The Wicked Problem of Climate Change

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CLIMATE CHANGE IN CONTEXT: STRESS, SHOCK, AND THE CRUCIBLE OF LIVINGKIND

by James Clement van Pelt

Abstract. An increasing number of environmentally knowledgeable observers and activists comprehend the situation faced by the emerging global civilization and its unsustainable systems, characterized by planet-altering positive feedback loops arising from human activity. They perceive contemporary natural and cultural developments as the prelude to the imminent collapse of technological civilization and the cataclysmic end of the Anthropocene epoch via a forced passage through the population bottleneck of the impending extinction-level event which only a remnant of the present biosphere is likely to survive. Should this understanding be accurate, our own time could become the occasion for the greatest choice ever made on Earth: whether to continue things as they are until humanity becomes the chief cause and the chief victim of the now-unfolding mass extinction; or to make the necessary transition to the awakening of Planet Earth.

Keywords: apocalypse; climate; crucible; culmination; eschatology; livingkind; mass extinction; megathreat; transition

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While the sand slipped through the opening
and their hands reached for the golden ring,
with their hearts they turned to each other's hearts
for refuge,
in the troubled years that came
before the Deluge.

– Jackson Browne, "Before the Deluge" (Browne 1974)

Climate scientists struggle to tell us where we are and warn us where we are headed, with each report from the field more ominous than the one before (Kelly 2017). Each climate-related catastrophe is doubly destructive: once due to its destructive effects, and again for its forewarning of even more terrible events to come. Yet how we got here, and why, is a neglected topic at the margins of anthropology, philosophy, and theology. Without shared answers to those seminal questions, how can we know how to remake our world, beyond symptomatic remedies applied half-heartedly, "in the troubled years that came before the Deluge"?

Many generations have faced decisive challenges: world wars, nuclear terror, economic collapse, resource exhaustion, cultural devolution, genocide, and natural catastrophes. Certain periods stand out as times when decisive events and those who endured them determined the subsequent course of civilization. No doubt there were equally decisive turning points prior to that tiny slice of the human story of which we have anything even close to certain knowledge.

Yet a sudden chill in the zeitgeist, emanating from scientifically informed sources, draws our collective awareness toward the realization that no population of human beings for thousands of generations past have faced the challenge now looming over us, and by extension the challenge looming over the entire biosphere. It is a challenge so daunting that few are willing to acknowledge its possibility for more than a few moments at a time, and fewer still are willing to think much about what to do about it. It is a challenge so vast that people prefer to think about practically anything else—especially those people who should be leading us in a direction that gets us past denial. Closer and closer the challenge approaches, yet its very magnitude keeps pushing it to the margin of humanity's mindshare.

The scale of the challenge can be expressed in one sentence: *Humanity and life in general face a combination of converging catastrophes whose cumulative effects equal or dwarf anything since the volcanic mass extinction seventy-five thousand years ago.* Even the onset of the most recent global ice age twenty thousand years ago, even the legendary deluge that global warming released twelve thousand years ago, even the decades since then when volcanic dust blocked the sun for months and turned the moon to blood, even when the forces of tyranny fielded great armies to plunge civilization back into a crueler dark age—none could compare to this "rough beast, its hour come round at last" (Yeats 1919) that so clearly defines our

future and determines our fate. And never before has natural calamity been so tightly bound to planet-scale human activity and titanic-scale human folly.

Context and Climate Change

> *The real problem of humanity is the following: we have paleolithic emotions; medieval institutions; and god-like technology. And it is terrifically dangerous, and it is now approaching a point of crisis overall.*
>
> —E. O. Wilson (quoted in Harvard Magazine 2009)

As the magnitude of climate change dawns on the world, and as a US president exemplifies our collective capacity for denial and self-delusion, the words of a very different president come to mind: "If we know where we are and something about how we got here, we might see where we are tending; and if the outcomes which lie naturally in our course are unacceptable, to make timely change." With these plain words Abraham Lincoln laid out the simple, obvious case for putting our collective situation into context.

As Lincoln's words imply, context is always *about* something. It is a web of relations in the center of which the specific meaning of a thing is enmeshed. It is about similarity and temporality: about how a particular fact is embedded in a field of everything else that affects it or that it affects; and also about temporality, because that web of relations includes a thing's origin, its present manifestation, and its probable future.

Extracted from its context, a thing has only traces of meaning. Since earliest applications of law, judicial proceedings have been instituted to ensure that the context of a transgression is understood prior to a judgment. Archaeologists and anthropologists must intuit the context of artifacts and practices that are otherwise baffling. A real estate agent sells the context of a house as much as the building itself: its neighborhood, services, history, nearby features, and so on. A fine restaurant serves up context in the form of ambience as carefully as it serves up food and drink. A political candidate runs as much on context as on specific policy proposals. History without context is little more than data; morality without context is rules devoid of compassion; observations lacking context are opinion devoid of wisdom. Without context, an intimate relationship is starved of romance.

Applied to climate change, without context all we have is facts that document Earth's precipitous overheating, its calamitous swings in weather, the infestations, fires, floods, and storms that result, with piles of graphs that chart trends and imply a range of scenarios—but never quite enough to disallow the option for wholesale denial. Without context, what is befalling life on Earth may call for this or that adjustment in lifestyle and infrastructure; but that truth remains just beyond our shared comprehension,

and consequently the necessary visions, plans, actions, and motivations required to sensibly respond remain beyond our collective reach.

Question following a natural disaster: Why is this happening?
Stock answer: Because Earth's climate is being heated as a consequence of human activity.
Follow-up question: When did it start?
Stock answer: At the onset of the industrial revolution.
Obvious question: How do we cope?
Obvious answer: Address the symptoms: set caps on greenhouse gas emissions from industry and transportation, move low-lying or overheated settlements to higher ground or cooler climes, replace fossil fuels with renewables, replace incandescent bulbs with LEDs, phase in electric cars, rebuild structures on higher ground, and then endure the intensifying weather extremes, floods, fires, disease, pestilence, famine, and war over the next few centuries as the exponential curves gradually level out.

In each case, the answer begs a further question, and the result is a version of climate disruption that fits into a conceptual box—a big box, but still a box—with a movement for change that fits into a silo. Then all it seems we need to do is to get far enough past the official state of denial to choose leaders willing to take on the Herculean task of starting the transition to a civilization that will let the planet begin to cool down. But of course, before we can talk about that, what we *really* need to talk about first is jobs, jobs, jobs . . . taxes . . . military preparedness . . . terrorism . . . political stalemate . . . social welfare . . . and all the rest of the entries on that long list of needs, desires, and crises that crowd out the larger context and direct our attention to the here-and-now instead of what is bearing down upon us.

The hope here is to provide a glimpse of the context of the end of the world as we have known it—or call it the literal end of history; and in parallel, the end of most of the natural richness now constituting the biosphere that quickens the waters, lands, and skies. Climate change nestles within that terrible context, sharing it with a bundle of other perils. Those perils are not direct consequences of global warming, having been foreseen generations prior to any consensus concerning the realities of climate disruption; yet all of them interact and converge to constitute what could be called the MegaThreat.

The MegaThreat and the End of History

Some of them were angry at the way the Earth was abused
by the men who learned how to forge her beauty into power;
they struggled to protect her from them, only to be confused
by the magnitude of her fury in the final hour.
– Jackson Browne, "Before the Deluge" (Browne 1974)

We have begun to experience the titanic effects of climate change—superstorms, firestorms, deluges, and seismic events including temblors, landslides, and liquefaction. Heat added in sufficient degree to an entire planet even advances the timetable for volcanic and geothermal catastrophes. In the background the evidence can no longer be ignored of massive glacial dissolution, tundra methane release, snow pack melts, mass extinction, and so on. For each separate threat, damages compound unpredictably over time as each one saps our capacities for recovery. Then, we switch channels and think about other areas of concern: wars in the Middle East and Africa, or the drift toward a nuclear exchange, or the collapse of the coral reefs, or inexplicable mass shootings—we give them all passing mindshare, but without necessarily linking them. They appear as separate reports in the news, separate treatments in journals, and separate topics of unrelated conferences and associations.

In a similar way, we tend to consider past and present events from the unstated presumption that the blank canvas of history on which events are recorded originates in the mists of time and will continue to unfurl indefinitely, for all practical purposes documenting a "world without end"—*The Neverending Story*. No doubt some bumps, breakdowns, setbacks, and eruptions are ahead, and no doubt some regions of the globe will be soaked, seared, shaken to bits. . . . Randomly a piece of space rock could smack into the planet many times faster than a bullet, or a major geological event could do us in, in either case wiping out a continent, shading out the sun for years, or inundating the seacoasts and the billions who live there.

