plight of her dwindling *Geochelone radiata* descendants. Instead, the search for fidelity requires going far beyond such concrete singular examples in discrete time and discrete space, because otherwise Detective Holden's test subject may think they are being asked to empathise with a singular turtle, when they are actually being asked to extend the generalisation away from any specific individual, toward empathy for the entire more-than-human world.

And so, by misappropriating the desert turtle dilemma as the arc of this song, Holden asks us to empathise with a turtle that is synecdoche for the scale of the world itself, and the scale of life itself, even if empathy still proves unredeeming for the haunted test subject. Who, though, is this 'we' that can scale up from Holden's individual test subject to the collective 'we' that now stares at the upturned turtle in the desert?

The answer is a singular one that oscillates into many, just as the turtle oscillates between the historical real-world individual turtle, synecdoche for all turtles, and metaphor for the world-of-life. The 'we' oscillates between we as contemporary society (the present tense), not to be contusioned with modern society (The Enlightenment et al.), ancient society (plural, bringing in societies across the globe), humanity (a nebulous concept, neither singular nor plural, here nor there), *homo sapiens* (ironically back to The-Singular-as-species), and the *hominidae* family (resting on another nebulous category of all species descendent from this family over its seventeen million year genesis).

In summary, that which 'we' refers is context-contingent. Meaning our present tense encounter is also a re-encounter due to the legacy of earlier endeavours

by modern and ancient societies in their times. Because our dour encounter is not truly with a single tortoise alone in the desert. It is with the World Turtle, being both the world, and our understanding of it to boot.

Turtles All the Way Down

> Dour philosophy has never improved the world.
> – David Hume, "Of Commerce (1752)," (1777)[41]

> We build our houses on the earth, the earth rests on an elephant, the elephant on a tortoise, the tortoise again – who knows on what? – and so on *ad infinitum*.
> – Johann Fichte, *Concerning the Conception of the Science of Knowledge Generally* (1794)[42]

What then is the difference between an encounter with our tortoise in the desert, and one with the World Turtle? In Vedic cosmology, the World Turtle holds that earth rests on a turtle, which itself rests on a larger turtle, and so on . . . This concept has been appropriated many times since, in fields as diverse as metaphysics and epistemology, to express how only fragments of details may ever be accessed from an infinite regression, whether probing ultimate origins, say of the universe, or ultimate ends, say of the earth. In no particular order: what issued forth the Big Bang? Back when there was No Thing. In probing any such enigma, all fragments rest on infinite layers of other detailed wholes, which will always be out of reach. No fulfilment is to be found, because the bucket is bottomless.

For those seeking ultimate limits to conceptual models of the world, this revelation profoundly undermines our understanding. In the quotation above, Fichte is referring to epistemic limits of attempts to understand any 'thing' – object, idea, system and so on. These limits are progressively revealed through our insatiable drive to interrogate how things work, from atom to atmosphere, and how seemingly disparate phenomena influence one another, from atom to atmosphere.

Every breakthrough a watershed in current limits to understanding only reveals that prior boundaries were just resting on yet another turtle. Stegosaurus says: *"we all have a brain about the size of a [rockmelon, née] walnut."* The universal sigh is not some nut to be cracked by changes to cognitive capacity, such as brain size or neuron density. Attempts to discover The Definitive Details of

41 David Hume, "Of Commerce (1752)," in *Essays: Moral, Political, and Literary Part II* (Indianapolis: Liberty Classics, 1987 [1777]), 256.

42 Johann Fichte, *Concerning the Conception of the Science of Knowledge Generally*, translated by Adolph Ernst Kroeger (London: CreateSpace Independent Publishing Platform, 2017 [1794]), 27.

Phenomenon A-through-∞ may yield spellbinding fragments, but overall will only ever reveal that it's turtles all the way down.

