IX

How to Fall in Lava with Volcanoes

"I'll laugh until my head comes off."

In a walnutshell:

Thinking Like a Mountain v Thinking Like a Volcano >
Acting Like a Volcano v Doing Like a Volcano >
The Synthetic Age v The Age of Loneliness >
The Subterranean Sigh >
The Return of Frankenstein's Monster >
Why Did the Chicken Cross the Road?

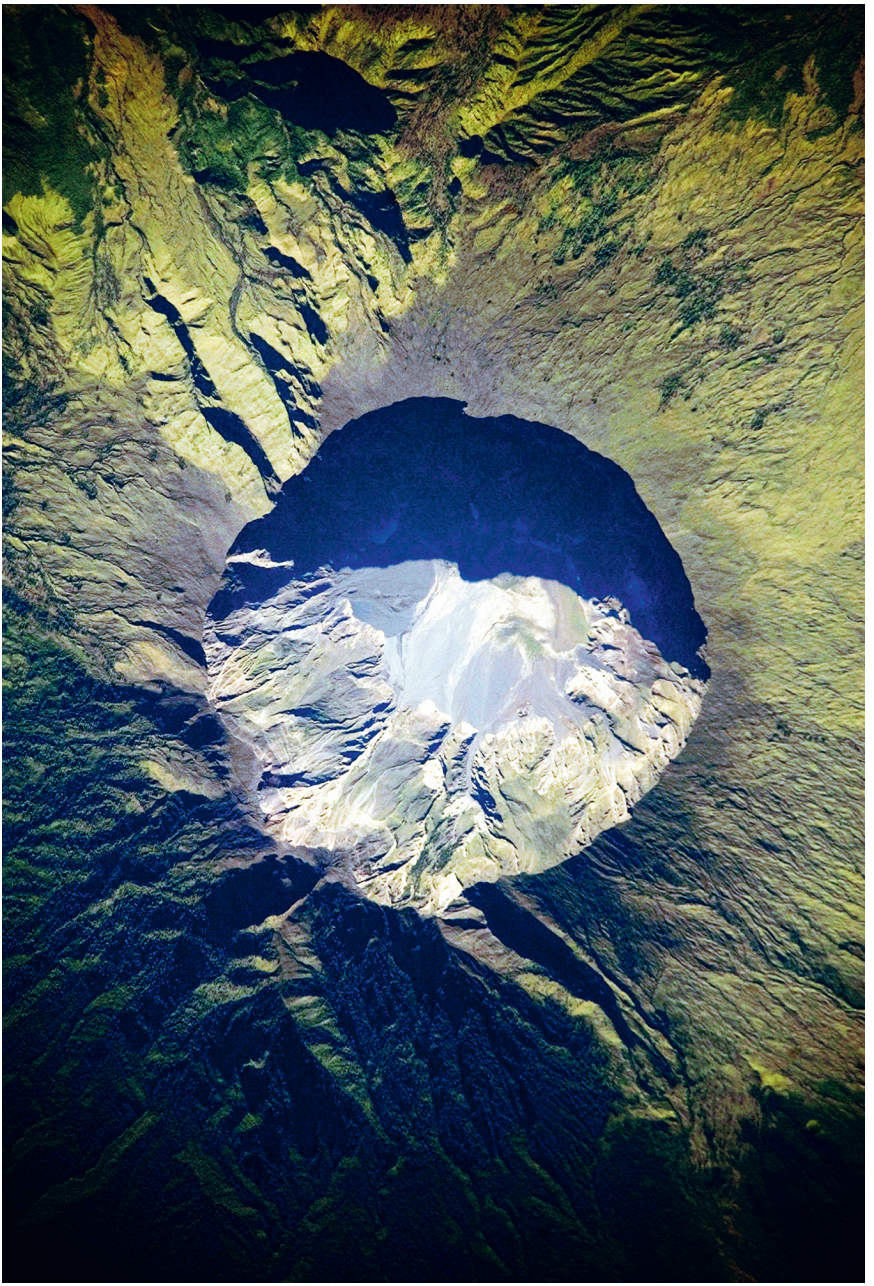

Fig. 18: Mount Tambora Volcano, Sumbawa Island, Indonesia, from the International Space Station, 350 kilometres above Earth, 3 June 2009.

Thinking like a Volcano

> A deep chesty bawl echoes from rimrock to rimrock, rolls down the mountain, and fades into the far blackness of the night. It is an outburst of wild defiant sorrow, and of contempt for all the adversities of the world. Every living thing (and perhaps many a dead one as well) pays heed to that call. To the deer it is a reminder of the way of all flesh, to the pine a forecast of midnight scuffles and of blood upon the snow, to the coyote a promise of gleanings to come, to the cowman a threat of red ink at the bank, to the hunter a challenge of fang against bullet. Yet behind these obvious and immediate hopes and fears there lies a deeper meaning, known only to the mountain itself.
> – Aldo Leopold, "Thinking Like a Mountain" (1949)[403]

> Epochal consciousness is not a position to which everybody naturally gravitates; one occupies it by following a certain path of thinking.
> – Dipesh Chakrabarty, "The Human Condition in the Anthropocene" (2015)[404]

Death makes for a mean leap into a zoecentric deep time worldview. For Aldo Leopold the leap came about by "thinking like a mountain." Rather than making the leap by watching an upturned turtle's eyes, Leopold reflected upon the "fierce green fire dying" in the eyes of a wolf he had mortally wounded. Through his act of murder, and reflection upon the act, Leopold fell into the "outburst of wild defiant sorrow,"[405] an outburst synonymous with the dour demeanour's heartfelt riposte to the demeanour of those who throw the dice.

The falling is one of freefall down into a portal to another temporal dimension – one known perhaps, in some way, by wolves, through their influence over the ages on the geomorphology of their mountain abodes. Leopold's epiphany was to peer down into the future, seeing that culled wolves means booming deer populations, which erode mountain vegetation, leading to denuded shrubs and trees, through to mountain topsoil dispersed into the winds. In a walnutshell: "only the mountain has lived long enough to listen objectively to the howl of a wolf."[406]

Picture the life cycle of entire mountain chains that have appeared, right through to their disappearance; from every accumulating grain, their sedimentation into rock, compiled upon rock-cum-rockface; their uplift through the endless cycling of plate tectonics, their metamorphosis from abiotic and biotic forces becoming conjoined: from glaciers carving a mountain in two, to ice cracking a rock

403 Aldo Leopold, "Thinking Like a Mountain," in *A Sand County Almanac and Sketches Here and There* (Oxford: Oxford University Press, 1949), 130.
404 Chakrabarty, "The Human Condition in the Anthropocene," 143.
405 Leopold, "Thinking Like a Mountain," 136.
406 Leopold, "Thinking Like a Mountain," 132.

into two, to microbial life living in soil, through to plant roots holding rocks together that would otherwise fall off the face of a mountain side.

Instead, the price of not learning to "think like a mountain" is that "we have dustbowls, and rivers washing the future into the sea."[407] Thus the intentional culling of wolves, or our unintentional flipping of the turtle, cry out for fidelity to life's inextricable entanglements with realms of space and time that far precede everything currently living, and far exceed its death. Leopold's epiphany heeds the call of Chakrabarty's "epochal consciousness" and its explosion of the spatial and temporal dimensions that our act of turtle flipping has opened up. And closed down.

To abide by that newfound fidelity is to hum along to the universal sigh, admitting changeability, consequences, and the comprehension of same, into the kernel of the walnutshell. It is to get reacquainted with the ghosts in one's shell, falling out of a tree with Lucy, or watching the Panama Isthmus slowly close and Raine Island slowly rise out of the ocean through the eyes of thousands of generations of mammals with whom we ultimately share a common ancestor. It is to stare into the eyes of the dying wolf, see there the genesis and erosion of mountains, and finally acquiesce entirely to the vicissitudes of the cosmos.

Once upon a time, which lasts the entire history of earth up until this particular rupture was unleashed, epochal consciousness could bask, awestruck, in the sheer majesty of Darwin's "endless forms most beautiful"[408] that is life. Nowadays, all such portals are fractured by the abhorrent shock of the human violence that first enacted this epiphany, then fell at the feet of the infinite regression of consequences revealed as the threads unravelled. In a walnutshell: epochal consciousness folds the "fierce urgency of now"[409] into deep time, enclosing the generations of human who had no knowledge of what they were doing with those who knew full well what they were doing, down to those who now understand we could not comprehend the full scale of the consequences of our actions even if we had all the time in the world. Those alive today have collectively acquired geological agency through the slow violence enacted by colonialism and capitalism on the poor and the biosphere alike. Social and biophysical limits to life come head to head, tail to tail.

Such is life, when one happens to be living during a rupture of life on earth. When epochal consciousness no longer cuts the mustard gas. When it is no longer enough to "think like a mountain." When one is "currently going through that

407 Leopold, "Thinking Like a Mountain," 135.
408 Darwin, *On the Origin of Species*, 459.
409 King, "I Have a Dream."

kind of a period"[410] where the period referred to is the Sixth Mass Extinction Event on earth. A psyche attuned to imperceptible deep time unfurling, like the time taken to forge, transform, sculpt, and eventually erode a mountain, is a psyche ill-tuned to the present tense.

Writing a half century after Leopold, Chakrabarty's leap into a zoecentric deep time worldview came from folding social limits into biophysical limits to life. Namely, Leopold's 1949 wolf murder expresses what Chakrabarty means when he says "humans are biological agents, both collectively and as individuals. They have always been so." This is the once upon a time . . . up until the Anthropocene. By the time these words had been penned in 2009, we had ceased being mere biological agents, and had instead "become geological agents," having "reached numbers and invented technologies that are on a scale large enough to have an impact on the planet itself."[411]

Leopold's "thinking like a mountain" is ill-tuned to this event, wherein our species went from being biological agents to geological agents within the space of a human lifetime. This transition from one form of agency to the other does not so much stretch the comprehension limits of the [rockmelon – née walnut – sized] brain, as demand a complete renewal of perspective. It throws our experience of the present tense into perspective, where the length of a day or the intrinsic volatility of earth and life itself become measured at the scale of the cosmos, and not at the scale of the being sizing up its measurement of all things great and small. But if desperate times do call for desperate measures, then measured against its only true correlate – the cosmos – a mountain does not make for a portal into either the desperation of the times, or the desperation of current proposals to counteract them.