Regardless of any of that, the prevailing conception of history assumes that its story can get messy, even dark, but without ever really reaching its end. As a result, few people can entertain for more than a few minutes the high probability that in our own time this magnificent civilization and most living beings struggling to coexist with it could all be reduced to dust, just as previous civilizations have been lost and forgotten. The possibility of a literal, interminable, irrecoverable fall of the world order and a collapse of the population it supports has occupied very little mindshare until recently, when just that sort of planetary calamity has become a major theme of whatever diverts us from our quotidian preoccupations: movies, novels, TV series, and computer simulation games. Prior to now it was accepted that only the few religiously disoriented or simple-minded or cosmically paranoid zealots would preach, "The end of the world is at hand" (see Figure 1). An endless procession of cartoons pictured such a would-be prophet wearing a sandwich board proclaiming just that—always a figure of ridicule.

Without a presumption of an end, of some climactic resolution, a narrative can only proceed toward an open end, and tends to collapse in upon itself when narrative expectations cannot be fulfilled. In the case of the narrative of this civilization, if there is no end, then there is no need to take measures to respond to the likelihood of its impending doom.

Figure 1. "End of the World" (McKee 2012).

Regardless of obsolete presumptions, the history we inhabit is indeed making its way along the exponential curves that chart the impending culmination of history's most perilous trends, as illustrated in Paul H. Carr's article in this issue (Carr 2018). What makes the prospect of "the end of this system of things" increasingly credible is the very steepness of those exponential curves. For two generations a scientific consensus has been developing that the present course of civilization is unsustainable, given its explosive growth and unrestrained consumption, its irresponsible carbon footprint, and its total lack of leadership possessing any inclination to recognize, much less confront, the gathering hurricane.

By now most environmentally mindful people accept with few reservations the simple statement: "This civilization is unsustainable." And most appreciate that *unsustainability* by definition is not a chronic condition we can somehow muddle through; as the word implies, it cannot be sustained. Yet even at this late date too few can take the next logical step: *an unsustainable civilization cannot be sustained; ergo it must fail*. How and when are the only remaining questions.

What is different now, yet still little noted, is the extent to which history is collapsing into a single planetary crucible—a unique convergence of what have been perceived as discrete threats to human well-being that can be addressed separately, interacting to constitute a single and unprecedented threat-of-all-threats: the MegaThreat, in which each formerly independent threat interacts with others, acting as what military planners call a *threat multiplier*:

> A new NATO special report concludes that climate change is the ultimate "threat multiplier"—meaning that it can exacerbate political instability in

> the world's most unstable regions—because by intensifying extreme weather events like droughts, climate change stresses food and water supplies. In poor, arid countries already facing shortages, this increased stress can lead to disputes and violent conflicts over scarce resources. As the report concludes: "*food, water and climate are intimately connected with the sectors of economic development, demography, energy, ecosystems and urban planning—to name but a few interrelated sectors*." (Nuccitelli 2017)

That report can be updated with the news that Cape Town, the location of the South African legislative branch, with a metro population approaching four million—the tenth-largest city in Africa—is near to running out of water both for drinking and for agriculture. Like many places, Cape Town has been mining water—drawing it from the water table faster than it can be replenished naturally, due to overpopulation and overdevelopment, exacerbated by drought. As in Syria, the result is bound to be millions more forced to join the world's burgeoning refugee population seeking the very basics of human sustenance.

Cape Town serves to illustrate how each discrete threat constituting an element of the MegaThreat is a *disaster multiplier*, in the sense that each disaster follows close on the heels of the previous one, requiring a recovery effort that over time can overtax capacities, divert resources from essential needs, and drain away the resilience any system must have if it is subject to disruptive events. A nation or community can be proud of how it recovers from a climate-change-multiplied hurricane or flood once, or twice, or even three times in a year, and of how it responds by relocating and adapting infrastructure, population centers, and resources. But if sets of regional-scale disasters occur year after year, "recovery fatigue" can set in, such that emergency management is slower, less comprehensive, even less sympathetic to the plight of the people affected, and certainly insensitive to the consequences for the other species affected. Eventually, after the winds die down, the waters recede, and the fires burn out, no one comes to help, no one returns to rebuild, and no one expects anything but more destruction followed by more dislocation, displacement, dispossession, and dissolution of the social order. It happens to this region, then to that region far away, then to one in between, and like the wildfires of the American Southwest, multiple regions combine in their devastation to reveal the landscape of apocalypse.

Carr's article enumerates many of the climate-related challenges faced by contemporary civilization (2018). It is beyond the scope of my essay to fully explore the ways in which many other perils formerly viewed as discrete and separable from one another are converging to interact as a single, gigantic MegaThreat menacing vulnerable points of our increasingly house-of-cards civilization. Yet, all one needs to do is to focus on any one of the many negative regional or global developments to trace its causes and its consequences, both of which can be seen to connect to other threats.

Table 1. The MegaThreat: Regional/global perils not determined by climate

Converging, interacting regional and planetary threats acting as a single threat system with climate change but *not caused* by climate change	
Environmental Causes	Threats Exacerbated by Technology
• Exhaustion (natural resources, water, food, antibiotics, institutions) • Pollution (smog, landfills, seas, nuclear waste, water supplies, oceans) • War and civil unrest • Social disintegration • Mass disaffection • Exhaustion of "green revolution" • Loss of pollinator insects due to pesticides • Exacerbation of global conflicts and breakdown of social order • Sapping of reservoir of resilience	• Nuclear proliferation • Weapons proliferation, nuclear hair-trigger, artificial intelligence–weaponized robots • Malicious computing (viral malware) • Adulteration of genetic integrity • Mass unemployment from robotics and artificial intelligence (e.g., truck drivers) • Economic inequity and neo-feudalism (poverty, starvation, disease) • Pandemics spread by population mobility (airborne, fatal, long incubation) • Mass addictions (opioids, stimulants)

Even more basic, just pick one from "land, sea, or air" (see Table 1). In the sea, coastal fisheries are being overfished and exhausted; water is being contaminated with plastic detritus; coral reefs and their denizens are dying by acidification; marine life counts are plummeting; and the natural order is being disrupted by changes in water temperature that kill off one set of species and bring others into the swiftly warming seas.

Looking to the land, a tight bonding of threats includes the insatiable demand for grain, the devastation of oxygenating rain forests, the rising consumption of animal flesh, the rising demand for larger carbon footprints, and the exacerbation of global warming. Environmental pioneer Lester Brown, founder of the Worldwatch Institute and an originator of the concept of sustainable development, now points to the compounding "geopolitical effects of fast-rising grain prices" (Brown 2011) since "the biggest threat to global stability is the potential for food crises in poor countries"—so big it could "bring down civilization" (Brown 2009). In a 2011 issue of *Foreign Policy*, Brown reported how the "new geopolitics of food scarcity" is already contributing to economic and political upheavals (Brown 2011).

To raise the grain to feed humans, their pets, and the animals consumed by both as meat (also used for biofuel), millions of acres of rain forest are cleared, with horrendous effects on the continental ecology. For cattle ranching and logging, in the past half-century "much of the rainforest in Africa and Asia has been destroyed." Whole regions of rainforest are being

cut down year by year, "often in order to remove just a few logs, and rainforest is being destroyed at double the rate of all previous estimates. Unfortunately, this means that there is a very high rate of extinction, as the wildlife depending on the forest dies with it" (Bennett 2008). Ruminant animals raised for human consumption, consuming megatons of grain and requiring vast expanses of formerly forested pasture, excrete massive quantities of methane, one of the most destructive greenhouse gases, which in turn intensifies the positive feedback loop warming the Earth.

Still looking to the land, in my home state of Connecticut the warmer climate has facilitated the infestation of beetles deadly to ash trees, which is spreading. The emerald ash borer, native to Asia, has spread throughout the Midwest since 2002, then to parts of the South and the Northeast. A warmer New England is certainly a factor, but so is the mobility of humans who bring invasive species into formerly pristine ecologies, as well as the short-sighted logic of soaking croplands in chemicals. That same combination is collapsing the colonies of essential pollinators such as honeybees, which now must be trucked by the billions across continents in huge trucks; and it is wiping out irreplaceable predators such as bats that control dangerous insect pests.

We can update the international manifestation of the MegaThreat by considering recent reportage about the civil war in Syria, where the death toll has been ranging around ten thousand *per month* since 2013. Christian Parenti, in his 2012 *Tropic of Chaos: Climate Change and the New Geography of Violence*, writes about how climate change exacerbates seemingly unrelated political and military crises. In a 2015 interview he said:

> Syria is a prime example. There has been a terrible drought there, which coincided with austerity measures imposed by the Assad government cutting aid to Sunni farmers. Many of them were forced to leave the land, partly due to drought, partly due to the lack of support to properly deal with the drought. Then, they arrive in cities, and there's more austerity taking place. This is experienced as oppression by the Alawite elite against an increasingly impoverished Sunni proletariat who've been thrown off their land. This situation then explodes as religious conflict, which is really the fusion of environmental crises with neoliberal economic policies. Of course, the violent spark to all of this is the fact that the entire region is flooded with weapons. . . .
> So, it's a perfect example of this catastrophic convergence: The landscape is littered with guns, hammered socially by increasingly market-fundamentalist politics, and at the same time, natural systems are beginning to buckle and break as climate change starts to accelerate. (Parenti 2015)

All of this turmoil and disruption ripples forth, enmeshing nearby peoples and nations:

> Part of what's fueling the sectarian conflict in Iraq has to do with this convergence. There's a very serious lack of water in southern Iraq, partly

> because Turkey has been taking more water than they should, but there's also a decline in precipitation, misuse of water resources, etc. In the Shia heartland, life is tough. These young farmers get pulled into the struggle against the Sunni, with militias or within the Iraqi Army. That's a better deal than trying to struggle on an increasingly decimated farm. (Parenti 2015)

The ripples reach well beyond the Middle East, as every year tens of millions of families are forced from their homes to become immigrants desperate for sustenance from well-to-do nations whose people find they have limits to their hospitality. The United Nations' refugee agency reports that the number of displaced people is at its highest ever—surpassing even post–World War II numbers, when the world was struggling to come to terms with the most devastating event in history. The total at the end of 2015 reached 65.3 million—or one out of every 113 people on Earth, according to the United Nations High Commissioner for Refugees (UNHCR). The number represents a 5.8 million increase on the year before. A little under 1 percent of the Earth's population is either "an asylum-seeker, internally displaced or a refugee" according to the UNHCR report, which was released on June 20, 2016. To add another 20 percent to update those figures is probably not unrealistic.