Nevertheless, hell bent we are on digging through, even though we know there is no bottom to be reached. In *Dialogues Concerning Natural Religion*, David Hume reasons that it is best to respect such limits to understanding. Hume constructs a dialogue between three philosophers named Demea, Philo, and Cleanthes, to elucidate the folly of trying to outmanoeuvre the World Turtle:

> If the material world rests upon a similar ideal world, this ideal world must rest upon some other; and so on, without end. It were better, therefore, never to look beyond the present material world . . . When you go one step beyond the mundane system, you only excite an inquisitive humour which it is impossible ever to satisfy.[43]

The danger in this pursuit goes beyond exciting an insatiable "inquisitive humour." What is found down there shows up just how shaky the foundations are up here. As for the world, so for understanding it. Not only are material encounters with the World Turtle vexingly enigmatic, so too are our understandings of it. Let alone the repercussions of understanding we will never be able to remotely understand it. Let alone the understanding of these repercussions, and so on . . . It's turtles all the way down.

On the one hand, this pursuit is necessary to unmask a sheltered worldview. On the other, what sort of a worldview is it to be endlessly chasing one's tail? An insult – given "it is impossible ever to satisfy" the desire to catch one's own tail – added to injury: the discovery of living with the knowledge that it can never be caught.

Only in nursery rhymes does the tail get caught. And then only to be "cut off . . . with a carving knife." The same dangers apply for singing sheltered or seditious worldviews into being. Sheltered worldviews rely on us "never look[ing] beyond the present material world." But seditious worldviews – as per the demeanour of the Dour – demand that once "we go one step beyond the mundane system," we continue on and follow the severed tails, twisted tales, and breadcrumbs trails wherever they may lead.

What is, then, the difference between seeking to resolve the ambiguity of the desert turtle location, or a discrete location for the cataclysm upstream? Both are akin to one another, as they occur in indiscrete places and times, the pursuit of which undermines claims toward certainty, in favour of evincing further facets of cosmic changeability and its consequences, and any comprehension of same. However, what these two pursuits reveal is an irreconcilable difference between

43 David Hume, *Dialogues Concerning Natural Religion* (London: Penguin Books, 1990 [1779]), 38.

finding oneself adrift in a proverbial desert, and actually flipping the World Turtle. The former predicament shows how lifeforms find themselves, from time to time, at the behest of earthly vicissitudes. The latter predicament shows how lifeforms, whether already rendered precarious or not, can also induce vicissitudes upon earth and their fellow inhabitants.

Their difference is irreconcilable because cataclysms are by definition highly erratic, meaning anything built upon them, whether mountain, mouse, house, or human, cannot be a static entity either. Thus a fundament of the dour demeanour is to recognise that everything above rests with a semblance of stability on everything below. Everything below rests on the infinite beneath, which closes in full circle because in the universe there is no such thing as up/down or top/bottom. Along some indiscernible point in this revelry of non-sense lies earth, which itself "rests on an elephant, the elephant on a tortoise, the tortoise again – who knows on what?"

N-LSD

> It is vital to this story that my human protagonists are caught up in a drama that is in the most part not of their making. We are . . . intrinsically, inescapably, ensnarled in a mass of forces and objects that greatly pre-exist our emergence and have no need of our continued existence. If we are to come to terms with the radical asymmetries of our residence on 'a specific planet', in 'a specific universe', then the autonomy of the forces that shaped and continue to shape us needs to be at the core of our thought.
> – Nigel Clark, *Inhuman Nature* (2011)[44]

> I cannot describe to you the agony that these reflections inflicted upon me; I tried to dispel them, but sorrow only increased with knowledge.
> – Mary Shelley, *Frankenstein* (1818)[45]

When Fichte talks of how "we build our houses on the earth" he refers explicitly to comprehending the world, and only by implication to the world itself, as an object of knowledge. When Clark refers to "our residence on 'a specific planet', in 'a specific universe'" he refers explicitly to the world itself, as independent and autonomous object-within-the-larger-universe. By implication, he is also concerned with comprehending some such World Turtle, but in a way mindful of the "autonomy of the forces that shaped and continue to shape us." Recalling the

44 Clark, *Inhuman Nature*, 182–183.

45 Mary Shelley, *Frankenstein, or the Modern Prometheus* (New York: Open Road Media, 2014), 138.

earlier reclaiming of biography as the life story of life, here the autonomous forces shaping "us" are substituted with those shaping life.