Given the gravitas of the particular period we are now going through, thinking like a mountain appears too gradual, too gentle, and too soothing a solace of cosmic nihilism. Living, as it were, during a rupture of life on earth, sings out instead for a worldview commensurate with the 'period.' This does not mean a worldview premised on the tangible geological agency now being wantonly banded about the planet. True, we are no longer in the business of marvelling at the unspeakable grandeur and cosmic verisimilitude of beholding a mountain. Nowadays we are in the business of blowing their tops off, to suck out the marrow of minerals and fossil fuels that compose a mountain interior. But this does not mean we can update Leopold's adage to our period by renaming it 'thinking like a mountain top removal.'

410 Chakrabarty, "The Climate of History," 207.
411 Chakrabarty, "The Climate of History," 207.

A worldview commensurate with living *during* a rupture of life on earth might, however, be achieved by thinking like a very specific form of mountain, one which passes from appearance to disappearance not with a "whimper, but with a bang."[412] By thinking, in short, like a volcano:

> This is a planet on which a shell of solidified rock – a slender firewall – is all that separates us and fellow creatures from a world of unbearable heat, pressure and motion. At the same time, our existence and the continuity of this crustal dwelling place is utterly dependent on its periodic puncturing, its replenishing by the matter-energy beneath. To even begin to comprehend this relationship, we must huddle around the hot spots, the fracture zones, the fiery portals between surface and underworld. Small wonder then that volcanology . . . is one of the deadliest fields of intellectual inquiry: a subdiscipline premised on stealing up on life-extinguishing forces.[413]

To gain a faithful view of our world is to huddle over "the fiery portals," with their ever-imminent latent cataclysms, in full awareness of our own fragility. Learning to think like a volcano is learning to embrace, rather than brace, for impact. Because, for all their cataclysmic consequences, Clark reminds us that volcanoes' puncturing of earth also replenishes "our existence." This 'our' is not anthropocentric because the hour at hand is not anthropocentric. This rupture, and indeed ruptures in general, are not about replenishing the existence of a single species. As The Flaming Lips sing it: "We're not going to make it/You and I were never meant to be part of the future . . ."[414]

Neither is the 'our' biocentric. Chicxulub has been unfairly judged within the moral arc of the universe, bending, as it does, neither to justice, nor to rhyme, nor to reason. Recently it has been revealed that the asteroid was probably not the single fell swoop from the heavens that it was always thought to be. Rather, it was the straw that broke the camel's back, the "cataclysm upstream" which cleared the planet for mammalian ascent, progressively speciating the order of mammals (from which: camels).

This is however a straw at the scale of the universe: the bolide impact, in and of itself, constituted a planetary-scale rupture. Its shockwaves repeatedly encircled the earth as their force permeated through all oceans and all landmass. At the time of the collision a colossal hotspot lay precisely opposite, on earTheia's yonder side, and the area that is now the Deccan Traps in India lay above this hotspot. One theory contends that, having travelled the planet's circumference, all these shockwaves transferred the concentrated bulk of their force onto this

412 T.S. Eliot, *The Hollow Men* (London: Faber & Faber, 1925), 128.
413 Nigel Clark, "Bare Life on Molten Rock," *SubStance* 47, no. 2 (2018): 14.
414 The Flaming Lips, "All We Have Is Now."

region, rupturing the earth above the hotspot.[415] The massive and enduring volcanic eruptions this unleashed thus became the straw that catalysed one of the most intensive known periods of planetary-scale transformations of all earthly -spheres: atmosphere, lithosphere, and, consequently, biosphere.

What remains of those hundreds of millennia of eruptions is nowadays the Deccan Traps: solidified flood basalt two kilometres thick, stretched across half a million square kilometres. Through "its replenishing by the matter-energy beneath," the hotspot under the traps may have elevated Chicxulub's rupture into the end of The Age of Dinosaurs. The hotspot's ability to be woken by intergalactic forces contains the overwhelming wellspring of one such period: a period that can be counted on "the same scale as that released at other times when there has been a mass extinction of species." Such is the "period" we are "currently going through."[416]

By this time, it has become redundant to recall that the details have been lost to time. It is self-evident that only fragments remain. Though it is clear that Chicxulub was a case of the Court Jester going about his merry ways, rather the Red Queen, the jury is still out on just how much Chicxulub was in cahoots with the Deccan hotspot. Mark Richards, one of the leading proponents of the theory that the asteroid set off the volcanic eruptions, appeals to reason, rather than rhyme: "If you try to explain why the largest impact we know of in the last 1000,000,000 years happened within 100,000 years of these massive lava flows at Deccan . . . the chances of that occurring at random are minuscule."[417]

Hence, volcanic "replenishing" of "our existence" is zoecentric, not biocentric. Where "life-extinguishing forces" also come to constitute life-creating forces. Which is why volcanoes make for the pre-eminent straw to break the back of the present tense. In "Volatile Worlds, Vulnerable Bodies: Confronting Abrupt Climate Change," the same article that has provided the premise of this song, Nigel Clark considers who else, or rather what else, is casting dice at the table where we so recently took a seat:

> A tiny nudge may be all it takes to unleash a set of cascading, self-reinforcing changes in the climate system. Conversely, a major impetus to change might lie dormant in the system for centuries or millennia before its impact is manifest . . . global climate might already be 'naturally' close to a tipping point, thus dramatically amplifying the significance of human

415 Mark Richards et al., "Triggering of the largest Deccan Eruptions by the Chicxulub Impact," *GSA Bulletin* 127, nos. 11-12 (2015): 1507–1520.

416 Chakrabarty, "The Climate of History," 207.

417 Mark Richards, quoted in Robert Sanders, "Did Dinosaur-Killing Asteroid Trigger Largest Lava Flows on Earth?", *Berkeley News*, 29 May 2015, accessed 8 January 2018, https://news.berkeley.edu/2015/04/30/did-dinosaur-killing-asteroid-trigger-largest-lava-flows-on-earth/.

> forcing, while there is also the possibility that human impacts have taken climate systems closer to a threshold, for which the final push could turn out to be an unforeseeable non-human forcing – such as a large-scale volcanic eruption.[418]

Clark's thinking like a volcano embraces the dour worldview that makes up the refrain of this song. It is incontrovertible that humanity is responsible for enraging the climate system, which looks set to "unleash a set of cascading, self-reinforcing changes." But humans were able to do this precisely because the system was always already prone to fits of rage. The three blind mice enraged the farmer's wife because she was already of volatile temperament, just as the three bishops were able to elicit such violent comeuppance from Queen Mary, because she was already in the habit of violently suppressing competing claims to faith and authority.

So, "a large-scale volcanic eruption" may become the actual straw to break the camel's back. Or, historical industrial activity may have already sufficed to induce a new climate regime. Or, historical industrial activity may have catalysed a series of events linked by breadcrumb trails, showing how those who created the trail also created the conditions of their own extinction. Nineteenth-century Raine Island phosphate mining is to twenty-first-century turtles falling over the island's cliff edge as the melting icecaps are to the isostatic rebound of continental crust millennia upon millennia from now.

Beyond the more obvious effect of raising sea levels, melting icecaps also give renewed buoyancy to some continental plates. Beyond this less obvious effect of the isostatic rebound, melting icecaps make it easier for magma to rupture earth's surface.[419] In a walnutshell, the proverbial "large-scale volcanic eruption" can be traced back to human forcing. Yet the details of those fragments will be lost to a time long succeeding our petrification. In the meantime, we are still blind to whether or not we have already been blinded. As we always were. As we could only ever have been.

In this Bataille-esque worldview, life is a phenomenon always at the behest of forces of radical asymmetry and radical contingency operating at the scale of the cosmos. And now, life is even more at the behest of these same forces, having been thrown into discombobulation by human-forcing that may (or may not) amount to the straw that broke the camel's back, or may (or may not) have

418 Clark, "Volatile Worlds, Vulnerable Bodies," 42.

419 Summer Praetorius et al., "Interaction Between Climate, Volcanism, and Isostatic Rebound in Southeast Alaska During the Last Deglaciation," *Earth and Planetary Science Letters* 452 (2016): 79–89.

already amounted to the final straw. To add contusion to the blunt force trauma: it turns out the camel's back was already broken, because it more or less exists in a permanent state of breaking.

In this perspective, it does not matter that we/WE* who did the flipping are but a tiny fraction of life-writ-large. Our culpability is certain, but irrelevant at this scale, especially since there is no possibility of atonement or repair. Thus, in the face of our empty gestures only humility remains, and with it, dour recognition of the incomparable pain and suffering the rupture will exponentially unleash not only in the coming decades, centuries, or millennia, but over unfathomable epochs to come.

In this vein, to think like a volcano is to embrace a zoecentric worldview. Hark the *New World Coming* with its New New Animals, which, on the balance of probabilities, will be dominated by forms of life that are utterly more tolerant to incomparably rapid biophysical change. Alas, that is not a new world conducive to the likes of animals or plants as they have lived thus far in their respective kingdoms. Which means the Stegosaurus does not lament that "the mammals are taking over." Rather, our present tense lament is that 'the microbes are taking over,' once the lion's share of existing animals and plants have become petrified.