Returning to the ripple effects in the Middle East:

> People have been reporting on Sanaa's water crisis for several years. Yemen's environmental crises are partly fueling the current conflict. Similarly, Boko Haram is capitalizing on and partly produced by environmental crises in northern Nigeria. Large parts of the West African Sahel—meaning the wide arid belt at the bottom edge of the Sahara Desert—have been experiencing all sorts of natural precipitation fluctuations; too much rain, too little, at the wrong times. This, plus rising temperatures, has led to increased climate migration, urbanization, poverty, and surprise, surprise! political desperation. These chaotic weather patterns are linked to climate change. (Parenti 2015)

The strategic significance of the affected regions and the reality of the greatest mass migration since World War II are drawing in the "great powers" who sense national gain in fueling a proxy war, raising the stakes and the possibility of direct conflict between nuclear nations.

Parenti's writing has been an eye-opener even to some who focus professionally on the Middle East because we are all so used to segmenting things to make them comprehensible and thus manageable. We enclose each threat in its own silo, each of which has a twin silo to contain the movement of people concerned to do something to ameliorate it. But more and more we must conceive of the entire cluster of silos encompassed by a single wall—as a single threat-of-all-threats encompassing all the others in the context of "the end of this system of things" in which climate change is one Cthulhu-size factor among a grim constellation of factors—the

Table 2. The MegaThreat: Ecological-sociopolitical-military

Example: Syria

1. Climate disruption leads to drought.
2. Drought drives farmers and farmworkers into cities.
3. Sudden migration to urban centers overstresses city services, employment, housing, health care, and so on.
4. Food supply crashes.
5. Massive revolt and civil war, hope for the "Arab Spring."
6. Government responds repressively.
7. Deaths from civil conflict: Ten thousand per month over four years.
8. United States, NATO, Russia join in the escalating conflict; risk of superpower conflict.

ultimate threat multiplier, but itself multiplied by its effect on the others (see Table 2).

Another factor that has threatened civilization since the onset of the Cold War in the late 1940s is the nuclear arsenals, now possessed by the ten nations with nuclear weapons, of which only two, Russia and the United States, possess probably 90 percent of the total. Bookended by the atomic bombing that concluded World War II, and the end of the Cold War fifty years later, the possibility of nuclear holocaust has been a vivid source of existential fear for millions of Americans and billions around the world. During the Cold War, novels such as Neville Shute's *On the Beach* (1957) and Pat Frank's *Alas, Babylon* (1959) dramatized nuclear war and its aftermath. American children were trained to recognize the ubiquitous noonday sirens as the cue for taking shelter against "the end of the world as we know it," and during too many afternoons to huddle in basement bomb shelters. Such fears spiked in October 1962 during the Cuban missile crisis, and again in the early 1980s incited by Ronald Reagan's presidential saber-rattling and his suggestion that "we may be the generation that sees Armageddon"—a threat recently updated to the present day by the nuclear saber-rattling of the newest nuclear power, North Korea, and the "oh, yeah?" schoolyard response of the United States.

Decades after the near-miss in Cuba it was disclosed that Soviet commanders there were not acting under Moscow's control, and had decided on their own to launch their nukes against the United States in the event of a bombing attack by US forces to take out their missile sites. For his part, Reagan's joking remark to a hot mike that he had launched the US strategic nuclear forces to "outlaw Russia forever" set off a Soviet military alert of the highest "defcon" level, causing its nuclear-armed long-range bombers to take to the air for the US mainland. Throughout those three decades, *The*

Bulletin of the Atomic Scientists, claiming to speak for many of those who had developed the US nuclear capability, kept the hands of their symbolic "doomsday clock" hovering on the verge of civilization's midnight. As that publication recently pointed out, despite the public relaxation since the demise of the Soviet bloc, many thousands of nuclear weapons are still kept at the ready in the United States and Russia, carefully targeted at their adversaries' cities, now being updated with systems to circumvent any feasible defense—pushing the world back toward the atomic brink of an irrecoverable dark age, or worse.

The full apocalyptic sweep was bestowed on the scenario in the early 1980s by a group of physicists and other scientists, most notably Carl Sagan, who reported that a (relatively low) critical mass of simultaneous atomic explosions in a band around the northern hemisphere would be sufficient to set off a "nuclear winter" that would block out the sunshine for decades, extinguishing most animal and plant species. Peace activist John Somerville coined a chilling new term: omnicide; today we would call it an E.L.E.: an extinction-level event. Others call it "planetary suicide" in recognition that since humanity is the intelligence of life, this extinction would be Earth's life committing suicide.

Since the end of the Cold War there has been a general relaxation of the nuclear terror that had dominated the world's fears for so long. But today those fears are being rekindled by nuclear weapons development and grave warnings in North Korea, as well as ongoing tensions involving regional nuclear powers such as India, Pakistan, China, and Israel.

Yet war is not a prerequisite for nuclear catastrophe. *Command and Control*, the film version of Eric Schlosser's book of the same name, tells

> The long-hidden story of a deadly 1980 accident at a Titan II missile complex in Damascus, Arkansas [and] exposes the terrifying truth about the management of America's nuclear arsenal, [showing] what can happen when weapons built to protect us threaten to destroy us.

That "deadly accident" ended in an explosion of liquid rocket fuel that killed several people and hurled a hydrogen bomb through the air, burying itself in the ground almost two kilometers away. It seems more a miracle than anything else that it did not detonate; absent that miracle, Schlosser states that over four hundred square miles of the surrounding lands would have been obliterated, and deadly radioactive fallout could have contaminated at least three states. Schlosser's book recounts a chilling series of such accidents, making it clear that the likelihood of a world-altering nuclear detonation is no less likely than it ever has been. (As this is being written, *The Bulletin of the Atomic Scientists* has positioned the hands of its doomsday clock as close to midnight as it ever has been.) How any civilization could recover from such an event is unknown. What seems clear is that the stocks of nuclear weapons capable of being launched by

Table 3. Pillars of the MegaThreat

Converging, interacting regional and planetary threats acting as a single planetary threat system: *Disaster Multipliers*
• CLIMATE DISRUPTION ("underlying stressor")
• POPULATION BOMB: explosive growth in developing world
• MASS EXTINCTION of terrestrial, marine, and avian species
• Habitat destruction
• Environmental degradation, pollution
• Depletion of natural resources, especially fossil fuels
Multiplied and accelerated by technology

a handful of men easily fit the definition of the E.L.E. shock that could cascade into a general collapse and thence a mass extinction.

From the discussion so far it seems reasonable to highlight the pillars forming the core of the MegaThreat: radical overpopulation, nuclear war, and climate change. Each of these is bound to others, interacting with them and multiplying the threats they pose (see Table 3).

What is of special note is how easily international cooperation and environmental awareness could bring these factors under control and even reverse the doomsday clock: via change of diet, reforestation, restoration of natural habitat, reliance on renewable power, implementation of cap-and-trade systems, factoring carbon footprint into transportation and lifestyle costs, mutually assured demilitarization, and elementary population control measures—beginning with the empowerment of women as to their reproductive and economic lives. If so, then the question arises: why so blind?

There is yet another threat—perhaps the source of all the threats, so critical, so central, yet so overlooked that the effect of its unmasking cannot be anticipated. That source threat is human desire, instrumentalized by technology in a way that gives rise to a fundamentally toxic self-concept of what it means to be human. Desire is the experiential equivalent of physical gravity; just as gravitational fields distort our ability to view whatever astronomical sights are on the other side of that gravitational lens, fields of desire distort and obscure our view of that which is factually the case and what should be done about it—what in Silicon Valley is called a "reality distortion field" when a high executive refuses to let reality thwart his desire for progress and profit. Arrayed against a background of the persistent human preference for denial, desire screens out the imperative to make fundamental changes that effectively respond to reality. There is massive denial as to the scale of the MegaThreat and the urgency of addressing its constituent dangers immediately via a planet-wide program, and massive resistance to ameliorating the pillars of the MegaThreat by extending the Paris Accords to include measures to collapse the human population,

protect other species, abolish nuclear weapons, transfer resources from military uses to disaster recovery and infrastructure resilience, and motivate humanity as a whole to make the individual and collective lifestyle changes required to mitigate the worsening consequences of climate change.