The foremost endeavour to bridge the chasm between encounters with the world and comprehension of it has taken place through Earth System Science. The emergence of this research endeavour in the 1980s revealed staggering insights into the complexity and interrelatedness of – *inter alia* – biological, physical, chemical and geological dimensions of earth. The concept of an Earth System denotes that life did not happen *on* earth. Life happened *to* earth. Conversely: earth happened *to* life, woven through as it is with abiotic forces of the atmosphere, hydrosphere, cryosphere and lithosphere. Such is the "mass of forces and objects" that life did not emerge *from* but rather *with*.

Wherein, "we are . . . intrinsically, inescapably, ensnarled in" Earth System behaviour that eviscerates any expectations of discernible causality, given how repercussions reverberate every which what way across an infinite progression of turtles. This is because the behaviour being analysed here operates according to Non-Linear System Dynamics (N-LSD). Picture cliché cyclones catalysed by a butterfly flapping its wings. A flap does not cause a cyclone, but in principle as well as practice, mammoth phenomena can be derived from minute actions. Shift happens because systems switch into entirely novel states that have no analogue with a prior phase of the system. And what constitutes a system is just the arbitrary lens that has been applied to whichever phenomena is currently under inquiry.

Take a seemingly simple manifestation of same: an enclosed acrylic cube, part filled with water. The cube osmotically absorbs heat from its surrounding environment. Liquid water will undergo state shifts between vapour, which rises to the underside of the ceiling, condensing into drops that fall back as liquid onto the bottom, only to start the cycle again. As a closed system, water may cycle through different states, whose novelty is limited by the closure of the system. Phase transitions between states may change speed in proportion to the ambient temperature of its surroundings, but even if the water within became steam it could not escape the cube, because the system closure only allows energy to dissipate, not matter.

German artist Hans Haacke presented such an evocation of N-LSD in his installation *Condensation Cube* in 1963. A seemingly simple artwork, comprising a milk-crate sized clear cube partly filled with water, presented on a stand in an art gallery. Yet it no longer seems simple when reading the last of the three materials Haacke listed in the artwork's composition: "clear acrylic, distilled water" and "climate in area of display."[46] What happens in the cube's immediate surrounds

46 Hans Haacke, *Condensation Cube*, 1963, https://www.macba.cat/en/obra/r1523-condensation-cube.

is part of the artwork, which is not merely a cube, but rather comprises both the cube and the environment of its display.

Condensation Cube runs counter to what art galleries strive for, which is climatic homeostasis, aka air conditioning. To maintain homeostasis galleries require elaborate heating and cooling systems, as does any house. Thus, *Condensation Cube* does not just present a closed water cycle but an eternal golden braid between heat, air, and water. An earth-writ-small with its cycle between two oceans. One of water, the other of air and both in part of one another too.

While *Condensation Cube* scales earth down to a domestic scale, the gallery scales it back up, showing up conceits about an earth-writ-large. It shows inhuman processes as affected by human actions, in concert with a much larger environ that we seek to regulate. We are part of, fixtured into, and entangled with the same system we are trying to disambiguate as being 'out there', despite having always been here inside of it at the same time. Being terrestrial beings, "we live, submerged at the bottom of an ocean of air,"[47] as Renaissance mathematician Evangelista Torricelli remarked. Conversely, we live at the top of an ocean of water. But where does one system end and the other begin? Can we ever not conflate the world with our comprehension of it?

To boot – biotic and abiotic systems which appear to be discrete – whether butterfly or cyclone – are entangled in ways that have only recently begun to be fathomed. Take the Sahara Desert and Amazon rainforest and the thousands of kilometres of open ocean that separate them. Given the difference between an ocean of air and an ocean of water, or an abiotic desert and a biotic rainforest, such systems may appear to have little to do with one another.