If this is the cause of our desperation, then we do not have to look far to find the measure of it. Timely and appropriate as it may be to *think* like a volcano in our present tense, our desperation can be measured by the fact that ModCon now wants to *act* like a volcano, without learning how to *think* like one first. This is a course of action that embraces a hubristic Fuller-esque worldview, of scaling *Dome over Manhattan* up to the entire planet via intervention in the form of climate engineering. In this measure of desperation, acting like a volcano refutes the zoecentric and the biocentric, convulsing instead with the self-importance of human exceptionalism, and its demonic progeny of an anthropocentric worldview.

Whereas the price of not having learned to "think like a mountain" was "dustbowls, and rivers washing the future into the sea," the price of not learning to think like a volcano is a dustbowl earth, and the sea evaporating into outer space via runaway climate change. To forestall such eventualities, ModCon now proposes one-shot and mostly completely blind casts of the dice designed to forestall the rupture's "cascading, self-reinforcing changes in the climate system."

Snorted Forth Fire-Streams

> If ever a breath came to me of creative breath and of that heavenly necessity that forces even accidents to dance astral rounds . . . If ever I rolled dice with gods at the gods' table of the earth, so that the earth quaked and ruptured and snorted up rivers of fire – because the earth is a gods' table, and it trembles with creative new words and gods' throws.
> – Friedrich Nietzsche, *Thus Spoke Zarathustra* (1884)[420]

> Above all, to work with and through volcanism or other geologic process, we stress, is to engage with an excess of possibility. To think in terms of becoming with volcanic and magmatic processes is to recognize that 'we' and other organisms have actualized only a fraction of the potentiality that inheres in the geologic domain. Which is also to imagine that, however much damage our species has done to the Earth – or the Earth to us – there remain a great many biogeophysical avenues as yet unexplored or incompletely realized.
> – Nigel Clark, Alexandra Gormally, and Hugh Tuffen, "Speculative Volcanology: Time, Becoming, and Violence in Encounters with Magma" (2018)[421]

A year after *Dr. Strangelove* satirised a fictional US President presiding over the Cold War MAD mentality, the actual President, Lyndon Johnson, was presented with a scenario that revelled in the MAD absurdity of the real world. On 5 November 1965, the President's Science Advisory Committee (PSAC) presented their report on *Restoring the Quality of Our Environment*. Having been directed by Johnson to investigate human-induced global warming, they reported that

> only about one two-thousandth of the atmosphere and one ten-thousandth of the ocean are carbon dioxide. Yet to living creatures, these small fractions are of vital importance . . . Within a few short centuries, we are returning to the air a significant part of the carbon that was slowly extracted by plants and buried in the sediments during half a billion years.[422]

Framing "worldwide industrial civilisation" as "unwittingly conducting a vast geophysical experiment," the report's authors calculated that the complete melting of the Antarctic ice cap by human-induced global warming would raise sea levels 130 metres.[423] Stating the oblivious, they restricted their frame to members of the same industrial civilisation that had catalysed the crisis to begin with: "the climatic changes that may be produced by the increased carbon dioxide content

420 Nietzsche, *Thus Spoke Zarathustra*, 185.
421 Clark, Gormally, and Tuffen, "Speculative Volcanology," 289.
422 Roger Revelle et al., *Restoring the Quality of Our Environment: Report* (Washington DC: The President's Science Advisory Committee: Environmental Pollution Panel, 1965), 112.
423 Revelle et al., *Restoring the Quality of Our Environment*, 123.

could be deleterious from the point of view of human beings."[424] Thus far unremittingly anthropocentric, echoing the public disclosure of same in the 1958 *Meteora* television documentary.

The PSAC report's private persona and *Meteora's* public persona also both echoed US attitudes toward responding to human-induced climate change. These are also unremittingly anthropocentric, and based on human agency and human hubris, rather than any kind of cessation of deleterious activities or humility to the forces at play. The report rhetorically asks whether "the possibilities of deliberately bringing about countervailing climatic changes therefore need to be thoroughly explored."[425] By "countervailing" they endorse a Fuller-esque 'do to undo' mentality: climate change should be actively tackled by asserting equal but opposite force, rather than reducing or minimising human forcing of "climatic changes."[426] Human interventions to 'restore' *our* existence and *our* environment stand in stark contrast to Clark's vision of the biosphere replenishing itself through volcanic ruptures and eruptions.

Both the PSAC report and *Meteora* already demonstrated that "countervailing" dice was a long-enjoyed US mentality. In *Meteora*, Baxter boasts to Carlson that "the next few years will see more progress in weather control, weather prediction, and in the use of weather, than has been made since man first raised his eyes to the sky." Such feats included "learn[ing] how to steer" hurricanes, through the use of "oil fires on the ocean, oil slicks, cloud seeding. The possibilities are endless . . ."[427]

From little things, big things grow. From little things, big things growl. From such proposals to control weather came forth planetary scale climatic interventions. Carlson boasts back: "And from these future weather wizards will come the answers to such questions as . . . what would happen if we could change the course of the gulf stream? Or the other great ocean currents. Or warm up Hudson Bay with atomic furnaces?"[428]

The "weather wizards" did not have to wait long to be anointed as the magicians behind the MAD myths that propel civilisation. By 1962 they had already conjured up "On the Possibilities of Climate Control" when Harry Wexler, Chief of the US Weather Bureau's Scientific Services, put forth the first proposal that constitutes climate engineering.[429] Although Wexler was building upon a much

424 Revelle et al., *Restoring the Quality of Our Environment*, 127.
425 Revelle et al., *Restoring the Quality of Our Environment*, 127.
426 Revelle et al., *Restoring the Quality of Our Environment*, 127.
427 Capra, *Meteora*.
428 Capra, *Meteora*.
429 Harry Wexler, "On the Possibilities of Climate Control," in James Fleming, *Fixing the Sky: The Checkered History of Weather and Climate Control* (New York: Columbia University Press, 2010), 224.

longer US history of proposed weather control going back a century before *Meteora*, to 1841, when James Espy, the first US Government meteorologist, proposed a systematic network of fires to form 'artificial volcanoes' in his *The Philosophy of Storms*.

Yet Espy's proposal did not quantitatively or qualitatively constitute climate engineering because it aimed to ephemerally control regional weather, through the network of "great fires"[430] that would, in theory, catalyse rainfall. And the relatively regional and short duration of weather control interventions are chalk to the cheese of the planetary scale and deep time effects of climate engineering. Suffice to say that delusions of grandeur in *The Philosophy of Storms, Meteora, On the Possibilities of Climate Control,* or *Restoring the Quality of Our Environment* were largely just utopian in the 1950s and 1960s, like Fuller's *Dome Over Manhattan*.

Over the 1970s and 1980s however, acting like a volcano became quantifiable and demonstrable, by satellite measurements of volcanic eruptions of sulphur dioxide, beginning with the 1982 El Chicho eruption. Ironically, the first modelling of cooling effects from an eruption was conducted aboard Nimbus 7, the satellite that first began to measure solar irradiance in 1978. The same device pinpointing the transition between earth's net negative to net positive energy balance, and thus the transition between Cass' and Simone's *New World Coming*, also pinpointed the efficacy of mimicking volcanoes to stall that new world from appearing around the bend.

Later in the same year that El Chicho's eruption provided the litmus test for mimicking volcanoes, Anglophone audiences discovered that their cultural imaginary was in fact shared by another booming industrial economy, via the Japanese cartoon *Astro Boy.* In *The Great Meltdown* episode, Astro Boy's arch nemesis Atlas deliberately melts the Arctic ice cap, showing up the tenuous fragility of industrial civilisation:

> Fortunately our city [Tokyo] has not yet been harmed by the rising waters but half of New York has been severely flooded. Almost all the icebergs of the North Pole, with the exception of the glaciers of Greenland, have melted completely. Tidal waves and extreme weather conditions are now pelting cities all over the globe and within days, much of the earth's land may be underwater.[431]

430 James Pollard Espy, *The Philosophy of Storms* (New York: C.C. Little and J. Brown, 1841), 496.
431 Osamu Tezuka, director, *Astro Boy*, episode 29, "The Great Meltdown," aired Nippon TV, 12 November 1982.

To remedy the rupture being unleashed, the Japanese government summons Astro Boy for a mission to refreeze the melted icecaps by delivering a "freezing proton bomb"[432] upon the Arctic. The bomb equates to the same "countervailing" forces advocated by *Restoring the Quality of Our Environment*: both born of an "epochal consciousness" that recognises industrial civilisation was already unleashing a *New World Coming*, but believing demons can be coaxed back into containment. Like his real-life US counterparts, the cartoon scientist Dr Elefun offers a rationale for such a weapon:

> We've been working on it because air pollution has been gradually raising the temperature of the atmosphere. Eventually this would cause the polar ice caps to melt, just enough to cause disastrous flooding in both hemispheres.[433]

The Great Meltdown collapses a deep time scale, equivalent to the unfathomable millions of years taken to suture together the Isthmus of Panama, into the duration of a human life. This 'eventually' is like witnessing the isthmus close over a handful of decades. Similarly, the episode scales down the long emergency that is the twenty-first-and-last century into a cartoon plot convention. Dr Elefun cautions Astro Boy that

> we hadn't planned to use it [the freezing proton bomb] this soon but this is an emergency . . . we know its powerful buts its only in the experimental stage. It may cause undesirable results. But we have to take a chance.[434]

Likewise, the Dice decries that "we have to take a chance" to slow the quickening global heating through climate engineering. In the cartoon version of *Astro Boy*, all hell breaks loose but all's well that ends well. In the film version of *Dr. Strangelove*, all breaks loose but all's well to end all. In the real-world version of the present tense, it remains to be seen which kind of all hell breaks loose in any eventuality.

In the decades following El Chico's eruption and Astro Boy's heroics, proposals for new forms of climate engineering have increasingly taken shape alongside the growing awareness that "worldwide industrial civilisation"[435] amounts to Atlas melting the ice caps. In July 1988, while James Hansen was testifying to the US Congress about human-induced climate change already being in effect, oceanographer John Martin infamously proclaimed to the Woods Hole Oceanographic Institution: "give me a half tanker of iron, and I will give you an ice age."