There is an understandable preference for focusing on perils in the foreground that we can deal with immediately. Imagine you are on a cruise ship, and along with the activities aboard, a group forms to focus on how the engine crew is underpaid, how the third-class passengers are underprivileged, how the food is underprepared. . . . Someone keeps pointing over the side toward a looming presence, but hardly any attention is paid. Now imagine that you are aboard the Titanic. Like the tip of the iceberg on the horizon, the MegaThreat seems far off and thus distorted, obscure, a mirage in the darkening mist. That short-sighted resistance to accepting and preparing for the consequences of the unsustainability of the present civilization reaches its zenith when it comes to the underlying base of the MegaThreat: the Human Bloom.

The Human Project and the Human Bloom

Don't beg anyone to board the Ark.
Just keep building and
let everyone know the rain is coming.
– Meme slogan posted by a Jehovah's Witness.
www.pinterest.com/pin/411586853428024301

I wanna know, have you ever seen the rain,
Comin' down on a sunny day?
– John Fogerty, "Have You Ever Seen the Rain?" (Fogerty 1970)

The term "project" usually implies a planned, deliberately organized effort expressing intention and comprehension, but sometimes those involved in an organized effort are oblivious to what they are devoting themselves. Soldiers in battle provide an example. A mother wolf giving birth is deep into a project she cannot comprehend. In Genesis, Noah is told to build an ark and given the necessary specifications, and he initiates that huge project without being told why or specifically how the project is to proceed. As one step is completed, he is given instructions for just the next step, and so on until he passes through the Flood and its diluvial aftermath and is guided safely to dry land.

That idea of a project as an organized effort in which the participants do not comprehend its purpose can be applied in an even more fundamental way to life itself. From life's thoroughly mysterious beginnings on Earth 3.5 billion years ago, the dynamics of evolution produced a regimen favoring the life forms equipped to survive and flourish under whatever conditions obtained. This is the Life Project. The life forms that covered the planet for three billion of those years were unicellular methane-breathers

obliviously competing for ecological purchase and sustenance. We do not yet know how rare it may be for a planet to become the platform for the Life Project, but it is certain that Earth has been transformed from a great wet rock into the platform for a history in which the creation, sustenance, and fate of life have become the narrative of this planet.

The evolutionary dynamic eventually produces complexity, starting a positive feedback loop that becomes a chain reaction. That process repurposed the Life Project to host the Animal Project, bringing into the story the sensations, emotions, expectations, improvisations, and intentions of animality we encounter especially in more complex mammals, along with at least an inkling of the purpose to survive, to be fruitful and multiply, to find companionship, and to make a home and a life from what is at hand.

At some point the greater complexity exploding from evolutionary processes yielded intellectual capacities that exceed the limits we ascribe to our fellow primates. The Animal Project was upgraded with genuine intention, dawning comprehension (sometimes expressed powerfully in mythic forms), aesthetic sensibilities, representations and abstractions, and the secondary extension of our very selves into the material world—primarily via our bodies, secondarily via the tools by which we extend the reach and power of those bodies, and tertiarily via the ways we instantiate relations that transcend physicality. Thus, the Animal Project becomes the host for the Human Project.

Yet for all of its quantitative superlatives, so far the history of the Human Project on this planet has been an ever more complexified, abstracted continuation of the Animal Project, just as the Animal Project is derived from the Life Project. In each case, the story is mainly about a semiconscious process of self-aggrandizing predation and defense, propagation, production, and consumption held in check by scarcity and interspecies competition. Science fiction author Robert Sawyer, in the Canadian documentary "2001 and Beyond" about the Stanley Kubrick film *2001: A Space Odyssey*, saw this in the iconic scene in which a thigh bone weapon hurled into the sky by a proto-human ancestor is suddenly overlaid by a present-day nuclear weapons platform orbiting in space: "What we see is not how far we've leaped ahead. What we see is that today, '2001', and four million years ago on the African veldt, it's exactly the same—the power of mankind is the power of its weapons. It's a continuation, not a discontinuity in that jump" (Sawyer 2001).

In the Human Project, the rudimentary tools of the Animal Project—sticks, stones, elementary techniques, and a rudimentary ability to innovate in their uses—are elaborated into tools of exquisite forms and uses, along with increasingly elaborate techniques, with tools and techniques fusing into technologies. The Human Project employs its agents' greater brain power to enact the Animal Project's purpose to survive and flourish in

what can be highly symbolic ways instantiating abstract ideologies and ideas of ethnic identity. Meanwhile science and technology seeks to make the Human Project's purpose be about how to transcend all physical limits, including mortality itself, to pursue what is imagined tragically to be its true project: "to become as gods":

> And the serpent said to the woman, "You shall not surely die: for God knows that on the day you eat thereof, then your eyes shall be opened, and you shall become as gods, knowing good and evil." (Genesis 3:4-5)

Age after age, the Human Project has circled endlessly around that empty promise, caught by collective desire between those two radically contradictory goals: the animal imperative to survive and flourish by cooperation and aggression using any available means, and the pursuit of what amounts to divinity via the powers of the human mind multiplied by technology's supremely seductive promise of omniscience, omnipresence, omnipotence, and immortality.

Darwin's Pond

A simple case of the Life Project, which serves as an analogy to how the Human Project is turning out, can be seen in the balanced ecology of a farm pond. (To differentiate it from Walden pond, call it Darwin's pond). Its unclouded waters, perfect for hydrophilic life, support millions of individual beings from thousands of species, energized by sunlight. Each being struggles to survive and flourish, with no awareness of the consequences to the delicate interdependence through which its watery commonwealth is sustained.

But one day that balance is disrupted by an excess of nutrients flowing in—perhaps effluent running off an overfertilized field. Given the means to fuel its flourishing, the algae in the pond begin what is called an algal bloom, digesting the nutrients and supplying sustenance to the many other species. The pool turns bright, murky green, supercharged with seething life. But the colony of algae, mindless as it is, cannot constrain its blooming. With a surfeit of nourishment, the algae soon exhaust the oxygen in the pond. At last comes the "die-off": the pond is hypoxic and the myriad beings suffocate together. The decaying matter consumes whatever traces of oxygen are left; the detritus descends to the bottom; and the now-lifeless pond is left in a state of clarified stasis.

Like Darwin's pond, human civilization is blooming as never before, thanks to the inflow of plentiful fossil-derived energy, the ready availability of minerals and other resources, and the development of technology to amplify the efforts made in pursuit of the goal carried over from the Animal Project: to survive and maximally flourish individually, in kinship groups, and in abstract groupings such as nations and ideologies.

(The idea of the MegaThreat includes the realization that those favorable conditions are ending just at the time when climate change and other threats are most seriously stressing civilization.) The Human Bloom thus has the galvanizing effect that techno-prophet Buckminster Fuller ([1938]1973) named "synergy": a breakthrough in one area enables advances in others such that the whole becomes more than the sum of its parts.

Science empowers technology empowers economies empowers cultures empowers political change . . . a true positive feedback loop producing the outcome of human flourishing. Compared to prior ages, the Human Bloom has led to cultural and intellectual flowering, increasing technical sophistication, enriching economic development, abundant food supplies, and the expansion of often ruthlessly imposed empires that at least provided relative political stability. These trends combined to support the explosion of human population and the conquest of natural competitors, all enabled by the triumphs of humanity over its mortal enemies: endemic starvation, pervasive conflict, untreatable pandemics, predator species, superstitious ignorance, and capricious tyranny.

When we contemplate all that science has already accomplished, how emerging technologies give us ever more god-like powers, how economic and political systems operate almost magically across the globalizing system, how institutions and individuals struggle to balance proprietary profit with moral transparency, and how dazzled we are by the products of the artists, musicians, dancers, producers, and all the angelic legions of "cultural workers" enriching our experience—when we contemplate the soaring, accelerating wonder of it all, then we truly have some grasp of the glories of the Human Bloom.