Yet Saharan dust, rich in nutrients, rises into the atmosphere, blowing across the Atlantic Ocean and making landfall in the Amazon, where it provides fertilisation vital to the rainforest soil. This interchange of millions of tonnes each year is millions of the years in the making: Amazonian abundance depends (in part) on Saharan sands. The Sahara may consume the life of our turtle that has wandered too far from its aquatic lifeline, but the same desert inadvertently supports life in the largest rainforest on the planet.[48] Not all deserts are deathly. Not all rainforests are lively, especially when the largest one on earth is on fire, transmogrifying into a state shift toward desertification.

47 Evangelista Torricelli, quoted in Gabrielle Walker, *An Ocean of Air: A Natural History of the Atmosphere* (London: Bloomsbury, 2010), 24.

48 Hongbin Yu et al., "The Fertilizing Role of African Dust in the Amazon Rainforest: A First Multiyear Assessment Based on Data from Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations," *Geophysical Research Letters* 42 (2015): 1984–1991.

Earth System Science is the endeavour unearthing where, how, and when planetary-scale phenomena pass critical thresholds, beyond which they irreversibly morph into novel states. Modelling the Sahara-Amazon relationship is however just one facet of the enterprise. The objective is to understand the propensity of systems such as the Amazon to tip into novel states, such as Sahara-like desertification, with profound consequences for global climate and the extirpation of lifeforms attuned to biomes as they existed prior to this unfolding rupture.

Such processes beget exponentially reinforcing feedback loops, a phenomenon intrinsic to N-LSD. To illustrate, a wilfully simplistic proxy occurs between a microphone and a loudspeaker. Up to a certain volume, someone sings into a microphone and it comes out of a loudspeaker. The show goes on. Until a critical threshold is reached. Loudspeaker then starts feeding back into microphone, which amplifies the signal even more, which feeds back even more . . .

The singer can exit stage left and a show of howling feedback will keep on *ad nauseam* until someone manually intervenes in the electrical circuit or the system itself breaks down. Now substitute this image for water cycling between states and Saharan sand circulating to the Amazon, and glimpse the succession of turtles all the way down from here to infinity. Feedback that just will not end howls on an empty stage, as proxy for incessant regime shifts between inclement and clement climates and N-LSD, themselves mere tips on the melting iceberg of "the autonomy of the forces that shaped" the world. Make it so, for a dour worldview of such a world as this.

Viva la (Upper Palaeolithic) Revolution!

In the realm of electrically amplified sound there are locatable boundaries between thresholds for avoiding, or inducing, feedback. At the scale of a highly dynamic planet, the relevant boundaries are not locatable. These are the World Turtle layers underpinning the "conditions of unknowability" that Clark refers to. Turns out that it's turtles all the way down too, for the search for the cataclysm upstream of humanity. The same must have always gone for those lying in wait downstream. Notional boundaries may be reconstructed through evidence of the past, but cannot be guides to the future. And that is *before* bringing the complexity of biotic forces into the equation.

On Jupiter the Great Red Spot looks like a persistent pimple on the gas giant's face. It is a storm system larger than earth, continuously raging for at least the last three centuries. The system is composed of a micro-world of self-reinforcing feedback loops (where micro = larger than Earth). Meaning the Great Red Spot is

perpetually self-perpetuating. That is, until it isn't anymore. The storm has come into and gone out of existence many a time. So clearly, it has thresholds just like the microphone and loudspeaker, but no discernible on/off switch.

Assume a butterfly equivalent exists on Jupiter. Assume we can locate, in time and space, this seemingly harmless butterfly. And more – we predict the nth wing fluttering that will cascade into a series of events culminating in the resurrection of the Great Red Spot. So what comes next? Would we then believe we have the will to clasp its wings shut at the decisive moment?