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432 Tezuka, *Astro Boy*.
433 Tezuka, *Astro Boy*.
434 Tezuka, *Astro Boy*.
435 Revelle et al., *Restoring the Quality of Our Environment*, 123.

This was based on his modelling that "with 300,000 tons of iron, the Southern Ocean phytoplankton could bloom and remove two billion tons of carbon dioxide."[436] Martin recalls first ushering his proposal "more or less facetiously" by "putting on my best *Dr. Strangelove* accent."[437] The punchline of his joke remains to be seen.

The following year, US engineer James Early put forth the first off-world climate engineering proposal, to deflect incoming solar radiation from outer space. His "Space-based Solar Shield to Offset Greenhouse Effect," published in the *Journal of the British Interplanetary Society*[438] effectively scaled up Fuller's *Dome Over Manhattan* to a 2,000-kilometre-wide glass shield stationed at Lagrange Point One. At this scale, the biosphere would not only be hitched to the vicissitudes of our local region of the solar system, as it always has been, but to human intention too. The same cosmic vicissitudes apply to covering Raine Island or coral reefs in shade cloth. The universe is here, there, and everywhere, connected across and between scales of inextricable entanglements.

Just as Hurricane Sandy would have obliterated Fuller's *Dome*, J002E3 would have shattered this glass ceiling when it returned via this Lagrange Point in 2002, had the solar shield ever actually been built. And in the exceedingly unlikely event any such structure will ever be built, mounted, and parked there, it is already written into the stars that J002E3 will become gravitationally lured in toward it when it next passes this Lagrange Point in 2041.

The Endless Summer Without a Year

> Anybody not wearing two million sunblock is gonna have a real bad day, get it?! You think you're safe and alive? You're already dead! Everybody! Him, you, you're dead already! This whole place! Everything you see is gone! You're the one living in a fucking dream!
> – Sarah Connor in *Terminator 2: Judgement Day* (1991)[439]

> Merrily merrily merrily merrily life is but a dream.
> – Eliphalet Oram Lyte, "Row, Row, Row Your Boat" (1881)[440]

436 John Martin, "Woods Hole Oceanographic Institution Journal Club lecture," transcript of speech delivered at Woods Hole Oceanographic Institution, Massachusetts, US, July 1988, accessed 18 February 2021, https://earthobservatory.nasa.gov/features/Martin.

437 Martin, "Woods Hole Oceanographic Institution Journal Club lecture."

438 James Early, "Space-based Solar Shield to Offset Greenhouse Effect," *Journal of the British Interplanetary Society* 42 (1989): 567–569.

439 James Cameron, director, *Terminator 2: Judgement Day* (TriStar Pictures, 1991), 35 mm.

440 Lyte, "Row, Row, Row Your Boat."

While many climate engineering proposals are as fantastical as Early's space mirrors, and many others have already been deemed as ineffectual as Martin's oceanic iron filings, one proposal remains too down to earth to be discounted outright as either fantasy or delusion. Stratospheric Sulphur Particle Injection (SSPI) proposes to mediate in earth's energy imbalance by continuously injecting sulphur particles into the stratosphere. Like Espy's system of 'artificial volcanoes', this entails mimicking volcanoes, but here by reflecting incoming solar radiation back into outer space in order to slow global heating. It is otherwise incomparable to Espy's 'artificial volcanoes', whose effects would be relatively local and ephemeral, whereas SSPI would have a wholesale effect on the Earth System's biogeochemical functioning.

SSPI received an air of legitimacy when Paul Crutzen declared his provisional support for researching the efficacy of such an intervention in his 2006 article on "Albedo Enhancement by Stratospheric Sulphur Injections: A Contribution to Resolve a Policy Dilemma?"[441] Posed with the poignant use of a question mark to end the title, Crutzen's article has reverberated through the work of scientists, especially given his standing as a Nobel laureate for co-discovering the ozone hole, and as the first scientist to propose formally renaming the current epoch to the Anthropocene.

Crutzen's provisional support encapsulates how the feverous measure of desperation is begetting utterly desperate measures. Eli Kintisch explains the dilemma this creates with breathtaking bluntness in *Hack the Planet: Science's Best Hope or Worst Nightmare for Averting Climate Catastrophe*: "to cogently oppose geoengineering research . . . one has to accept one of two faulty propositions: either the problem is not that serious, or we're on our way to solving it. These days, one will be hard pressed to find many takers for either."[442] Confronted with the present Now-or-Never, or truly pressed between the rock we rolled and the hard place we built, the familiar ethics of conservation and intervention must either become unspeakably warped, or lose their relevance altogether.

The measure of desperation and the ethical impossibility of the present tense is succinctly expressed by environmental philosopher Christopher Preston, in his *Climate Justice and Geoengineering: Ethics and Policy in the Atmospheric Anthropocene*:

441 Paul Crutzen, "Albedo Enhancement by Stratospheric Sulphur Injections: A Contribution to Resolve a Policy Dilemma?", *Climatic Change* 77 (2006): 211–220.

442 Eli Kintisch, *Hack the Planet: Science's Best Hope or Worst Nightmare for Averting Climate Catastrophe* (Washington, D.C: Wiley, 2010), 16.

> Many of the best options for dealing with the escalating climate problem are no longer on the table. The options that remain are increasingly far from ideal. What might have been a slow and orderly transition to a low-carbon economy will now have to be a rapid and lurching one. What might have been a timely and balanced research and development path away from fossil fuels and towards clean technologies will now have to be an almost impossibly quick one. Where climate engineering once looked outlandish or even repulsive, it is now becoming increasingly credible to growing numbers of observers.[443]

Having waited so long that "many of the best options" for dealing with the crisis are no longer "on the table," the remaining choices are between multiple evils, both active and passive. That time has passed (into the past). That boat has sailed (into the storm). This bird has flown (into the jet propeller). SSPI is truly shoot first, ask questions later: this one-shot cast of the dice seeks to co-opt volcanic forces, now that no more appealing or ideal choices remain.

Of the "increasingly far from ideal" options that do remain, SSPI is also too down to earth because of how close to home it is. Namely, as inhuman geographer Kathryn Yusoff points out, the "logic" of a superficial similarity between unintentional anthropogenic climate change and intentional climate engineering is "used to defend geoengineering to its critics" on the basis that

> there is little distinction between inadvertent geoengineering (anthropogenic climate change) and overt climate engineering, just one of intent . . . The shift is from the generation of predictive climate scenarios to predictive interventions in climate actualities.[444]

For instance, the dust jacket of legal theorist Jeremiah Purdy's 2015 book on *After Nature: A Politics for the Anthropocene* states that "climate change is engineering without design."[445] Yet nowhere in the book does he mention climate engineering or even design, making such claims toward a politics for the Anthropocene null and void. Climate change can only be reduced to "engineering without design" if earth can be reduced to Fuller's *Spaceship Earth* and his hubristic notion that it "must be comprehended and serviced in total."[446] In Purdy's wilful misreading of climate science, exercising climate engineering agency is situated as a choice to

443 Christopher Preston, "Introduction: Climate Justice and Geoengineering," in *Climate Justice and Geoengineering: Ethics and Policy in the Atmospheric Anthropocene*, ed. Christopher Preston (New York: Rowman & Littlefield International, 2016), xi.

444 Kathryn Yusoff, "The Geoengine: Geoengineering and the Geopolitics of Planetary Modification," *Environment and Planning A* 45, no. 12 (2013): 2801.

445 Jedediah Purdy, *After Nature: A Politics for the Anthropocene* (Cambridge, MA: Harvard University Press, 2015), dust jacket.

446 Fuller, *Operating Manual for Spaceship Earth*, 16.

be made in the future. Yet we have been "unwittingly conducting a vast geophysical experiment" since well before Johnson's PSAC warned of such, back in 1965.

WE* are the ones who let the times for less desperate measures pass. The time when intervention could have amounted to merely ceasing to do bad deeds. And now amounts to doing new bad deeds: intentional geoengineering to counter the current "inadvertent geoengineering" that constitutes anthropogenic climate change. Meanwhile, instances abound that quantify the extent of our existing 'inadvertent geoengineering' in terms of both frequency and severity of detail. The show about nothing must go on: recall the 1°C increase in temperature over the continental US in the 48 hours after the 11 September 2001 attacks, because air traffic was grounded.

After all, modified commercial aeroplanes are one of the proposed means for placing the sulphur particles in the stratosphere. In this proposal, they are modified to leave behind sulphur trails, in addition to their existing contrails that also manifestly modify the current climate. For Yusoff, climate engineering is indefensible because it acts with this degree of intentionality. Similarly, sociologists Maialen Galarraga and Bronislaw Szerszynski inveigh against the defence that climate engineering merely represents the distinction between unintentional influence and intentional intervention:

> The very definition of geoengineering means that it is intentional and planned; the full-scale implementation of Solar Radiation Management would thus result in a climate that was an artefact – a climate that has not just been disturbed by human intervention, but has been intentionally shaped by human intervention.[447]

Endorsements of such interventions in the social sciences go back as far back as a 1998 article published in the Stanford Environmental Law Journal, whose author, Jay Michaelson, proclaimed it to be "the first law review article advocating geoengineering as a climate change mitigation strategy."[448] Michaelson's *Geoengineering: A Climate Change Manhattan Project* is indeed such an endorsement, though it never defines what it means by its titular conflation of climate engineering and the Manhattan Project. Nor does it mention the atom bomb, Hiroshima, Nagasaki, violence, war, or indeed what enemy is to be combatted via this herculean undertaking. Naturally, it also fails to point out that any such Manhattan

447 Maialen Galarraga and Bronislaw Szerszynski, "Making Climates: Solar Radiation Management and the Ethics of Fabrication," in *Engineering the Climate: The Ethics of Solar Radiation Management*, ed. Christopher Preston (Lanham, MD: Lexington Books, 2012), 221.