The Human Project has so far depended on consuming natural resources that were assumed to be, practically speaking, inexhaustible and essentially free. The religiously bolstered conservative practices and constraints of traditional cultures have been supplanted as part of modernist cultural imperialism that seizes energy resources and other exploitable resources accumulated over thousands of millennia to exploit them for profit, exhausting them in a geological flash over mere tens of decades. However inequitable that flourishing has been so far, and however, heedless its cost to the other denizens of Earth, the global civilization of the Human Bloom is regarded as the pinnacle of human intelligence, and the idea that it must undergo a fundamental transition to a truly sustainable state constrained within an "era of limits" is barely on the horizon of the public mind. As the algae colony blooming in a pond takes all other pond life with it as it suffocates itself, the Human Bloom is bringing on a natural, social, cultural, political, military, health catastrophe, previously experienced only on a regional scale during wars and natural disasters, and an extinction-level event not experienced planet-wide for at least seventy-five millennia (see Figure 2). Because the cause of the extinction is human activity, and

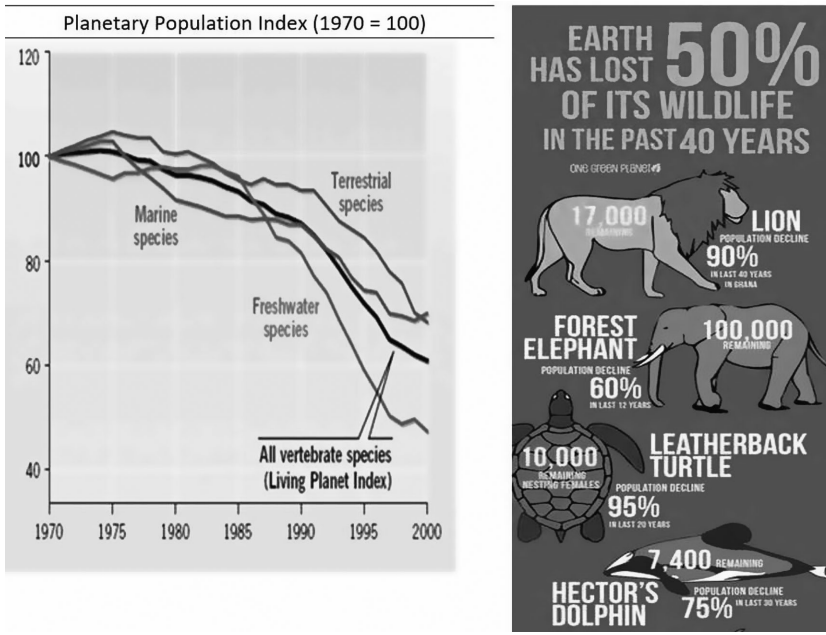

Figure 2. World Wide Fund for Nature, "Planetary Population Index", wwf.panda.org, and UNEP World Conservation Monitoring Centre, "Earth has lost 50% of its wildlife."

because humanity is an outcome of life itself, this amounts to the suicide of life itself. Thus "we are caught in the Devil's bargain," trapped in the schizophrenic insanity of the Human Project: *we are the crown of creation, and at the same time life's terminal cancer*.

Where the Human Bloom, the Human Project, and the MegaThreat converge is undoubtedly amidst the population explosion, a term popularized by Paul Ehrlich, author of *The Population Bomb* (1968). The exponential increase in the size, reach, and impact of the human population is the consequence of many truly marvelous advances in human health and well-being, but is also the reason for outstripping the planetary carrying capacity by nearly an order of magnitude, while depriving millions of species of the habitat they require to exist at all. By definition, overpopulation occurs when the ecological footprint of a population of any species located in a particular place exceeds the carrying capacity of the territory occupied by that population.

Understanding the exponential curve that maps population growth during the Human Bloom is the key to appreciating all that follows, because that same curve maps many other trends that are determined by population and that determine the impact of its ruinous multiplication (see Figure 3). The curve tells us that a hundred thousand years of struggle was required

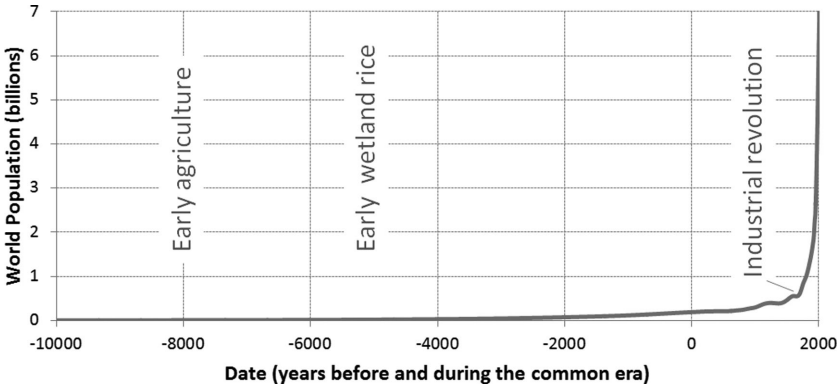

Figure 3. World Population growth over the past 12,000 years (Earle 2016).

for the worldwide human population to reach a million, growing arithmetically with occasional spikes and disastrous declines. Within only another twelve thousand years the estimated human population had quadrupled to four million—less than half of the current population of New York City. As the most recent ice age came to an end and the climate moderated to favor a planetary bloom, that number began to increase at a percentage that looks modest on the graph, but was more than arithmetic. The doubling of the population from four to eight million—a tremendous increase—required only a twelfth of that time: a thousand years. The population tripled again during the onset of the historical era, reaching 250 million by the end of the so-called Dark Ages. It doubled over the succeeding seven centuries, reaching that milestone at about the time Europeans began exploring the Americas in earnest. Only 250 years later it had doubled again, reaching a billion human beings at the beginning of the nineteenth century—arguably the Earth's maximum sustainable carrying capacity. To double that number required just another century. "Things sped up considerably in the middle of the twentieth century. The fastest doubling of the world population happened between 1950 and 1987: a doubling from 2.5 to 5 billion people in just thirty-seven years—the population doubled within a little more than one generation. This period was marked by a peak population growth of 2.1 percent in 1962" (Roser and Ortiz-Ospina 2018).

Whereas it once took a thousand years to add four million human beings to the population, that number is now added every two or three weeks. As this is being written, the human population is heading toward eight billion. Though the rate of increase is declining in nations where women have control over their reproductive lives, the advances that support this population explosion continue. The population has soared century after century despite wars, pogroms, plagues, natural disasters, ignorance, high

infant and maternal mortality, and everyday tragedies that have truncated families, tribes, and ethnic groups.

Given the sevenfold increase in the global human population over the past two centuries, vastly exceeding the planetary carrying capacity, the only way to sustain that population is to borrow from the future: to mine ancient water tables, to pump and shake every last drop and whiff of fossil fuels from the Earth's crust, to drag entire fish populations from the seas, and in general to consume resources far more rapidly than they can conceivably be replenished. Thus, the glories of the Human Bloom betoken the exhaustion of the rapidly expiring resources that took millions of years to develop, now being depleted in a geological flash.

The Culmination and the Catalyst

You can hold on steady, try to be ready,
but everybody's gonna get wet;
don't think it won't happen
just because it hasn't happened yet.
– Jackson Browne, "Before the Deluge" (Browne 1974)

The metanarrative that leads to the Culmination, when history reaches its fulfillment one way or the other, begins in the converging threats, led by, but by no means limited to, climate change. Those threats interact and combine to create a negative synergy of threats (the MegaThreat), exerting stress on the interdependent systems of civilization through an unending sequence of natural disasters and human excesses, until only a catalyst is needed to shock the system and set off a cascading collapse. That catalyst can be the shock of a natural disaster or human destructiveness, both easy to fear but somewhat random and hard to predict in advance.

A consideration of basic principles of the current state of technological civilization suggests that the catalyzing effect can be expected in the form of a cascading technological failure, of which we get previews from time to time when the grid supplying power and internet access is disrupted (and we learn how dependent we are on both). Such a failure could result from a large number of factors, including infrastructure damage caused by natural disasters and human error, sabotage and larceny perpetrated on a massive scale by criminal computer hackers, the loss of essential data held in the centralized repositories of financial, governmental, and other institutional guardians, and even sunspots and solar flares, which in the past have blown out transformers and power grids. The US Defense Department has demonstrated weaponized drones equipped to evade detection while distributing electro magnetic pulse over a wide expanse, destroying the intricate structures of the microchips on which our entire society depends.

Just a moment's reflection will remind us how dependent each individual, each institution, each government has become on reliable, secure power

grids and data networks. Look ahead a few years and imagine the entire transportation complex, including every self-driving car on the interstate highways, coming to a halt as a minor failure somewhere in this incomprehensibly complex system of systems cascades from one central point to another, taking all the interconnected nodes down along the way. Yet each time a report is issued that a major data pool (say, a hundred million customer records from a major internet provider) has been breached and stolen, we are reminded that security and redundancy frequently lag behind the constant upgrades required to stay current with the rest of the internet.

The probability that a cascading failure of technological systems could deliver the shock that sets off a global collapse and thence a mass extinction is high because of the very nature of technology itself. Just as evolution bends toward increasing anatomical (and especially neurological) complexity, technological development strives toward ever-increasing efficiency, which translates into increased capacity, accuracy, effectiveness, and thus profits for its owners.

The aim of technology has been expressed by Buckminster Fuller as *ephemeralization.* He explicated that term as follows: technology is the quest "to do more and more with less and less"—in other words, to optimize efficiency by maximizing potency while minimizing instrumentality (Fuller [1938]1973).