From little things, big things grow. From little things, big things growl. Just because they now growl at us does not mean we possess the capacity to sever the ties between little things and the big things they beget. N-LSD can deduce inexorably complex formulae for relating all things great and small. It reminds us that the act of clasping the butterfly wings may avert a Great Red Spot, but may then have repercussions of an unknown order of chaos. Or, it may not. Or, we may never know either way. Or, we may know one way or the other, but only after the fact. By which point we may as well be living in the eye of the Great Red Spot.

On Earth we need no make-believe butterflies (yet). But we need heed the fact that the complexity of N-LSD in abiotic forces – geological, physical, chemical – become even more heady when conjoined with biotic forces. Hence our World Turtle offers a metaphor not only for the inherent instability and complexity of the Earth System, but also for limits to our comprehension of same.

This planet has a habit of lurching between phase states that are full of surprises and utterly resistant to attempts to predict where, how and when the planet will oscillate with such volatility. Much like discovering that we missed (or caught) the boat on shutting the butterfly wings. What is known is that this planet is rife with historical examples of phase transitions. The normal is instability. The abnormal is stability. Making the abnormal . . . normal.

Such is the drama Clark's "human protagonists are caught up in." Not because it was *the* stage they walked on to. As he says: "it is in the most part not of their making." But because it was the *only* stage they could have ever walked on. Same for life-at-large. Then for them, now for us. Then, when we creatures were more vulnerable and would "build our houses on the earth" more feebly, that stage could never have been regarded as static or background. Its volatility could have only ever been the foreground. Living at the behest of such radical asymmetries presupposes that these dramas beget some deep-seated sensibility about changeability, consequence, and comprehension of same: sensibility to the three universal sighs.

By implication, rather than just saying we "build our houses on the earth" as per Fichte, our way of life, our life, and life itself rest atop an infinite array of World Turtles. Long before there were houses built upon earth, or even people who built houses, or even people, there was a World Turtle that flipped many a time. Or rather, there have only ever been worlds that flip, many a time. Meaning that it is not just that the "cataclysm [is] upstream of our humanity." Rather, humanity is built upon the cataclysm. For Clark, this brings about a dour plot twist in the drama:

> What if the current suspicion that humankind has turned the planet's weather systems into a vast experiment has a supplement, the idea that drastic climatic shifts have been experimenting with human life, putting us through the cruellest trials, time and time again?[49]

Given the paucity of fragments, and the inaccessibility of the coveted details beyond the "current suspicion," the Dour asks us to cast an eye backward and inward as means for going forward. To when all the world was a stage, and we were literally just bit players. To see how the past may still inform the deep-seated who, who face off now against this unknowable future. That deep-seated who is not you, me, or even us. Rather, it is a vague apparition of *hominidae* lineage, for whom we are just the newest kid on the block.

Ancient ancestors poked about at the flesh of the World Turtle, but evidently did not flip it. Vice versa, the World Turtle has clearly been flipped before, by forces biotic, abiotic, internal, external, local, global, subterranean and/or cosmic. Some flips befell our ancient ancestors. Precipitously endangered by an entity they did *not* enrage, they still lived to tell the tale.

Given that our ancestors, in the most we-the-species sense, lived through conditions nothing like the abnormally stable Holocene climate, do we then retain some of the sensibilities our ancestors possessed that allowed them to live through past ruptures? Is there something in us attuned to the deep-seated sensibility of an ancestry pockmarked by unsolicited invitations from earth to get "caught up in" dramas and put "through the cruellest trials"? Something, in short, that could support our dour demeanour in the present tense? This progression of inquiry leaves an astounding question: to what do we owe our survival up to this point, but to those who came through prior ruptures? How do their ghosts linger in our shell? We may not want to exorcise these ghosts. Indeed, the Dour hints that we may need to resurrect them if we are to continue to play upon the stage.