448 Jay Michaelson, "Geoengineering and Climate Management: From Marginality to Inevitability," *Tulsa Law Review* 14 (2010): 21.

Project is premised on a MAD mentality, thus enacting its Mutually Assured Destruction: so goes the biosphere, so goeth civilisation-so called.

Instead, Michaelson argues that "in the post-Kyoto world, we need more than promises of emissions cuts and tradable permits. We need a Climate Change Manhattan Project."[449] Avoiding mention of any historical or contemporary disasters posed by nuclear weapons, his proposal riffs on the "famous film subtitle" with the paraphrase that "it is time for environmentalists to learn to stop worrying and love the Big Fix."[450] In subsequent years Michaelson's endorsement has not waned, wherein he concluded a 2010 article with the heading "How I Learned to Keep Worrying and Still Love Climate Management," arguing that "if human management of the global climate scares us, good – it should scare us. But it should not scare us into jokes."[451] That the butt of the joke is Mutually Assured Destruction is evidently no laughing matter.

With such a worldview gaining increasing currency with tyrants who wield world-changing power, namely, fossil fuel companies and their geopolitical omnipresence, climate engineering has come to be posited as manifest destiny for designing a way through the rupture. However, that portentous throw of the die differs greatly from all other ModCons, as many proponents are not motivated by any more-than-human concern, such as species extinction, but rather by pure self-interest in perpetuating the society and economies that put us into this parody of *Dr. Strangelove's* parody in the first place.

Swirling in such self-edifying currency, "we are, it seems, gearing up to fight fire with fire" in this manifest destiny rationale, which for Clark

> is hardly surprising that claims about humankind becoming a preeminent geomorphic force have been accompanied by proposals to convert our accidental impacts on earth systems into effects that are intentional and compensatory.[452]

All the more reason to collectively consider the childhood adage about how those who play with fire get burned. First, by accident. Now, with intention.

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449 Jay Michaelson, "Geoengineering: A Climate Change Manhattan Project," *Stanford Environmental Law Journal* 17, no. 73 (1998): 81.

450 Michaelson, "Geoengineering: A Climate Change Manhattan Project," 131.

451 Michaelson, "Geoengineering and Climate Management," 27.

452 Nigel Clark, "Rock, Life, Fire: Speculative Geophysics and the Anthropocene," *Oxford Literary Review* 34, no. 2 (2012): 259.

The Year Without a Summer

> There's a fatal subconscious attraction in resolving the problem of one's own death in the thought of the whole world blowing up together.
> – Stanley Kubrick, on *Dr. Strangelove* (1964)[453]

> I like juxtaposing all the silly details with the end of the world. When the Earth is ready to crumble between our fingers, whatever we do in the way of heroic conquests or petty family squabbles doesn't matter.
> – Lars von Trier, on *Melancholia* (2011)[454]

Nearing the end of something is as good a time as any to return to the beginning. In this case, the cover song of this book: Mount Tambora, photographed from the International Space Station, 350 kilometres above earth, in 2009. The six-kilometre-wide and one-kilometre deep caldera shows the remains of the day in 1815 when this Indonesian volcano erupted, changing global climate so profoundly over the following years that 1816 was referred to in Europe as The Year Without a Summer.

Up to ten million deaths are attributed to the eruption's proximal and distal effects. This includes those killed instantly in the immediate vicinity, as well as those who died from starvation months later and tens of thousands of kilometres away, due to crops ruined by the abrupt climatic changes caused by the eruption. Those killed instantly may have become frozen in motion, caught at the confluence between being and becoming petrified, like the petrified remains of a village of 10,000 inhabitants on the flank of Mount Tambora. Entombed in their last moments, as were the inhabitants at Pompeii and Herculaneum.

Experiencing the aftereffects from Lord Byron's house on Lake Geneva, an 18-year-old Mary Wollstonecraft weathered The Year Without a Summer with an acute sensitivity to something untoward in the air. It was there and then that she conceived *Frankenstein; or, The Modern Prometheus*, inspired by the unnerving winter-during-summer, although nobody at that time knew that the cause lay in a volcanic eruption.

In her prescient insights into the relationship between social and biophysical limits to life lies the key for taking *Frankenstein* as a parable for contemporary proposals to harness volcanism to engineer climates. These proposals bear echoes of Dr Frankenstein's harnessing of mortality to design life. Like the tormented

453 Stanley Kubrick, *The Stanley Kubrick Archives*, 365.

454 Lars von Trier, interview with Juul Carlsen, "The Only Redeeming Factor is the World Ending," *Danish Film Institute*, 4 May 2011, accessed 18 February 2021, http://www.dfi.dk/Service/English/News-and-publications/FILM-Magazine/Artikler-fra-tidsskriftet-FILM/72/The-Only-Redeeming-Factor-is-the-World-Ending.aspx.

doctor, we are already confronted with the return of monsters set loose well before yesteryear: whether emissions from the 1960s or space-junk like J002E3.

These monsters were, unlike Frankenstein's creation, born of accident, ignorance and incompetence, rather than actual intention. But what happens when we do as Shelley's doctor did, and intentionally create monsters: new monsters, born of intention to ameliorate both themselves and the monsters of old. Monsters which, as the unfolding rupture teaches us, will inevitably return to haunt us.

The monsters confronting us today already take multiple forms, owing to the historical actions that fuelled contemporary civilisation. The foremost form confronting us is a contemporary manifestation of the character Burk Turgeson's all-options-are-on-the-table report, which he brandishes in the *Dr. Strangelove* War Room. The report, entitled in upper case as "WORLD TARGETS IN MEGADEATHS", lists projected figures for US first strike and counter-strike atomic warfare scenarios, drawn from the all-too-real contemporaneous MAD doctrine.

While Tambora, despite its cataclysmic portent, lies comfortably in the realm of cosmic vicissitudes and more-than-human agency, intentional climate engineering is a man-made monster that responds to the rupture with a MAD mentality. It asks in all earnestness which multitudes are most or more likely to perish from SSPI side effects, as if the probability of the once-and-once-only die roll can be foretold. The War Room report now reads WORLD SPECIES IN MEGADEATHS. This is where the "fatal subconscious attraction in resolving the problem of one's own death in the thought of the whole world blowing up together" emerges from screenplay into all-too-stark reality. Here, Kubrick is referring to the cold comfort he satirised in *Dr. Strangelove*, although, WORLD TARGETS cannot map onto the contemporary manifestation of WORLD SPECIES.

What thinking then, and thinking like what volcano, could offer a portent into the present tense? While Tambora has been passive since its last explosion in 1815, the westerly volcano that neighbours Agung and Batur is perpetually active. Kawa Ijen provides a telling stage for an alternate take on Lars von Trier's rationale for *Melancholia*, which he describes as "juxtaposing all the silly details" of individual human lives with the "end of the world."[455]

Ijen's details are by no means 'silly', though they are rendered so, as is all else, by the unfurling end of the world. The volcano is distinct for being an active sulphur mine, which provides the raw mineral that any prospective SSPI would require. Furthermore, Ijen is distinct because its sulphur is artisanally mined, meaning that only hand tools are used, without any mechanised equipment. 'Artisanal' often conjures up romantic images, but here this euphemism conceals

455 von Trier, "The Only Redeeming Factor is the World Ending."

the differentiated anthropos that begat the Anthropocene, whereby WE* became we, through the entrenched inequality and subjugation that fuelled the cataclysm.

Day in day out men trudge up to the summit of the 2,800-metre peak, then descend 300 metres into the caldera, via a narrow, unfenced path with cliff drops either side, to the acidic lake edge, where they prize off exposed sulphur chunks with a crowbar. Piling upwards of 60 kilogrammes in bamboo wicker baskets worn across the shoulders, they carry each load back up to the caldera summit, accumulating them into hand-pulled trollies that are then wheeled three kilometres down the volcano flank to a car park.

Massive plumes of toxic sulphur dioxide continuously funnel out of dozens of vents by the lake edge. Working without any mask, save for a scarf wrapped around the face, long-term health injuries ensue from osmotically breathing in the toxic fumes. Continuously changing wind directions also inundate workers in thick sulphurous vapour clouds, reducing visibility to less than being able to see one's hand in front of one's face. Including while descending and ascending the caldera, with thongs for footwear and no handrails to brace from falling into the precipice.

So goes the deeply divided anthropos folded into the imbroglio. Between those wielding geological agency by making War Room-style decisions to throw the dice in an attempt to lessen the numbers of WORLD SPECIES IN MEGADEATHS, and those who wield only biological, not geological, agency. Those who dictate and those who listen remain as different and chalk and cheese, and yet they are now forced to stand together under the Anthropocene's all-encompassing umbrella. The present tense and its rupture unfolding mean that these social limits to life placed on individuals and groups of individuals are bound up with the species' biophysical limits to life in ways that have never been more closely entwined.

In response, Chakrabarty argues for folding such deep time processes as volcanism into the social limits of life:

> For humanists living in such times and contemplating the Anthropocene, questions about histories of volcanoes, mountains, oceans, and plate tectonics – the history of the planet, in short – have become as routine in the life of critical thought as questions about global capital and the necessary inequities of the world that it made.[456]

Yet, while the "questions" have become "routine in the life of critical thought," this life of critical thought takes place far away from Ijen's crater, and worlds away from the men who work there. Removed from the privilege of space and time and leisure to pontificate, the absence of answers is anything but routine.

456 Chakrabarty, "Anthropocene Time," 32.

What question does Ijen then pose, both by the "inequities of the world that it made" and the volcanism itself?