The most extreme examples of ephemeralized systems, and thus the ones most subject to catastrophic disruption, are probably financial in nature. After the sudden stock market crash ("flash crash") in 1987, one financier said that on that day they learned that they had not a collection of separate markets, but rather a single market with thirty thousand terminals—integrated, interactive, and interdependent. Three decades later, thanks to the internet, we must multiply that count of terminals by a hundred thousand (billions of terminals, including potentially a stock market access point in everyone's pocket), and then we must add categories of money that have no physical embodiment whatsoever, such as credit default swaps, Apple Pay, and bitcoin. How will such extreme degrees of ephemerality serve us when the failure of some interdependent system cascades into the medium that enables the population to measure and exchange value?

Combining Fuller's insight with the many exponential curves that illustrate the unsustainable advance of technological development leads us to what can be considered the technological *telos*: the logical extension of "to do more and more with less and less" is "to do virtually everything with virtually nothing"—in other words, to transcend physical limits, neutralize the limitations of time and distance, and thus engage with finitude itself. To that end technology delivers ever more dense and compact wireless systems augmented by artificial intelligence. Month after month, year after year since the mid-1960s, Moore's Law has proven true. The law, enunciated by Intel founder Gordon Moore, has been generalized to

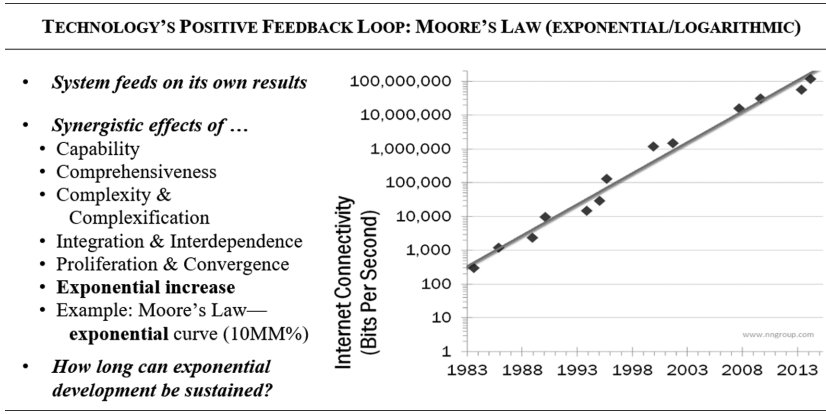

Figure 4. Moore's Law (graph by nngroup.com).

predict that computing power will double every two years, as the price of that power similarly decreases and the ease of accessing it increases. As this exponential curve soars, the exponential curves of technical progress in general more and more closely approach the vertical axis—the unreachable asymptote that charts the quest to attain omnipotence, omniscience, and omnipresence through the minimization of physical instrumentality (see Figure 4).

Underlying this pursuit is the unspoken quest of the Human Project that both defines and dooms it: that one's will would become limitlessly, instantly actualized. This is the technical way of expressing the choice of Adam: *to be as gods*. Thus, technology—the human ways and means of mastering the physical world and overcoming its limitations—carries out the human tragic flaw, in its dedication to the same unattainable goal chosen by Adam in Eden: to transcend mortality—to be divine. Yet, beings who physically are animals reliant on physical instrumentality of whatever kind are incontrovertibly mortal. The ancient warnings—the Tower of Babel in the Hebrew Bible (Genesis 11); Jesus's parable of the eye of the needle (Matthew 19); the myths of Sisyphus, Prometheus, Orpheus, Gilgamesh, and so many more; and the recent avalanche of apocalyptic fiction and film,[1]—all join in one voice through the ages to prophesy that the Human Project cannot be sustained and thus must fail, taking with it this towering civilization and the crumbling paradigm at its base and core.

The Culmination and the Earth Finitude of History

Because so many longstanding trends are now converging, interacting, and reaching their logical conclusion within the same constricted time frame, one can venture to hypothesize that the present cultural definitions (postmodern, modern, Enlightenment . . .) are passing away because their

characteristics take no heed of the exponential speeding up of historical trends and threats, and also no heed of the possible finitude of history. The definition of the Culmination addresses those inaccuracies. The contemporary cultural era can justifiably be called the Culmination era of cultural history, set within the Anthropocene geological epoch—the time defined by the effects of human activity on the biosphere and climate, and thus a time that could far exceed the actual presence of human culture and humanity itself on Earth. The Culmination historical era encompasses and supersedes all prior cultural eras, most recently the postmodern, as the postmodern encompassed and superseded the modern, and so on. The reign of each era has been briefer than its predecessor, again tracing that exponential curve: an era of millennia giving way to eras over centuries, and recently over just decades, and now . . . years. This repositioning emphasizes the importance of recentering the primary concerns of every sphere of human activity around the rapidly coalescing reality of the Culmination, when nearly every megatrend of modern times is likely to converge with every peril of the MegaThreat, all colliding in one cacophonous derailment.

The Culmination has a narrative structure with a beginning, middle, and end that somewhat parallel the stages of mass extinction. First, there is a general flowering in accordance with climatic conditions; in our case, the Human Bloom. Then, there is an extended period during which survival conditions are put under increasing stress and strain, sapping the resilience and reserves of the ecological system on which existence depends; we have entered that period, and public attitudes and government policies are beginning to reflect that. Then, there is the sudden shock event that exhausts whatever resilience remains, acting as the catalyst to bring about the collapse of the ecological balance required for existence. Finally, there is the long resounding quiescence as that which once dominated the scene fades into oblivion. The intertwined threats form themselves into the evolutionary filter known metaphorically as a bottleneck (either of population or of genetic diversity), through which only a remnant of individuals, kinship groups, and species is able to pass.

In a mass extinction, the number of species able to negotiate that narrow passage can be small; as reported in *The Sixth Mass Extinction*, the preeminent entomologist E. O. Wilson was able to calculate that one land species is forever lost about every hundred minutes; fourteen every day; five thousand every year—mostly arthropods (insects, spiders, centipedes), mostly in the tropics, and most before they are ever discovered (Kolbert 2014, 186). "Here's another way to express" the effects of mass extinction over the coming three decades: "Look around you. Kill half of what you see. . . . That's what we could be talking about" (Kolbert 2014, 186).

Chris Thomas, a University of York biologist, determined recently that within the next three decades the number of globally extinct species could range as high as one-third of all species. The consensus estimate of his team

was closer to a quarter, but it is time to take into account the perennial underestimation of the relevant factors, starting with the rapidity and intensity of the planetary warming itself. He reports "a high likelihood that climate change on its own could generate a level of extinction on par with, or exceeding, the slightly 'lesser' extinction events" of life's history on Earth (quoted in Kolbert 2014, 166–67).

What about our mammalian and aviary compatriots? What of the fish that provide protein to most humans? Some species are likely to escape extinction according to the extent to which they have the capacity to sustain extremes of desiccation, pain, and habitat degradation. Many will not. To imagine a world with so many sentient beings gone forever is excruciating beyond measure—even though only the surviving humans will have the mind to "understand a thing so simple and so huge" (Browne 1974).

These bottleneck dynamics can befall a single species (dodo, passenger pigeon) or a class of them (large North American mammals) or an entire planet's complement (pollinator insects, dinosaurs). As much as we may resist the idea, extinction is a regular and normal occurrence in nature as ecological conditions and external events shift. What makes a succession of "regular, normal" extinctions into a mass extinction is the pace; and at present extinctions are occurring at a rate thousands of times greater than "normal," affecting entire regional ecosystems and in some cases even the entire planetary ecosystem—the theater of mass extinction (Kolbert 2014, 166–68).

Perhaps the most vivid artistic representation of the dynamics of the Culmination can be heard at the very end of the recording regarded by many critics as the most important musical recording of the past century, *Sergeant Pepper's Lonely Hearts Club Band* by The Beatles (1967)—the stressful, cacophonous build-up, the inescapable crescendo, the drawn-out rising note denouement—the soundtrack of the end of what we are accustomed to calling history. "I'd love to turn you on . . . " That final cut on *Sergeant Pepper's* prophetically replicates the experience of contemplating the multiple trends soaring chaotically out of control—global warming, climate disruption, natural disasters, technological frangibility, resource exhaustion, population, pollution, and so on—until they hit their limits, like the overnourished algae in Darwin's pond as it reaches its crash point. The rising note coda, extending on and on, represents the peace following the crisis—it is for us to determine whether that be the peace of the dead or the peace of awakened contemplation.

There is a certain logic to the assertion that the course of events that has led to the culmination of technological civilization, and to the human freedom to break free of that predetermined course to choose between planetary cataclysm or planetary awakening, is baked into the nature of the universe. With the appearance of life came the onset of evolution, and eventually an evolutionary preference for complexity, leading directly to the

appearance of vertebrates, then mammals and avians, then primates, then humanity; and with humanity, tools, systems of tools, and technological civilization; and with that civilization, the MegaThreat, and the promise of planetary awakening. If each of those steps arose from the interplay of random and determined forces, and then from the human quest to transcend mortality and physical limits, then to that extent the history that brings humanity to this ultimate choice was predetermined from the beginning of time.

The tragic flaw of humanity, that supreme hubris, that schizophrenic self-concept that humanity has proven to be both the crown and the cancer of creation—that mortal failing from which has come the freedom to choose our fate—is unavoidably embedded in the Human Project. That very flaw, which has put civilization in peril of implosion, and which has exposed the planetary community to the supreme peril of mass extinction, is latent in the Animal Project, in its determination to survive and flourish above all; and has been in fact inevitable from that mysterious moment when the unfurling of livingkind that leads to us was first seeded on Earth, until this decisive present moment.