49 Clark, *Inhuman Nature*, 31.

At Home on the Range Shifts

> Do I care if I survive this?
> Bury the dead where they're found.
> In a veil of great surprises,
> hold to my head till I drown.
> – Sufjan Stevens, *The Only Thing* (2015)[50]

Until ten millennia ago, to be *homo sapien* was to be nomadic. Restless wanderers, ever since speciating 200 odd millennia ago, along with all forebears beforehand. Whether following annual seasons, seasons repeating with enough similarity to become climates, or climates oscillating too wildly for such a thing as a season to even be thought of, home was a moveable feast. Cultural expression, through story, song, myth & co. tells of relentless and unpredictable environmental change over the ages. That is, until instability gave way to stability. And our songs became about singing sheltered worldviews, no longer rhyming with the arhythmic universe.

Only since the most recent glacial period ended 11,700 years ago has our species – along with the bulk of the biosphere – enjoyed an utterly atypical period of climatic stability. Only then did "we build our houses on the earth," with scant regard for the "radical asymmetries of residing on 'a specific planet,'" subsequently mythologised as yielding steadfast foundations for domesticated dreams.

Sedentary life meant seeking ever deeper, stronger, and more steadfast foundations on a planet that offers and withdraws such without rhyme or reason. Steadfast in a world that is always anything but, even if the physical world seems to settle into sustained periods of stability. Why else do we drill deeper and deeper into bedrock, if not to affix taller and taller buildings more firmly? Since we began to believe that we had hung up our nomadic boots for good, our aim has been not just 'to be', but to be increasingly separated from the earth upon which our house is sited.

In times of turmoil turtles can retreat into their shell. They carry their home upon their back, because it is their back. The cataclysm is not to dwell on the earth – all life technically 'dwells' in whichever way it inhabits its lifeworld. The cataclysm is to build houses on the earth: to construct fables of stability where there is none. But where can one take this message home to? In search of solid foundations to rebuild ideas of home, how on earth can we now inhabit such shaky underpinnings? Footings that were always shaky even before we undermined whatever foundation they had, via our unique impact on this earth where we built our homes.

---

50 Sufjan Stevens, "The Only Thing," track 7 on *Carrie & Lowell* (Asthmatic Kitty, 2015).

Even those who dwell without a house upon the earth still find themselves having to relocate when the going gets tough. But relocate to where? Herein lies the take home message of what Clark means by becoming "'true' to . . . a radical undoing of the human capacity for collective action." It is the folding-in of hominid evolution with the dynamism of Earth System processes. Home is, after all, on a home planet, which is a thoroughly "'specific planet', in 'a specific universe.'"

So, to return to the question that ended the last scene: are there breadcrumb trails back to some lingering feet which faintly recall how to move about within range shifts of the earth? Because the Dour asks us to leave our home on the range and go in search of making a home on the range shifts. A utopian kind of dwelling in houses that can now only stand in 'no-place', the literal meaning of utopia. Any re-cognition of our ways immediately prior to becoming sedentary is far more distant than some faint memory that returns like a vague apparition to our conscious, or even sub-conscious.

However, the ghost in the shell is there somewhere. A sample of *homo sapiens* from 40 millennia ago, were he or she born today and raised like a contemporary human being, would meld seamlessly into whichever contemporary culture they were raised in. Thusly raised, they would be indistinguishable in appearance and cognitive functioning from us. Meaning that for at least the last 40 millennia Upper Palaeolithic humans were physiologically and psychologically indistinguishable from those alive today.[51]

For the first 30 of those millennia wild climates raged outside of our proverbial caves. We sang songlines, painted mythologies onto cave walls, adorned bodies with coveted items, and, arguably, experimented with domesticating our dreams as well as our bodies. One argument holds that *hominidae* agriculture was not invented after the Holocene epoch ended 11 millennia ago.[52] (Pole position goes to ants, who invented agriculture 50 million years ago.[53])

However, another hypothesis posits that Upper Palaeolithic humans repeatedly attempted agriculture many millennia earlier, but were unable to achieve sufficient harvests because of inclement climates.[54] This argument is contentious

51 John Shea, "Homo Sapiens is as Homo Sapiens was: Behavioral Variability versus 'Behavioral Modernity' in Paleolithic Archaeology," *Current Anthropology* 52, no. 1 (2011): 1–35.