In search of a response to that question, I visited Ijen, following on from my journey to Agung, Batur, and Pemuteran, to get too close to home with climate engineering, sulphur mining, and volcanism itself. No reason or rhyme to be made, only that of following the workers down into the caldera to one of William Blake's "dark satanic mills."[457] Only to surmise the sheer scale of activity, of human bodies dwarfed by the enormity of the caldera cathedral, ensnared in earthly volatility in order to fuel a human desire for unearthing that harks back to some of the earliest ghosts in our shells. The wind whips in all directions, sending the thick sulphur plumes morphing into everything from thin cyclone-like spiral shapes, to diffuse clouds that circle around the caldera.

Attempting to ascend back up the caldera face, I am forced to enter into the sheer volatility of the plume's shapeshifting directions. The sulphur dioxide burning against my eyes and throat, cowering on my hands and knees, blinded and chocking on the fumes, unable to move, frantically wondering whether to grope about blind on all fours to search for the plume's edge, even while unable to see the path's edge. Or, to lay in wait for the wind to change. I just keep cowering pressed against the cliff face, even though I cannot breathe, because to crawl around blind is to probe the fall a metre or so away from the cliff face path.

The response comes back in a walnutshell: no such fire can be wielded against the fire already lit by civilisation so-called. It is no coincidence that hellfire and lightning were once thought to be composed of sulphur. Having opted to unearth the infernal material, we now seek to co-opt it to our ends. These ends have, up until now, generally precipitated disasters at the proximal level, from petroleum to gunpowder in the case of sulphur. Now we co-opt it to try and delay our own end. SSPI skirts disaster at a cosmic level, in the original meaning of disaster: fallen stars. Our end extends to our local star, whose solar radiance we seek to diminish. All aboard *Spaceship Earth* – destination: nowhere. In short: the response itself also amounts to an empty gesture.

In long form, so too do all climate engineering "details," and, by extension, all ModCons. These are the "details" that become "silly" when juxtaposed "with the end of the world." Their silliness arises not only from their inability to actually forestall the end of the world, but in the conceit they display, of humans attempting to redirect the Earth System trajectory. To play such a game is to play with the dice of N-LSD, blindfolded and dumbfounded at the table of the gods.

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457 William Blake, "And Did Those Feet in Ancient Time," in *Milton: A Poem in Two Books* (London, 1810).

As if the spurious claim that no other options remain is grounds to pursue the game. To fathom such non-sense means descending deeper into what acting like a volcano actually entails. Clark states that ModCon "can only ever be a negotiation between the forces that humans can conceivably impact upon and those that remain – provisionally or permanently – beyond their practical reach."[458] Namely, biophysical limits to life always already outmatch any metamorphosis within the social limits to life. He maintains that

> even advocates of the most audacious proposals to intervene in the earth's climate are aware that they are only 'tweaking' a vast, massively complex system. They know full well that any nudging of global climate into or away from a threshold is only possible because the alternative regime is one of the possible or virtual states that inhere in the extant earth system. In whatever form it might be imagined or applied, then, geoengineering is not a total remaking of the earth, not the final seal on the 'end of nature.'[459]

Yet those hell bent on acting like a volcano do so by massively overstating human agency as if it were "a total remaking of the earth." As if the dilemma about whether to flip the World Turtle back onto its front were in any way akin to flipping individual turtles on Raine Island.

Alongside concerns about nation state(s) unilaterally pursuing climate engineering, say, in desperation against the global lack of greenhouse gas mitigation, there are also legitimate concerns about rogue individuals acting outside of any global governance conventions. The most notorious experiment to date occurred in 2012, when the Oceaneos Marine Research Foundation illegally dumped 100 tons of iron sulphate into the coastal waters off British Colombia. The experiment aimed to sequester carbon dioxide by triggering an algae bloom, which would also boost salmon stocks for local fisheries.

Deemed to be in violation of UN prohibitions against geoengineering experiments, a global backlash ensued from marine and climate scientists as well as environmental governance bodies. Yet the dumped iron sulphate and the backlash both amounted to empty gestures, the former of human ability to coax the demon back into its bottle of containment, and the latter of human ability to placate it with soothing words.

Such meagre prospects for both acting and non-acting highlight how ill-suited notions of ethics are for responding to the rupture. Applying normative human ethics in the midst of a cataclysm recalls the absurdity of the scene preceding *Dr. Strangelove's* climax, when Major Mandrake desperately attempts to telephone

458 Nigel Clark, "Geoengineering and Geologic Politics," *Environment and Planning A: Economy and Space* 45, no. 12 (2013): 2831.
459 Clark, *Geoengineering and Geologic Politics*, 2831.

the US President to provide the code to withdraw the planes from their bombing mission. Colonel Guano thwarts Mandrake, as he suspects him of being an enemy soldier. Short of change to make the phone call, Mandrake begs Guano to shoot a Coca-Cola vending machine in order to get enough coins. In response to Guano's reluctance, Mandrake implores:

> Can you possibly imagine what is going to happen to you, your frame, outlook, way of life and everything, when they learn that you have obstructed a telephone call to the President of the United States? Can you imagine? Shoot it off! Shoot! With the gun!

To which Guano finally agrees to shoot the vending machine, with the caveat that if Mandrake is unsuccessful, then "you're going to have to answer to the Coca-Cola Company."[460]

As an analogy for the present tense, imagine the entire world has been overtaken by a madman who has exploited a MAD mentality to destroy the world. In this context, Guano still upholds normative ethics, claiming that a vending machine cannot be damaged in order to extract the money for the phone call, because "that's private property."[461] When the entire world has been held hostage by a group of warmongering men, why is individual behaviour not a free-for-all, especially when it may be motivated by attempts to undermine the destruction of the world?

Such are the dilemmas posed between thinking like a volcano, versus acting like one. As with this song, haunted by Tambora by way of *Frankenstein*, volcanoes indeed make for a good cover story even when they appear peripheral to the subject of an inquiry. Beyond their shared subject matter, Nigel Clark's *Inhuman Nature: Social Life on a Dynamic Planet,* Michel Serres' *The Natural Contract*, and Bruno Latour's *An Inquiry into Modes of Existence*[462] each feature a volcano on their respective book covers. While volcanism is woven through Clark's book, Latour mentions volcanoes only once, whereas Serres does not even mention it explicitly or implicitly.

Only those who know that acting like a volcano is perilous can comprehend the folly of acting like one. Only those who are hell bent on acting like a volcano could choose to not give a damn or toss of the dice about what it means to attempt to think like one.

In the instance of the Oceaneos Marine Research Foundation's ocean iron fertilisation experiment, these dilemmas were expressed not only in the project's

460 Kubrick, *Dr. Strangelove*.
461 Kubrick, *Dr. Strangelove*.
462 Bruno Latour, *An Inquiry into Modes of Existence: An Anthropology of the Moderns*, translated by Catherine Porter (Cambridge, MA: Harvard University Press), 2018.

controversy, but so too in its efficacy. Even though the Canadian government effectively shut down its outcomes, and the 100 tons fell well short of the 300,000 that John Marin facetiously claimed "will give you an ice age," the experiment opened the door for dice rolling as an individual intervention. A door all the more portentous, as Clark cautions, since "geoengineering promises the worst of all worlds." Because it leaves unchecked the inequities behind Ijen sulphur mining, and by extension, all the root causes for the unfolding rupture. Clark explains why such intervention can only promise "the worst," due to how

> the authorisation of climate modification under the veil of emergency is likely to override democratic procedure and undermine the nascent architectures of collective environmental governance. And catastrophic global change will be visited upon us, regardless.[463]

For instance, say curtailing the rupture was limited to diffusing excess thermohaline energy. A Manhattan Project is undertaken, removing Panama's mid-section to allow the Pacific and Atlantic oceans to once again become one. Yet the equivalent forcing wieldable though climate engineering amounts to prying open Panama with the Panama Canal. This is neither thinking like a mountain, nor thinking like a volcano, but rather thinking like 'mountain top removal.' Because a trickle does not become a torrent unless it has the means to do so. A torrent needs a lasting, unequivocal chasm. To do so then requires not only removing the landmass, but the means generating and re-generating the landmass itself. Which means putting a lid on the subterranean volcanoes that feed Panama. ENSO on ENSO forth *ad infinitum* . . .

463 Clark, *Geoengineering and Geologic Politics*, 2827.

Throw Down or Throw Up

> Everybody knows the dice are loaded,
> Everybody knows that the good guys lost.
> – Leonard Cohen, "Everybody Knows" (1988)[464]

> This civilisation is over and everyone knows it.
> – McKenzie Wark, "This Civilization Is Over. And Everybody Knows It" (2015)[465]

In the end, the game of dice appears to boil down to two principal options. To watch the desert tortoise die of dehydration, lying "on its back, its belly baking in the hot sun, beating its legs trying to turn itself over, but it can't." Or to attempt to flip it back onto its front. The latter employs a Fuller-esque hubris of increasingly experimental and risky ModCons deployed at a Manhattan Project scale.

The former remains resigned to a dour demeanour, accepting with Bataille-esque humility that anything and everything was always already too little too late. All rivers *eventually* empty into the sea, all species undergo petrification upon extinction, all interior heat of the earth is progressively being expelled into the cosmos by way of volcanic eruptions, through to the universe finalé by way of universal heat death. In this demeanour, there are always forces at work that episodically rupture life on earth, making any measures to counter this nothing more than empty gestures in a universe that gives and takes with wanton abandon.

Always behest to these same forces, the hubristic path also suffers from the inherent flaw, that dealing with the tail-end of changeability and its consequences is an act of chasing one's tail. A never-ending pursuit that never gets anywhere, much like the Red Queen's race, where all must run constantly just to stay in the same spot in *Through the Looking-Glass*, except that to stop running is not to come to a standstill. It is to die. Do not hold your breath for any such curbs. Do not hold your breath for ModCon to stem the unfolding Sixth Extinction Event. Were it to allow some species to remain on the playing field, embattled, they would still remain under the auspices of the Dour, which underpins everything.