To the extent that life was predetermined to arise on this gloriously Goldilocks planet, then to that extent the entire history culminating in the onrushing MegaThreat is nothing more than the inevitable manifestation of the same laws and forces that have produced the cosmos in the first place. The Human Bloom and its fearsome MegaThreat is not a crime committed by an evil, defective species but rather a natural outcome of the active intelligence that has arisen from cosmic, biological, and cultural evolution, combined with the oblivious drive to thrive (in the basest sense) heedless of the consequences.

For the past three centuries, the pace of progress toward this *telos* has been accelerating exponentially in a wide spectrum of human endeavors, all of which have been converging toward a common point. So far, this is the chief contribution that human intelligence has made to the Life Project. A breakthrough in one area synergistically facilitates leaps forward in others: science empowers technology empowers the economy empowers culture empowers political change . . . all toward the flourishing of those who maximally benefit from those powers. Now we are on the verge of experiencing "the age of consequences" when that flaw brings down the tower of human achievement that was supposed to get us to heaven, fatally disrupting both the Life Project and the Human Project (see Figure 5).

That underlying principle of the Human Project as we have known it so far—the quest to transcend the very mortality that makes us human—was vividly illustrated in the 1955 science fiction film *Forbidden Planet,* in which an advanced race, now extinct, is found to have succeeded in developing the planet-wide capacity to materialize whatever one desired without any visible apparatus to make that happen. What they did not

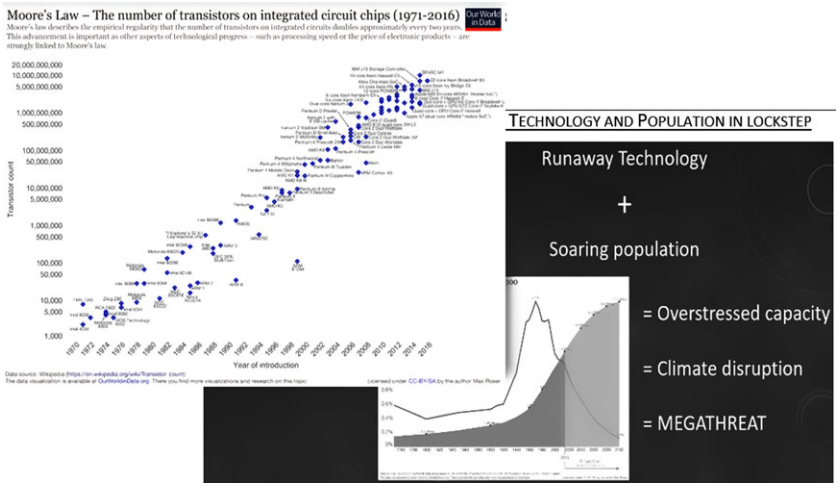

Figure 5. Note that the Moore's Law graph is logarithmic (advancing by powers of ten) while the population growth graph is arithmetic. Population is a rising wave; technology is a tsunami. (Upper graph licensed by Max Roser under CC-BY-SA. Data source: Wikipedia). [Color figure can be viewed at wileyonlinelibrary.com]

anticipate was that this divine power would remain activated even during sleep, when "the monster of the id" could materialize and wreak havoc.

For us today the lesson is this: the accelerating progress toward ever more powerful, ever more ephemeral instrumentality—more and more easily accessed for less and less hassle and expense—puts greater and greater power into more and more hands, with a greater and greater range of motivations. Automatic weapons fired by a lone "shooter" into a festival crowd or a school classroom, drones buzzing over airports and stadiums, airplanes turned into giant bombs, the internet being used to shut down power grids and turn financial systems inside out—how many more examples come easily to mind? And how easily does one disruption or disaster cascade into adjacent systems, as the cataclysmic context of climate change drains away their resilience?

Crucible, Cataclysm, Chasm, Commonwealth

***Leader**: Now please, tell me why you have come to our planet.*
***Klaatu**:* YOUR *planet?!!*
***Leader**: Yes. This is our planet.*
***Klaatu**: No. It is* NOT.
—*The Day the Earth Stood Still* (Boardman 2008)

In scientific terminology, a crucible is a (traditionally) ceramic vessel in which substances can be tested at very high temperatures to determine

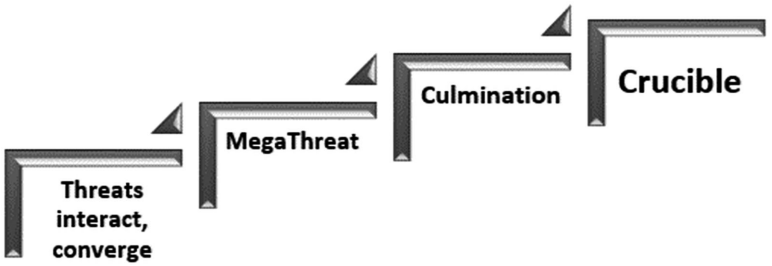

Figure 6. Four stages lead to the crucible of the present civilization.

their properties. Metaphorically it means a critically stressful situation that reveals the character of that which is under trial. Applied to this discussion, it designates the stage of the Culmination into which the present civilization is about to plunge headlong, when the MegaThreat will either be faced, or misunderstood, or denied, when appropriate responses to save humanity from itself and the other animals from humanity will be discussed and either implemented or resisted, or both; and when humanity's collective self-concept will be resolved to embrace planetary responsibilities or to dodge those responsibilities to continue the present quest to survive and flourish until Culmination resolves into collapse (see Figure 6).

This means that the Culmination metanarrative, which puts the human story in the same context as climate change, presents in its climax a choice, and possibly a kind of Armageddon showdown between those on one side who understand the need to choose a new, sustainable path, and those on the other side who choose to remain in denial, committed to a futile insistence on returning to an imaginary past—a past before the need to respond to the MegaThreat was recognized.

The Cataclysm

> [T]he situation has deteriorated. Not only the survival of open society, but the survival of our entire civilization is at stake. . . . Mankind's ability to harness the forces of nature, both for constructive and destructive purposes, continues to grow, while our ability to govern ourselves properly fluctuates, and it is now at a low ebb. (Soros 2018)

This divergence of interests and "which side are you on" polarization correlates with a fork in the metanarrative's plot line, based on how successfully those on the awakened side can respond to the MegaThreat versus how successfully the forces of denial can bring on environmental, social, political, military, and economic collapse. To differentiate this ultimate failure of intelligence from lesser disasters, I suggest that the term "Cataclysm" be reserved, in the same way that "Holocaust" is reserved to

name the Nazi genocide perpetrated against the Jews and others found to be undesirable by the Third Reich.

(1) The Cataclysm begins when the public begins to associate with climate change the repeated natural disasters that are greater and more frequent than would otherwise be expected for the region in which they occur. Nations and peoples sustain bankrupting costs of relocating and hardening infrastructure, restoring devastated areas, and preparing for disastrous repetitions. Large regions, such as low-lying lands and overheated tropics, must be largely abandoned. Other consequences of the MegaThreat severely tax the resources and resilience of civilization. Political pressure builds for concerted action to respond to the MegaThreat, resulting in resistance from those whose power and privilege depend on the existing order. The resulting polarization manifests as increasingly polarized political discord and popular revolt as the progression of disasters continues.

(2) It builds when those natural disasters (which may be ignited by humans, such as wildfires) are associated with other negative environmental and political threats, such as the exhaustion of fisheries, the waning responses of emergency agencies, or the political-military-social effects of drought, as in Syria; in other words, the idea of the MegaThreat and the need for a fundamental top-down and bottom-up restructuring of civilization becomes a public issue.

(3) The Cataclysm continues in ways that elicit ultimatums and incite conflicts among those directly affected and those who use capacities to respond to their needs have been exhausted.

(4) A general breakdown begins, presaged by signs that the fabric of the general agreement concerning human relationships may be fraying beyond repair. Signs include random mass murders, isolated acts of terrorism, extreme road rage, more frequent instances of family violence and abuse, rising gang violence, and the formation of extremist organizations promoting noxious values derived from an imaginary lost era.

(5) The breakdown escalates, disrupting supply chains, leading to mass looting and rioting, draconian police and military responses, general civil breakdown, health crises (pandemics and exhaustion of antibiotics), famine, contamination, infestations, weather exposure, and the lack of personnel, facilities, and supplies to respond to emergencies.

(6) The order that keeps advanced weapons out of the hands of bad actors deteriorates, leading to massive proliferation, threats to launch, and limited international nuclear exchanges.

(7) The world order collapses into smaller and smaller units dominated by "warlords."

(8) Resources are stripped away and consumed without regard for the future.

(9) A positive feedback loop begins, sucking the remains of civilization into a dark maw. The four horsemen—famine, pestilence, disease, and war—ride unrestrained over the ruins.