52 Peter Richerson, Robert Boyd, and Robert Bettinger, "Was Agriculture Impossible During the Pleistocene but Mandatory During the Holocene? A Climate Change Hypothesis," *American Antiquity* 66, no. 3 (2001): 387–411.

53 Raghavendra Gadagkar, "The True Origin of Agriculture: Credit goes to the Ants," *Resonance* 5 (2000): 76–79.

54 Rowan Sage, "Was Low Atmospheric CO2 During the Pleistocene a Limiting Factor for the Origin of Agriculture?" *Global Change Biology* 1 (1995): 93–106.

due to difficulties of obtaining incontrovertible physical evidence. Once again: the details have been lost to time. Only fragments remain. In any event, whether our ghosts of 40 millennia ago or only 11 millennia ago had domesticated dreams of sedentary life on the farm, their residue is still heavily present within us today.

Ghosts in our shell we generally call human nature. Ghosts from 40 millennia ago are much closer to the bone than those from 400 millennia ago, when *Homo erectus* had already mastered fire. The same applies going back 4,000 millennia ago, before *Australopithecus* had learned to use or control fire. The further back in time, the less we call our ghosts human nature and the more we call them animal instinct.

Here we start to share ghosts with our animal cousins, whether of Cenozoic ("New Animals") such as elephants, or old reptiles of the dinosaur age, such as turtles. The further we stray from our evolutionary tree branch, the more and more closely we share our ghosts. After all, saying the Human evolved from the Animal is a circular statement: we have always been, and will always be up until we are no more, animals. A wolf in sheep's clothing is a still a wolf, just as a human in clothing is still an animal. Of all the nursery rhymes we have sheltered ourselves with since time immemorial, the most dangerous is the one that sings of humans being separate, special, and above animals, or nature in general.

But this breadcrumb trail of diversions has still not answered our question. If the cataclysm has only ever been ever-imminent, and has been ever-so-occasionally-present at myriad transitional points of *hominidae* history, is there then some ineffable sixth sense of cosmic vicissitudes embedded in a psyche vastly predating Upper Palaeolithic humans? A 'Dour' that has always been the default demeanour? To better know our ghosts, the next chapter travels further upstream: to *hominidae* evolution in the Pleistocene, the epoch from 160 to 10 millennia ago; then to the Pliocene, the 300 millennia preceding the Pleistocene, when hominids first appeared.

The journey upstream progressively embeds hominid evolution deeper and deeper into Earth System processes, in terms of how abiotic ruptures induce biotic ruptures, and vice-versa. In Part II, the discussion moves on to one 'moment', one instance among many of past turtle flipping that occurred without hominid provocation or enticement, where "the autonomy of the forces that shaped and continue to shape us" sweeps our protagonists into "a drama":

> It is the moment when crucial life support systems pass through a critical threshold – the realignment of meshing tectonic plates, the irruption of a viral epidemic, the tipping of climate into a new regime – that the tolerance levels of an individual or collective body are most likely to be pushed or breached. As we are now learning, our own ancestors had to negotiate a great many of these transitional points.[55]

55 Clark, *Inhuman Nature*, 251.

On the one turtle, the "moment" when "tolerance levels of an individual or collective body are . . . pushed or breached" *needs* to be felt by those groping about in the dark for a portal into the incomprehensible magnitude of pushes and breaches of life-at-large. On the other turtle, an "inquisitive humour" needs to be mindful of the fact that even feeling cannot fill the emptiness, because the bucket has no bottom.

The moment chosen to open the next chapter enriches forms of rupturing away from isolated events emanating from cosmic depths, such as an asteroid, and into protracted episodes emanating from deep within earth itself. The moment, though, is placed in geological time, roughly three million years before the present. But 3,000 millennia go by in a blip for a planet that has been around for millions of millennia. Getting at such timeframes and Earth System processes was only ever going to be ineffable.