Granted this game played at the table of the gods already has, and will increasingly have, consequences throughout the world-of-life. But the game was never going to be won. Because it is not a game that gets won. It cannot usurp the universal sigh, say by deflecting the asteroid or designing fitness curves for species' safe passage through the unfolding rupture.

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464 Leonard Cohen, "Everybody Knows," track 3 on *I'm Your Man* (Columbia, 1988), LP.

465 McKenzie Wark, quoted in Rachel Rosenfelt, "This Civilization Is Over. And Everybody Knows It," *Versobooks* blog post, 21 April 2015, accessed 18 February 2021, https://www.versobooks.com/blogs/1950-this-civilization-is-over-and-everybody-knows-it.

Why then intentionally intervene in ecosystems or evolution? Can the ends that these ModCons claim to serve ever justify the means? How so, when there is no end in sight for how intervention only begets more intervention in an endless spiral of dependency?

The simple answer to the question of why it is necessary to intervene rests on a simple premise of how acute the existential threat or predicament really is: Do-or-Die, Swim-or-Sink, Now-or-Never. The facts are not euphemistic or arguable. Much that presently lives has already become or is becoming consigned to extinction over the coming decades and ModCon is the only option left on the table, all the less interventionist options, including the *ceasing* of damaging action, having been manifestly ignored until they became too little, too late. When talking in desperate measures, though, where do we draw the line between human responsibility (or culpability) for trying to stem the extinction tide facing the more-than-human world? Do we, in fact, draw any lines? As Hamilton argues:

> Humankind is now confronted with a momentous decision: to attempt to exert more control so as to subdue the Earth with greater technological power – the express purpose of some forms of geoengineering – or to draw back and practice meekness, with all of the social consequences that would follow.[466]

Except that "all of the social consequences" are the least of our concerns, when the subject at hand is bio-graphy: the biography of life-at-large. The life story of life is concerned with all biophysical consequences over the long-term future of earth. Which in the present tense manifests as a deep concern for how the next decade's ModCon responses to the ecological crisis will disproportionately determine the long-term trajectory of life on earth. Therein, the decision to not attempt to flip the turtle onto its back is taken despite how much more-than-human life will perish as a result. This is to choose inaction, not as we have done before, in denial, but in the full knowledge of what we are doing.

Even if invoking a spectrum of possibilities, there is no middle ground between these two extremes. To throw down is to commit to rolling the dice. To throw up is to be repulsed at what happens if the dice are not cast. Do does not become reconciled with Die. Neither Swim with Sink, nor Now with Never. Nor do these dilemmas allow for a moral high ground, when the ground is so clearly going underwater, and drowning species in the act of rising up. Picture again a soap box sermon delivered by a puritan opposed to the disproportionately powerful and their

466 Hamilton, *Defiant Earth*, 17.

ModCons, standing on the non-profiled section of Raine, where tens of thousands of drowned turtle eggs lie underfoot.

To object to such hubristic intervention and attempted control requires an avowed willingness to accept a colossal loss of species alive today. That is not so much puritanical as tyrannical. Who is it that speaks for the more-than-human, saying ModCon should not be extended to their plight? That means the choice not to throw down carries the burden of knowing what the consequences entail for those multitudes of species dragged into our quagmire. Just as there is no bet hedging when playing at the table of the gods, ignorance was never bliss. It merely had the innocence of a nursery rhyme.

Evolutionary biologist Edward Wilson sums up this double-edged sword in the opening gambit to his book on *The Future of Life*. He declares that "the race is now on between the techno-scientific forces that are destroying the living environment and those that can be harnessed to save it."[467] Wilson does not describe what these other forces are, or how they can be harnessed. Simplistic framing like this has no bearing on the new rules of dice game we are playing, where life-at-large has been pushed to its limits by the same obliterating technoscience now proposed as its salvation.

Given attempts to 'save nature' require remaking it into something so unnatural that it becomes . . . un-nature, does not all of this just serve to call into being new tyrannies far more insidious than Tyrell and Queen Mary? In trying to save ourselves, we may well beckon a *Blade Runner* world made manifest *on Earth.* Or on what is left of earth. Well may we find ourselves pleading to leverage some of this new tyranny's power to redefine social and biophysical limits to life. Not to extend our own lives, but rather to redirect some of their social and biophysical power toward the plight of species at imminent risk of extinction.

Indeed, Christopher Preston dubs ModCon as heralding *The Synthetic Age*. His 2018 book, subtitled *Outdesigning Evolution, Resurrecting Species, and Re-engineering Our World,* charts how:

> The changes we are facing are much more significant than the familiar litany of human impacts such as climate change, species extinction, and toxic pollution. Earth is entering a period in which some of its most fundamental processes are being co-opted and redesigned by engineers. Synthetic biologists, climate engineers, and nanotechnologists are reaching deeply enough into the workings of nature to alter the very metabolism of the planet we inhabit. In so doing, they promise to create an entirely new, synthetic world.[468]

467 Edward Wilson, *The Future of Life* (New York: Vintage, 2003), xii.

468 Christopher Preston, *The Synthetic Age: Outdesigning Evolution, Resurrecting Species, and Re-engineering Our World* (Massachusetts: MIT Press, 2018), dusk jacket.

The operative word here is "promise." Given that climate engineering, assisted evolution, and synthetic biology are not only promissory but also propositional, vexing debates rage as to whether they should be deployed, how, and by whom. After all, they entail reconfiguring life from cell to sky, and the earth from atom to atmosphere. And after all, they promise nothing less than the flipping of the turtle back onto its front by redesigning the turtle and its desert to fit the *New World Coming*.

Whether we withdraw into acquiescence or attempt to design novel and radical responses to the rupture, whatever world that results will be unrecognisable to the world-as-it-currently-is. If the radical proposals for *The Synthetic Age* are kept at bay, say due to moral outrage against enacting them, then the *New World Coming* will also be unrecognisable to the world-as-it-currently-is.

That age will also have a neologism to describe it: Edward Wilson tells us "we will then enter what poets and scientists alike may choose to call the Eremozoic Era – The Age of Loneliness."[469] The loneliness he speaks of would be between our species and the world-of-life rendered extinct by human activity. Not unlike the loneliness of the characters in *Blade Runner*. Options for company being fellow members of your drastically overpopulated species, or synthetic proxies of those rendered extinct by your kind.

If You Find Yourself in Hell, Where Hell is Other People . . .

> The die is cast; I have consented to return, if we are not destroyed. Thus are my hopes blasted by cowardice and indecision; I come back ignorant and disappointed. It requires more philosophy than I possess, to bear this injustice with patience.
> – Mary Shelley, *Frankenstein* (1818)[470]

> You know those little snow globes that you shake up? I always thought my brain was sort of like that. You know, where you just give it a shake and watch what comes out and shake it again.
> – Gary Larson, interview with Robert Holguin (1994)[471]

When all is said and done this entire construct reveals itself for what it is. A joke. That could be the case for life itself, or maybe just the present tense, when empty

469 Edward Wilson, *The Creation: An Appeal to Save Life on Earth* (New York: Norton, 2006), 91.
470 Shelley, *Frankenstein*, 390.
471 Gary Larson, interview with Robert Holguin, "Voice From The 'Far Side': Gary Larson Opens up About Retiring," *The Seattle Times*, 14 October 1994, accessed 19 February 2021, https://archive.seattletimes.com/archive/?date=19941014&slug=1935794.

gestures are deadly serious, but the prospectus, let alone the cosmic context in which it is embedded, is so laughably absurd that it can only be signed off on by another Gary Larson cartoon.

Here the devil impatiently implores an inductee to hell to choose one of two facing doorways to go through. Left is marked 'Damned if you Do', right is marked 'Damned if you Don't.' Like Detective Holden who implores that "You're not helping. Why is that?" the devil too intones against the inductee's indecisiveness. With pitchfork prodding into his back, the devil declares it is high time to throw up or throw down: "C'mon, c'mon – it's either one or the other."[472] Where "one" is Do (*The Synthetic Age*) or "the other" is Don't (*The Age of Loneliness*).

Beyond both pathways being deplorable, they also share a wholeheartedly anthropocentric concern. The former is a world refashioned for civilisation so-called to continue apace, the latter privileges the suffering of the survivors. So why even choose if all roads lead down to the ruination of Rome? Or when the only other option is to not do at all? As if throwing up one's hands and letting the devil decide would somehow absolve us for letting the crisis deepen to the point where we have wound up with two vying contenders, both trying to be the lesser of two evils. As Soren Kierkegaard surmised in *Either/Or: A Fragment of Life:* "I see it all perfectly; there are two possible situations – one can either do this or that. My honest opinion and my friendly advice is this: do it or do not do it – you will regret both."[473]

The three universal sighs of changeability, consequences and comprehension of same are also present in the fiery depths of earth's mantle, where Larson's cartoon is set. The universal sighs are atemporal, at least for the duration that life has existed in the universe, because at such a scale any possible 'whenever' is bound to happen. And down here exhaling them honestly brings into being a third possibility, though it is not an option in the sense of the two facing doorways. This third possibility is a worldview premised on fidelity to earth's deep history, the solar system to which it belongs, and then in increasing orders of magnitude, the progressive encompassment of the milky way, through to the universe.

In his section in *Ethics* on "Human Bondage, or the Strength of the Emotions" Benedict de Spinoza found solace in this worldview, with its embrace of the radical asymmetry and radical contingency of human life to cosmic vicissitudes:

472 Gary Larson, "Damned if you do, Damned if you don't," from The Far Side, *New York Daily News*, 10 July 1985.
473 Kierkegaard, *Either/Or*, 396.