Rather than continue, it is worth noting that this disastrous litany has already occurred in part, is now occurring, in the nations and territories referred to as "failed states" such as Yemen and Sudan, and formerly in Rwanda and regions dominated by pseudo-Islamic terrorists, and even for extended periods in the possessions of developed nations, such as the US possessions of Puerto Rico and the US Virgin Islands. When climate change produces a succession of disasters in the same areas with no end in sight, those areas are abandoned and not reconstructed. Imagine that happening on a global scale.

The Chasm

The idea of the Chasm is that humanity is spared extinction, but the general collapse of civilization, or its regression to more primitive states (feudalism, tribalism) in which hard-won social progress of the modern era is forfeit, persists for years and decades, bringing about a dark age far worse than that which followed the gradual withdrawal of Roman rule. The Chasm follows a period of worldwide destruction and predation far worse than that which was suffered in medieval times, with a nightmarish descent into barbarism, accompanied by the effects of mass extinction described in *The Sixth Extinction*. The plagues such as those that blighted the Middle Ages would not be excluded from the darkness. The human population would crash along with its productive capacity.

Several aspects would tend to distinguish the Chasm from past collapses. First, the descent into darkness could be much more rapid than in the past because it would have available all of the channels of international relations, travel, and knowledge. A rogue group could get to its destination faster, and know more about it, than would have been possible in the past. Second, recovery would be hindered by the very exhaustion of resources that helped precipitate the Cataclysm. The fossil fuels, metals, minerals, and other resources that were once readily available would be difficult to come by. The waters and skies could be devoid of marine and avian life for many years. The apparatus and chemicals that made it possible to form the parts to maintain vehicles and buildings would be inaccessible due to distance or overuse. The incessant conflicts engendered by competition for resources and territory would disrupt efforts to rebuild and recover.

Third, the deepest imaginable posttraumatic stress disorder would infect the survivors, who would require some ways to blot out the realization that human activity is responsible for the devastation of the entire planet. The combination of suffering, deprivation, demoralization, and anger might be too much for many to bear. The cultural soil for toxic fundamentalist ideologies and cults would be fertile indeed.

Human Purpose and the New Project

And when the sand was gone and the time arrived,
in the naked dawn only a few survived,
and in attempts to understand a thing
so simple and so huge,
believed that they were meant to live
after the Deluge.

– Jackson Browne, "Before the Deluge" (Browne 1974)

Every great metanarrative presents its climax and denouement as its culture's crucible, ending in a choice. In the Book of Exodus it is written that after the climactic crossing through the parted waters, Moses ended his service to his people and his God in these words: "Today I have set before you life and death, blessing and curse. Therefore choose life, that you and your progeny may live."

The metanarrative that begins at the Big Bang and culminates in our own time can be read as great tragedy of the Greek kind, in which fate determines the outcome as the characters act predictably according to their natures and positions. "The trouble with normal is, it always gets worse" (Cockburn 1988) and if the situation is allowed to continue drifting toward collapse, a tragic end to the human story seems inevitable, like the Hebrews facing Pharaoh's army, their backs to the sea.

In this metanarrative about "the fate of the Earth," the possibility of planetary choice is a consequence of the evolution of human agency. Humanity has been offered that choice by voices of ancient wisdom for thousands of years: "Therefore choose life." It is the choice to transcend the Animal Project by repurposing the Human Project away from one choice—the inherently pointless striving to survive and flourish, and the inherently irrational rejection of mortality—and toward the alternative: toward a new human purpose. To do so would constitute the New Earth Project, as in "a new Heaven and a new Earth" (Revelation 21).

The lives of those we know well, or our own life, may offer reasons to believe in the New Earth Project. It is a truism among those who treat addiction that those suffering in that hellish state often need to "hit bottom" before their web of denial collapses and opens them up to full participation in a curative twelve-step program. In the same way, it is possible that the forces of denial in a species addicted to an unsustainable way of life will give

way, hopefully in time to avoid the worst of the Crucible and the Chasm. Much social progress has been made in the past two centuries when a cause seemed utterly unrealistic, yet a critical mass of people gathered to advance the demands of the dispossessed and disenfranchised. Those historical examples can provide realistic hope that the rapid communications and social networking that involve many of us in each other's concerns might facilitate the formation of the critical mass required to compel those in power to yield to or lead the transition to a sustainable civilization "while there's still time"—once there is a common understanding as to what that transition actually involves.

That wisdom contains a message whose import is that human intelligence is properly not limitless intelligence to be employed only for the benefit of humankind, but specific kinds of intelligence for the benefit of all life—of *livingkind.* It is in this sense that the Human Project encompasses and exceeds the limits of the Life Project and the Animal Project to become the New Earth Project—exceeds in a very specific way: by implying this: human intelligence has evolved to take on the mission of reconstituting and stewarding the primal harmony that unites all sentient beings, from the DNA we share to the mortal fate we share. And there is a darker implication: that the failure of the Human Project to transcend the Life Project's drive to survive and flourish carries with it the direst consequences for all livingkind.

To translate this into contemporary terms: the evolutionary tendency that favors complexity has added a measure of competent, compassionate intelligence to the biosphere capable of providing necessary and otherwise unavailable services to livingkind, such as protection, conservation, restoration, and in general conditions favorable to flourishing. At its most basic, this simply means taking on the responsibility of ensuring that as many sentient beings as possible, individually and collectively, live to find their fulfillment in livingkind. That measure of intelligence comes in the form of human being—not as the supreme conqueror in the interspecies competition, but rather as the eager steward in service to the planetary commonwealth. For humanity to provide those services is no different from the services provided by the countless other living organisms interacting with their inorganic surroundings as contributors to the self-regulating biological system essential to a hospitable planetary home for life.

Along with technology, human intelligence has developed a deep wisdom documented in scripture and myth, whose ultimate source is obscured in the mists of time. That wisdom, prevailing across many cultures, contains a deeply conservative yet also deeply liberating message:

(1) Intelligence is not only for humanity's use, not for defeating the Animal Project, and not for ravaging the Earth for the benefit of just one species.

(2) Instead, humanity has a planetary purpose, having evolved to serve as the intelligence of all life.

(3) Although the idea of purposefulness is difficult to apply to the evolution of species, there is a clear benefit to life for there to be intelligence directed toward the well-being of the commonwealth of sentient beings, broadly defined—not just mankind, not just humankind, but *livingkind*. The present idea of species would lose its legitimacy, as the recent ideas of race and gender as absolutes have lost theirs. To avoid or at least to mitigate regional and planetary catastrophes, it would be adaptive from an evolutionary perspective to have an intelligent agency capable and empowered to watch over the Earth, to detect the ways in which its regions and communities are vitally threatened, and to serve in the role of the planetary protector or gardener, or (to use a different metaphor) the steward or viceroy of an absent owner. That function requires intelligence—perhaps even more than the degree and kind humanity collectively now possesses.

(4) Consequently, a critical need for the conservation of livingkind on Earth matches up with the distinguishing trait of a certain species: *Homo sapiens*. The need for great intelligence matches up with humanity's intelligence and potential wisdom, whose best interest is served by becoming the planetary conservator as one part of its own existentially critical transition to sustainable ways of living. This depends on redefining humanity in its full inclusiveness no longer as the conqueror species, but rather as the compassionate intelligence of livingkind.

(5) If this match of need and capabilities is adaptive, one could hypothesize that an ecological niche for an intelligent, wise, compassionate species has existed from the beginning; a niche to be filled only upon the culmination that compelled humanity's awakening by a species struggling to be worthy of that niche.

(6) In that sense, there is a kind of truth in the idea that intelligence has evolved for the direct survival and flourishing of the one and only species that possesses it, and now equally for the well-being of the entire biosphere and all its inhabitants.

(7) Thus there is a case to be made for the evolutionary value in a role for humanity to expand its circle of compassionate affinity to include all sentient beings, and all other beings on which sentient beings depend.

Following this logic, there is indeed a choice between the Crucible and the Chasm on one hand, and becoming the Conservator for the Commonwealth of livingkind on the other. And there is now a way to decide what humanity is *for*—what gives human life its cosmic meaning, and what gives our work its planetary purpose. The only way to get beyond

the Life Project's default ascription of supreme value to the drive to survive and flourish is to get beyond selfishness, collective or individual.

> The way out of the deadlock will be found through selflessness. The only alternative which will bring solution will be to stop hating and to love, to stop wanting and to give, to stop domination and to serve. (Baba [1943]2009)

Through this crucible, the animal component of the Human Project—galvanized by technology in an ultimately futile quest to transcend physical limitation—will either continue to decimate the Life Project, or it will energize the New Earth Project in ways that subsume technology within the context of wisdom, to bring a transformation more significant than any since humanity's inception: the long-prophesied Eschaton.

> *Let Creation reveal its secrets by and by,*
> *When the light that's lost within us*
> *Reaches the sky.*
>
> – Jackson Browne, "Before the Deluge" (Browne 1974)

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Note

1. See "List of Apocalyptic Films" at en.wikipedia.org/wiki/list_of_apocalyptic_films. A burgeoning subgenre is "cli-fi," meaning fiction about catastrophic climate change.

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