While the central concern of the "moment" is lifeforms-at-large, the approach is through one among these great many *hominidae* "transitional points" when our ancestors negotiated such individual and collective passage "through a critical threshold." In matters closer to home, this particular moment provides a proxy for our provocations and enticements toward the rupture unfolding now. Making it not "upstream of our humanity" but contemporaneous with the present tense. After all:

> what if the event of our time turns out to be not so much the knowledge that human action is altering global climate, as the realisation that climate is responsive to our nudges only because it is far more precarious than we ever dared imagine?[56]

Here, then, lies the key to the elusive cataclysm upstream. Here, there, and everywhere lies "the cataclysm that has always already occurred," but there is no definitive source to the river, because the cataclysm is neither a single rupture, nor a rolling thunder of ruptures. Instead it is the precarity intrinsic to the planet, its climate and the tenure of all lifeforms at all times, making ruptures part and parcel of phase transitions between inclement and clement climates. So, the "event of our time" is really the confluence where sheltered fantasies of climatic stability meet a staggering knowledge of inhuman causes *coupled with* human causes of ruptures, from climates and ecosystems, to the long-term evolution of life on earth. In a walnutshell, where the fantasy of stability meets the Dour's embrace of perpetual volatility.

56 Clark, *Inhuman Nature*, 31.

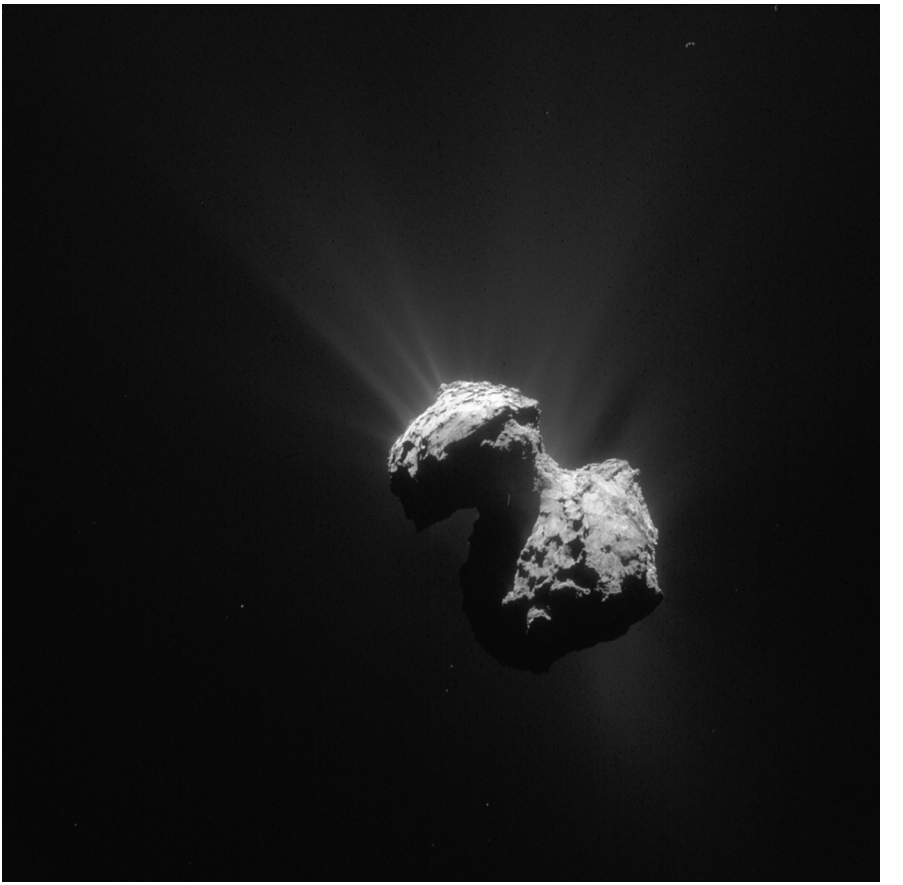

Fig. 3: European Space Agency, Comet 67P/Churyumov-Gerasimenko, 450,000,000 kilometres from the Sun, 7 July 2015.