> Human power is extremely limited, and is infinitely surpassed by the power of external causes; we have not, therefore, an absolute power of shaping to our use those things which are without us. Nevertheless, we shall bear with an equal mind all that happens to us in contravention to the claims of our own advantage.[474]

For our present tense such solace makes for a worthy exhalation of the universal sigh, just as it did for the Stegosaurus atop his Town Hall stage: "the picture's pretty bleak . . . The world's climates are changing, the mammals are taking over, and we all have a brain about the size of a walnut."[475]

For Spinoza, writing about the society that sang the *Three Blind Mice's* 1609 lyrics, equanimity was a portal to a zoecentric worldview. The third possibility exists precariously within this worldview, precisely because words contain worlds – they become polysemic when people speak one language, but grant different meanings to the same word. Like the chalk-and-cheese difference between the two meanings of petrified, equanimity also has two seemingly irreconcilable meanings. The same word denotes both "equal mind" and "calmness and composure, especially in a difficult situation."[476] Therein, equanimity toward the two meanings of petrified means bringing the state of being terrified to bear on the biophysical process of becoming fossilised during a rupture of life on earth.

And from this embrace of equanimity, the third possibility flourishes. A worldview that beholds there were never two doors marked 'Damned if you Do' and 'Damned if you Don't', nor a subject faced with the choice. Let alone one cajoled by the devil's pitchfork prod. There were never two doors and two pathways because there was never a choice to begin with. Come what may, desperate times indeed call for desperate measures. But their measure of desperation reveals that we do not possess any "absolute power of shaping to our use those things which are without us."

The only response to the devil's prodding is one measured against the only true correlate of life-at-large and any and all of its pieces: the cosmos. That "we shall bear with an equal mind" the false prospect of two doorways. Because this third possibility need only to remind us that forces that go behind, beneath, beyond and above, from volcanic eruptions to viral irruptions, hold prospect for grinding everything to a halt, from industry to the continued existence of much that is living in the biosphere at present. And, having already been partially woke by the completed unfolding of the Holocene and the advent of the Anthropocene,

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474 Benedict de Spinoza, *Ethics Part IV: Of Human Bondage or the Strength of the Emotions*, translated by Robert Elwes (Alexandria: Library of Alexandria, 1901 [1677]), appendix XXXII.

475 Gary Larson, "The Picture's Pretty Bleak."

476 "Equanimity," *Oxford English Dictionary*.

this third possibility shows just how empty a gesture it is to walk through either doorway.

Only a dour demeanour is capable of honouring this fidelity to our new comprehension of the vicissitudes of the cosmos. The rockmelon, née walnut has been thoroughly shaken up, in order to bring our comprehension to bear on cosmic changeability and the consequences of same. But back here on earth, only the demeanour that will throw the dice can honour this fidelity to our guilt for having collectively catalysed the rupture. The dilemma is as impossible as the gesture is empty. There is no resolution for the reasonable mind.

The stakes are without precedent, yet the prevaricating hand remains ambivalent about casting the dice. The hand that holds them tight revels in the uncertainty of how any response may still amount to no more than an empty gesture. "Thus," writes Shelley "are my hopes blasted by cowardice and indecision." Turning back, having failed to reach the sought-after destination, gives rise to a humility born of this fidelity, for "it requires more philosophy than I possess, to bear this injustice with patience." In tandem, our journey appears to have travelled from the Dour, through the Dire, to terminate in the Dice, only to come full circle back to where we began, and where we shall end: the Dour. No more nursery rhymes that make horror palatable. No more empty gestures. Ashes to ashes. Dust to water.

When all is said and done, during a time when all is so rapidly coming undone, abandoning the dour demeanour to run after the human-centred panic of the dire and throw the dice is a zero-sum game. Yet for many thinking humans involved in the details and mechanics of the unfolding rupture (whether social and/or biophysical) a breadcrumb trail appears to lead from Dour to Dire to Dice. Instead, this swansong sings of learning to think like a volcano with humility, rather than hubristically deciding to act like one. This is why the dour demeanour is threaded throughout, to provide both means and encouragement to resist the lure of both the dire demeanour and the demeanour of the dice.

What, then, does the Dour offer? Technically, nothing. Which is precisely in keeping with the emptiness of the cosmos. Though where it is forever trapped inside the human condition with its inescapably human-centred worldview, the Dour does offer something-amidst-the-nothing: fidelity. Thus, to cultivate a dour demeanour rather than giving in to the temptations of the dire or the dice is to recognise beyond common sense (and uncommon sense) that the gig, this gig, our gig, and the gig of everything we have ever known and were ever capable of knowing as life *on Earth*, is well and truly up. *What on earth, on Earth?*

Short of some intervention from the heavens, or a rupture of earth's surface unprecedented in human memory that issues forth a seismic volcanic eruption, conceits for curbing either the causes or consequences of the unfolding rupture

reveal only empty gestures at hand. Absent a supervolcano or three, the technofix dream of instantaneous mass greenhouse gas sequestration, or any other random acts of impossibility encompassed in Clark's "unforeseeable nonhuman forcing,"[477] a dour demeanour is the only faithful posture to adopt, no matter how much it may be abhorred.

When Nietzsche asked "if ever I rolled dice with gods at the gods' table of the earth" the answer was as mystical as the stanza is obtuse. Reading a little further to the immediately following text appears to render our own answer disturbingly unambiguous and concrete. Wherein, the result of playing dice with the gods is that "the earth quaked and ruptured and snorted up rivers of fire" on a planet that now "trembles with creative new words and gods' throws."[478] This new creativity includes whatever will be the dictums of *The New World Coming*. Our own answer is sung by Leonard Cohen, when he intones on his swansong album, *You Want It Darker*, released 19 days before his death: "I'm leaving the table/I'm out of the game."[479]

In the meantime, entranced at the entrance to any doorway, there remains the vulnerable body, open to the volatility of the world itself as the most apt means for living, and dying, during a rupture of life on earth. Equanimity holds out its arms to us in the guise of the Dour, offering an invitation to embrace for impact, rather than to brace. Like the *Three Blind Mice* of 1842, 1609, or 1555 lore, the divergent meanings of words morph when successive societies weave their respective worldviews onto the same word-as-world.

For the present tense, we take this word 'equanimity' and turn it to our purposes: to embrace equanimity between being petrified and becoming petrified is to no longer just "build our houses on the earth." It is to be at home. Not here on some imaginary stable and non-volatile earth that never was. Nor here on an uninhabitable hothouse earth. Not even here on an earth rendered uninhabitable by humanity, our species just one rupture amongst so many, over so much unfathomable time. Rather here in a universe that never promised us anything else. That never promised us anything at all.

Welcome home.

477 Clark, "Volatile Worlds, Vulnerable Bodies," 42.

478 Nietzsche, *Thus Spoke Zarathustra*, 185.

479 Leonard Cohen, "Leaving the Table," track 1 on *You Want It Darker* (Colombia, 2016), LP.

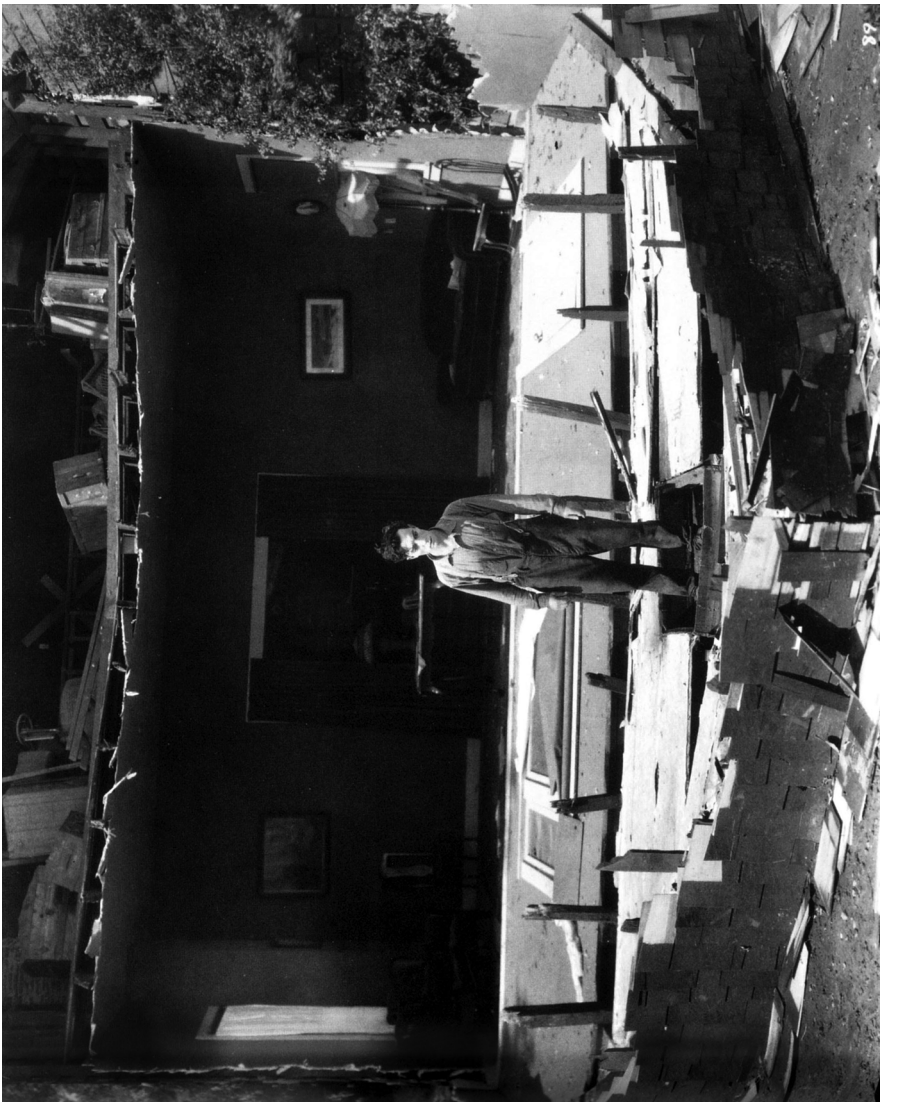

Fig 19: Welcome Back: Buster Keaton, *Steamboat Bill, Jr* (United Artists, 1928).